<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 – 8:00 am</td>
<td>Breakfast Provided/Registration</td>
</tr>
<tr>
<td>8:00 – 8:30 am</td>
<td>Welcome &amp; Overview – David Weismiller, MD, ScM, FAAFP</td>
</tr>
<tr>
<td>8:30 – 9:15 am</td>
<td>Health Promotion &amp; Prevention – David Weismiller, MD, ScM, FAAFP</td>
</tr>
<tr>
<td>9:15 – 9:45 am</td>
<td>Obesity &amp; Metabolic Syndrome – Belinda Vail, MD, FAAFP</td>
</tr>
<tr>
<td>9:45 – 10:15 am</td>
<td>The Major Arthritides – Benjamin Gilmer, MD, MS</td>
</tr>
<tr>
<td>10:15 – 10:30 am</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>10:30 – 10:45 am</td>
<td>Break</td>
</tr>
<tr>
<td>10:45 – 11:15 am</td>
<td>Urologic Problems – Benjamin Gilmer, MD, MS</td>
</tr>
<tr>
<td>11:15 – 11:45 pm</td>
<td>Diabetes – Belinda Vail, MD, FAAFP</td>
</tr>
<tr>
<td>11:45 – 12:15 pm</td>
<td>Endocrine Diseases – Benjamin Gilmer, MD, MS</td>
</tr>
<tr>
<td>12:15 – 12:30 pm</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>12:30 – 1:30 pm</td>
<td>Lunch Provided</td>
</tr>
<tr>
<td>1:30 – 2:00 pm</td>
<td>Common Issues in the Elderly I – Russell Blackwelder, MD, MDiv, CMD</td>
</tr>
<tr>
<td>2:00 – 2:30 pm</td>
<td>Preoperative Examination &amp; Surgical Management – Belinda Vail, MD, FAAFP</td>
</tr>
<tr>
<td>2:30 – 3:00 pm</td>
<td>Common Issues in the Elderly II – Russell Blackwelder, MD, MDiv, CMD</td>
</tr>
<tr>
<td>3:00 – 3:15 pm</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>3:15 – 3:30 pm</td>
<td>Break</td>
</tr>
<tr>
<td>3:30 – 4:00 pm</td>
<td>Acute &amp; Chronic Cognitive Diseases – Russell Blackwelder, MD, MDiv, CMD</td>
</tr>
<tr>
<td>4:00 – 4:30 pm</td>
<td>Abnormal Uterine Bleeding – David Weismiller, MD, ScM, FAAFP</td>
</tr>
<tr>
<td>4:30 – 5:00 pm</td>
<td>Unique Geriatric Pharmacologic Issues – Russell Blackwelder, MD, MDiv, CMD</td>
</tr>
<tr>
<td>5:00 – 5:15 pm</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>5:15 – 6:00 pm</td>
<td>Guide to Exam Preparation (no CME) – David Weismiller, MD, ScM, FAAFP</td>
</tr>
</tbody>
</table>


Course Chair

David Glenn Weismiller, MD, ScM, FAAFP
Professor
Department of Family and Community Medicine
University of Nevada, Las Vegas School of Medicine
david.weismiller@unlv.edu
Course Objectives

• Discuss common clinical problems in family medicine.
• Summarize an evidence-based approach to current advances in the diagnosis and treatment of common clinical problems.
• Demonstrate successful study and test-taking techniques.
SSID: AAFP
Password: aafp2020
Course Information Page

• Board Review Express Course Webpage
  (You received this link – http://www.aafp.org/houston-info via email.)
  − Course Schedule
  − Course Syllabus
  − Audience Engagement System (AES)
  − Live Course Learning Assistant
  − Board Review Self-Study Package
Other Housekeeping

- Badge
- Write your name in your syllabus
- Silence Cell Phones
- Issues/Concerns/Information
  - Material/Exam – Faculty
  - Course – AAFP Staff
• SORT
• Levels of Evidence
• USPSTF

GUIDANCE WITH NOMENCLATURE
Sort

Strength of Recommendation Taxonomy

- **Category A:** Recommendation based on consistent and good-quality patient-oriented evidence.
- **Category B:** Recommendation based on inconsistent or limited-quality patient-oriented evidence.
- **Category C:** Recommendation based on consensus, usual practice, opinion, disease-oriented evidence-based series for studies of diagnosis, treatment, prevention, or screening.
## Levels of Evidence

<table>
<thead>
<tr>
<th>Level</th>
<th>Study Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Meta-analysis of RCT</td>
<td>A statistical analysis that combines or integrates the results of several independent clinical trials considered by the analyst to be &quot;combinable,&quot; usually to the level of re-analyzing the original data; also sometimes called: pooling, quantitative synthesis.</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Systematic review of RCT</td>
<td>Review of a body of data that uses explicit methods to locate primary studies, and explicit criteria to assess their quality.</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>High-quality RCT</td>
<td>Individuals are randomly allocated to a control group and a group who receive a specific intervention. Otherwise the two groups are identical for any significant variables. They are followed up for specific end points.</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Sensitivity and specificity (test)</td>
<td>True positive rates and true negative rates for diagnostic tests.</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Cohort study</td>
<td>Groups of people are selected on the basis of their exposure to a particular agent and followed up for specific outcomes.</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Case control study</td>
<td>&quot;Cases&quot; with the condition is matched with &quot;controls,&quot; and a retrospective analysis used to look for differences between the two groups.</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Cross sectional study</td>
<td>Survey or interview of a sample of the population of interest at one point in time.</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Case report or case series</td>
<td>A report based on a single patient or subject; sometimes collected together into a short series.</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Expert opinion</td>
<td>A consensus of experience from the good and the great.</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Anecdote</td>
<td>A conversation.</td>
</tr>
</tbody>
</table>
# Definitions of USPSTF Recommendation Grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
<th>Suggestion for practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The USPSTF recommends the service; there is high certainty that the net</td>
<td>Offer/provide this service</td>
</tr>
<tr>
<td></td>
<td>benefit (i.e., benefits minus harms) is substantial</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>The USPSTF recommends the service; there is high certainty that the net</td>
<td>Offer/provide service</td>
</tr>
<tr>
<td></td>
<td>benefit is moderate or there is moderate certainty that the benefit is</td>
<td></td>
</tr>
<tr>
<td></td>
<td>moderate to substantial</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>The USPSTF recommends against routinely providing the service; there may</td>
<td>Offer/provide the service only if there are other considerations in support of offering/</td>
</tr>
<tr>
<td></td>
<td>be considerations that support providing the service in an individual</td>
<td>providing the service in an individual patient</td>
</tr>
<tr>
<td></td>
<td>patient; there is moderate or high certainty that the service has no net</td>
<td></td>
</tr>
<tr>
<td></td>
<td>benefit or that the harms outweigh the benefits</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>The USPSTF recommends <strong>against</strong> the service; there is moderate or high</td>
<td>Discourage the use of this service</td>
</tr>
<tr>
<td></td>
<td>certainty that the service has no benefit or that the harms outweigh the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>benefits</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>The USPSTF concludes that the current evidence is insufficient to assess</td>
<td>If offered, patients should understand the uncertainty about the balance of benefits</td>
</tr>
<tr>
<td></td>
<td>the balance of benefits and harms of the service; evidence is lacking, of</td>
<td>and harms</td>
</tr>
<tr>
<td></td>
<td>poor quality, or conflicting, and the balance of benefits and harms cannot be</td>
<td></td>
</tr>
<tr>
<td></td>
<td>determined</td>
<td></td>
</tr>
</tbody>
</table>
Schedule

- Conclude at 6:00 PM today
- Breakfast
  - Provided Wednesday-Saturday – 7:00 AM
- Lunch
  - Provided Wednesday-Friday – 12:30-1:30 PM
- Lectures
  - Wednesday-Friday – 8:00 AM
  - Saturday – 7:30 AM
Audience Engagement System

https://aafp4.cnf.io/
1. Which former president was born in Missouri?

A. Woodrow Wilson  
B. Harry S. Truman  
C. Theodore Roosevelt  
D. Dwight D. Eisenhower
2. Which performing arts legend created the role of Dolly Levi on Broadway?

A. Barbra Streisand  
B. Elaine Stritch  
C. Angela Lansbury  
D. Carol Channing
3. In what year did The University of Oregon defeat The Ohio State University to win the first-ever NCAA men’s basketball tournament?

A. 1939
B. 1941
C. 1946
D. 1952
4. When do you plan on taking your board examination?

A. April 2020
B. November 2020
C. April 2021
D. Taking the FMCLA
E. Not taking boards, here for CME only
Off we go...
Health Promotion and Prevention

David Glenn Weismiller, MD, ScM, FAAFP
Department of Family and Community Medicine
University of Nevada, Las Vegas School of Medicine
Disclosure Statement

It is the policy of the AAFP that all individuals in a position to control content disclose any relationships with commercial interests upon nomination/invitation of participation. Disclosure documents are reviewed for potential conflicts of interest. If conflicts are identified, they are resolved prior to confirmation of participation. Only participants who have no conflict of interest or who agree to an identified resolution process prior to their participation were involved in this CME activity.

All individuals in a position to control content for this session have indicated they have no relevant financial relationships to disclose.
Learning Objectives

1. Describe the differences among health promotion, prevention, and screening.
2. Recognize the three leading causes of morbidity in the United States.
3. Counsel patients on necessary lifestyle modifications to maintain health.
4. Reinforce the necessity of patient education and counseling for health promotion, including healthy diets, exercise, and smoking cessation.
Health Promotion and Prevention

• Effective health promotion
  − Lifestyle modification: 3 leading causes of morbidity in the US
  − Counseling

• Prevention
  − Primary e.g., Immunizations
  − Secondary e.g., Breast cancer
    • Screening – done in asymptomatic patients
  − Tertiary e.g., Heart Failure Reduced Ejection Fraction (HFrEF)
  − Quaternary
    • Set of health activities to mitigate or avoid the consequences of unnecessary or excessive intervention of the health system. It is the practice of “first do no harm.”
Examples of *Quaternary Prevention*

- Avoiding the indiscriminate use of antibiotics
- Aspirin for the primary prevention of stroke in men
- Mistaking a risk factor for disease
- Avoiding unnecessary exams
  - e.g. stool Hemoccult after normal colonoscopy
- Avoiding unnecessary screening
  - e.g. Pap tests after the age of 65
### TABLE 1  Recommended glycemic targets for older adults

<table>
<thead>
<tr>
<th>Organization</th>
<th>HbA1c goal</th>
<th>Health status</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Diabetes Association&lt;sup&gt;4&lt;/sup&gt;</td>
<td>&lt;7.5%&lt;sup&gt;*&lt;/sup&gt;</td>
<td>Otherwise healthy, few comorbidities, no cognitive/functional impairment</td>
</tr>
<tr>
<td></td>
<td>&lt;8.0%&lt;sup&gt;*&lt;/sup&gt;</td>
<td>Multiple comorbidities, ADL impairments, mild-to-moderate cognitive impairment</td>
</tr>
<tr>
<td></td>
<td>&lt;8.5%&lt;sup&gt;*&lt;/sup&gt;</td>
<td>Long-term care, end-stage chronic illness, ADL dependencies, cognitive impairment</td>
</tr>
<tr>
<td>American Association of Clinical Endocrinologists&lt;sup&gt;6&lt;/sup&gt;</td>
<td>≤6.5%&lt;sup&gt;*&lt;/sup&gt;</td>
<td>Most adults</td>
</tr>
<tr>
<td></td>
<td>7% to 8%&lt;sup&gt;†&lt;/sup&gt;</td>
<td>History of severe hypoglycemia, limited life expectancy, advanced complications/comorbidities</td>
</tr>
<tr>
<td>American Geriatric Society&lt;sup&gt;7&lt;/sup&gt;</td>
<td>7% to 7.5%&lt;sup&gt;†&lt;/sup&gt;</td>
<td>Healthy with few comorbidities and good functional status</td>
</tr>
<tr>
<td></td>
<td>7.5% to 8%&lt;sup&gt;†&lt;/sup&gt;</td>
<td>General target for older adults</td>
</tr>
<tr>
<td></td>
<td>8% to 9%&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>Multiple comorbidities, poor health, limited life expectancy</td>
</tr>
<tr>
<td>International Diabetes Federation Global Guideline for Managing Older People with T2D&lt;sup&gt;8&lt;/sup&gt;</td>
<td>7.0% to 7.5%&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>Functionally independent: no ADL impairment and no or minimal caregiver support</td>
</tr>
<tr>
<td></td>
<td>7.0% to 8.0%&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>Functionally dependent: ADL impairment, increased likelihood of requiring additional care</td>
</tr>
<tr>
<td></td>
<td>&lt;8.5%&lt;sup&gt;*&lt;/sup&gt;</td>
<td>Functionally dependent and frail, or with dementia</td>
</tr>
</tbody>
</table>

Abbreviations: ADL, activities of daily living; HbA1c, glycated hemoglobin; T2D, type 2 diabetes.
Strength of evidence: <sup>†</sup>1, strong, based on randomized clinical trial(s); <sup>‡</sup>2, strong, based on clinical trial(s) or other analytical studies; <sup>*</sup>3, weaker, expert consensus.
Who is involved?

2020

• AAFP and more than 80+ partners comprising over one million clinicians are now partners of the Choosing Wisely campaign

• Specific, evidence-based recommendations clinicians and patients should discuss

  > 550 recommendations

Choosing Wisely® is an initiative of the ABIM Foundation.

`http://www.choosingwisely.org`
Lists

• Each list provides information on when tests and procedures may be appropriate, as well as the methodology used in its creation.

• In collaboration with the partner organizations, Consumer Reports has created resources for consumers and providers to engage in these important conversations about the overuse of medical tests and procedures that provide little benefit and in some cases harm.

Choosing Wisely® is an initiative of the ABIM Foundation.

http://www.choosingwisely.org
Best Practice Recommendations

- The *Choosing Wisely* initiative addresses overuse of tests and treatments in medical care
- Goal: Informed decision-making that leads to intelligent and effective patient care choices
- Targeted interventions are needed to help overcome physician and patient reluctance to adopt some of *Choosing Wisely*'s recommendations
  - “Likely that interventions will need to extend beyond [primary care provider]-directed education, feedback, and incentives, in order to impact change for recommendations that [primary care providers] fear patients will reject.”
- Anticipation of patient concerns should not be allowed to create undue hesitation in efforts to implement such initiatives
- To search *Choosing Wisely* Recommendations relevant to primary care: http://www.aafp.org/patient-care/browse/type.tag-choosing-wisley.html
Health Promotion
<table>
<thead>
<tr>
<th>Topic</th>
<th>Healthy People 2020 Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to Health Services</td>
<td>• Persons with medical insurance&lt;br&gt;• Persons with a usual primary care provider</td>
</tr>
<tr>
<td>Clinical Preventive Services</td>
<td>• Adults who receive a colorectal cancer screening based on the most recent guidelines&lt;br&gt;• Adults with hypertension whose blood pressure is under control&lt;br&gt;• Adult diabetic population with an A1c value less than 9 percent&lt;br&gt;• Children aged 19 to 35 months who receive the recommended doses of DTaP, polio, MMR, Hib, hepatitis B, varicella, and PCV vaccines</td>
</tr>
<tr>
<td>Environmental Quality</td>
<td>• Air Quality Index (AQI) exceeding 100&lt;br&gt;• Children aged 3 to 11 years exposed to secondhand smoke</td>
</tr>
<tr>
<td>Injury and Violence</td>
<td>• Fatal injuries&lt;br&gt;• Homicides</td>
</tr>
<tr>
<td>Maternal, Infant, and Child Health</td>
<td>• Infant deaths&lt;br&gt;• Preterm births</td>
</tr>
<tr>
<td>Mental Health</td>
<td>• Suicides (MHMD-1)&lt;br&gt;• Adolescents who experience major depressive episodes</td>
</tr>
<tr>
<td>Nutrition, Physical Activity, and Obesity</td>
<td>• Adults who meet current federal physical activity guidelines for aerobic physical activity and muscle-strengthening activity&lt;br&gt;• Adults who are obese&lt;br&gt;• Children and adolescents who are considered obese&lt;br&gt;• Total vegetable intake for persons aged 2 years and older</td>
</tr>
<tr>
<td>Oral Health</td>
<td>• Persons aged 2 years and older who used the oral healthcare system in past 12 months</td>
</tr>
<tr>
<td>Reproductive and Sexual Health</td>
<td>• Sexually active females aged 15 to 44 years who received reproductive health services in the past 12 months&lt;br&gt;• Persons living with HIV who know their serostatus</td>
</tr>
<tr>
<td>Social Determinants</td>
<td>• Students who graduate with a regular diploma 4 years after starting 9th grade</td>
</tr>
<tr>
<td>Substance Abuse</td>
<td>• Adolescents using alcohol or any illicit drugs during the past 30 days&lt;br&gt;• Adults engaging in binge drinking during the past 30 days</td>
</tr>
<tr>
<td>Tobacco</td>
<td>• Adults who are current cigarette smokers&lt;br&gt;• Adolescents who smoked cigarettes in the past 30 days</td>
</tr>
</tbody>
</table>
Health Promotion

- Risk stratification
  - Age, sex, family history (genetic), SES, lifestyle choices, environmental factors, and medical issues
- Counseling
  - Reading the patient correctly
    - "Soft-sell"
    - Direct approach
  - USPSTF recommends that prevention be discussed at each patient visit.
    - [http://www.ahrq.gov/clinic/pocketgd.htm](http://www.ahrq.gov/clinic/pocketgd.htm)
- Patient education
Steps in Administering Health Promotion Counseling

• Define health risks.
• Determine the stage of readiness of the patient.
• Advocate and commend behavior change.
• Assist in identification of a target behavior; identify barriers versus benefits.
• Reinforce health benefits of behavior change.
• Offer resources, strategies, and support; create plan of action and monitoring mechanisms.

Barriers

• Practicalities of organizing staff and practice to systematically implement
• Reaching affected patients in a practice or community; limited systems to address prevention during every visit with every patient
• Time and reimbursement for prevention remain major issues – improving
United States Preventive Services Task Force (USPSTF)

- The USPSTF was convened by the Public Health Service to rigorously evaluate clinical research in order to assess the merits of preventive measures, including screening tests, counseling, immunizations, and preventive medications.
- [www.uspreventiveservicestaskforce.org/us psttopics.htm](http://www.uspreventiveservicestaskforce.org/uspsttopics.htm)
  - Topic Index (A to Z)
# Published Recommendations

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Year</th>
<th>Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal Aortic Aneurysm: Screening</td>
<td>Screening</td>
<td>2014</td>
<td>Adult, Senior</td>
</tr>
<tr>
<td>Abnormal Blood Glucose and Type 2 Diabetes Mellitus: Screening</td>
<td>Screening</td>
<td>2015</td>
<td>Adult, Senior</td>
</tr>
<tr>
<td>Alcohol Misuse: Screening and Behavioral Counseling Interventions in Primary Care</td>
<td>Counseling, Screening</td>
<td>2013</td>
<td>Adolescent, Adult, Senior</td>
</tr>
<tr>
<td>Aspirin Use to Prevent Cardiovascular Disease and Colorectal Cancer: Preventive Medication</td>
<td>Preventive medication</td>
<td>2016</td>
<td>Adult, Senior</td>
</tr>
<tr>
<td>Asymptomatic Bacteruria in Adults: Screening</td>
<td>Screening</td>
<td>2008</td>
<td>Adolescent, Adult</td>
</tr>
<tr>
<td>Autism Spectrum Disorder in Young Children: Screening</td>
<td>Screening</td>
<td>2016</td>
<td>Pediatric</td>
</tr>
<tr>
<td>Bacterial Vaginosis in Pregnancy to Prevent Preterm Delivery: Screening</td>
<td>Screening</td>
<td>2008</td>
<td>Adolescent, Adult</td>
</tr>
<tr>
<td>Bladder Cancer in Adults: Screening</td>
<td>Screening</td>
<td>2011</td>
<td>Adult</td>
</tr>
<tr>
<td>Blood Pressure in Children and Adolescents (Hypertension): Screening</td>
<td>Screening</td>
<td>2013</td>
<td>Adolescent, Pediatric</td>
</tr>
<tr>
<td>BRCA-Related Cancer: Risk Assessment, Genetic Counseling, and Genetic Testing</td>
<td>Counseling, Screening</td>
<td>2013</td>
<td>Adult</td>
</tr>
<tr>
<td>Breast Cancer: Medications for Risk Reduction</td>
<td>Preventive</td>
<td>2013</td>
<td>Adult</td>
</tr>
</tbody>
</table>

You selected: You have not selected any filters. Use the items in the pod below to refine your results.

Refine your search:

- **Keyword(s):** Enter keyword
- **Filter:**
  - **Age Group:**
    - Adolescent
    - Adult
    - Pediatric
    - Senior
  - **Gender:**
    - Female
    - Female (pregnant)
    - Male
United States Preventive Services Task Force (USPSTF)

- The USPSTF was convened by the Public Health Service to rigorously evaluate clinical research in order to assess the merits of preventive measures, including screening tests, counseling, immunizations, and preventive medications.
- www.uspreventiveservicestaskforce.org/uspsttopics.htm
  - Topic Index (A to Z)
  - AHRQ ePSS (Mobile Application)
    - Recommendations for adults
    - Recommendations for children and adolescents
  - Affordable Care Act: USPSTF A and B Recommendations
# Definitions of USPSTF Recommendation Grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
<th>Suggestions for Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The USPSTF recommends the service; there is high certainty that the net benefit (i.e., benefits minus harms) is substantial.</td>
<td>Offer/provide this service.</td>
</tr>
<tr>
<td>B</td>
<td>The USPSTF recommends the service; there is high certainty that the net benefit is moderate or there is moderate certainty that the benefit is moderate to substantial.</td>
<td>Offer/provide this service.</td>
</tr>
<tr>
<td>C</td>
<td>The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.</td>
<td>Offer or provide this service for selected patients depending on individual circumstances.</td>
</tr>
<tr>
<td>D</td>
<td>The USPSTF recommends against the service; there is moderate or high certainty that the service has no benefit or that the harms outweigh the benefits.</td>
<td>Discourage use of the service.</td>
</tr>
<tr>
<td>I</td>
<td>The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service; evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.</td>
<td>If offered, patients should understand the uncertainty about the balance of benefits and harms.</td>
</tr>
</tbody>
</table>
# Top 20 Recommendations

1. AAA Screening  
2. Screening for DM  
3. Aspirin for Primary Prevention  
4. Breast Cancer Screening  
5. Screening for Carotid Artery Stenosis  
6. Chlamydia/GC Screening  
7. Screening for Colorectal Cancer  
8. Screening for Depression  
9. Folic Acid Supplementation for Prevention of Neural Tube Defects  
10. Screening for Hepatitis B  
11. Screening for Hepatitis C  
12. Screening for HIV  
13. Screening for Intimate Partner Violence  
14. Screening for Latent TB  
15. Aspirin for the Prevention of Preeclampsia  
16. Screening for Lung Cancer  
17. Screening for Obesity  
18. Screening for Prostate Cancer  
19. Statin Use for the Primary Prevention of CVD  
20. Screening for Syphilis
1. The number 1 cause of preventable morbidity in the United States today is:

A. Poverty
B. Tobacco
C. Alcohol dependence
D. Overweight/obesity
## US Major Health Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Prevalence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults who are current smokers (2016)</td>
<td>15.5</td>
</tr>
<tr>
<td>Obese adults (2010)</td>
<td>27.5</td>
</tr>
<tr>
<td>Physically inactive adults (2009)</td>
<td>49</td>
</tr>
<tr>
<td>Incidence of syphilis, gonorrhea, and chlamydial cases per 100,000 (2008)</td>
<td>517.4/100,000</td>
</tr>
<tr>
<td>Adults with <strong>alcohol</strong> and illicit drug abuse or dependence (2006-2007)</td>
<td>9.2</td>
</tr>
<tr>
<td>Uninsured (ages 19-64 years) (2010)</td>
<td>17.8</td>
</tr>
</tbody>
</table>

Three leading causes of morbidity in US.
QuickStats:
Number of Deaths from 10 Leading Causes—National Vital Statistics System, United States, 2010

In 2010, a total of 2,468,435 deaths occurred in the United States. The first two leading causes of death, heart disease (597,689 deaths) and cancer (574,743), accounted for nearly 50% of all deaths. In contrast, the other leading causes accounted for much smaller percentages, ranging from 5.6% (1,380,080 deaths) for the third leading cause of death, chronic lower respiratory disease, to 1.6% (38,364) for suicide, the 10th leading cause of death. All other causes combined accounted for 25% of the deaths.


Date of download: 4/22/2013
Highest Ranked Services With the Lowest Delivery Rates

- Tobacco cessation counseling to adults
- Screening older adults for undetected vision impairment
- Offering adolescents an anti-tobacco message or advice to quit
- Counseling adolescents on alcohol and drug abstinence
- Screening adults for colorectal cancer
- Screening young women for chlamydial infection
- Screening adults for problem drinking
- Vaccinating older adults against pneumococcal disease
Tobacco Use


- **Leading cause of preventable death and illness in the U.S.**
  - Approximately half of smokers will die from a smoking-related disease.
- In 2016, 15.5% of U.S. adults were current cigarette smokers, compared with 17.7% in 2010.
  - At this slow rate of decline, adult smoking rates in the United States will reach approximately 17% by 2020, substantially higher than the Healthy People 2020 target goal of ≤12%.
- Some daily smokers appear to be smoking fewer cigarettes per day.
  - No amount of smoking is safe, and the best option for any smoker is to quit completely.
- **Sustained, adequately funded, comprehensive state tobacco control programs can reduce adult smoking in the U.S.**
Cigarette smoking is down, but almost 38 MILLION American adults still smoke.

Cigarette smoking remains high among certain groups:
- Men
- Adults 25-64 years old
- Lower education
- Below poverty level
- Midwest and South
- Uninsured or Medicaid
- Disabled
- Serious psychological distress
- American Indians, Alaska Natives, and Multiracial
- Lesbians, gays, and bisexuals

Strategies essential to continue reducing cigarette smoking overall:
- Implement smoke-free laws
- Run mass media campaigns
- Raise tobacco prices
- Make quit help easy to access

https://www.cdc.gov/chronicdisease/
The USPSTF recommends that clinicians ask all adults about tobacco use, advise them to stop using tobacco and provide behavioral interventions and U.S. FDA-approved pharmacotherapy for cessation to adults who use tobacco. 

**Grade: A recommendation**

The USPSTF recommends that clinicians ask all pregnant women about tobacco use, advise them to stop using tobacco, and provide behavioral interventions for cessation to pregnant women who use tobacco. 

**Grade: A recommendation**
USPSTF: Smoking (2015)

- The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of pharmacotherapy interventions for tobacco cessation in pregnant women. **Grade: I recommendation**

- The USPSTF concludes that the current evidence is insufficient to recommend electronic nicotine delivery systems (ENDS) for tobacco cessation in adults, including pregnant women. The USPSTF recommends that clinicians direct patients who smoke tobacco to other cessation interventions with established effectiveness and safety (previously stated). **Grade: I recommendation**
USPSTF: Tobacco Use

August 2013

• Recommends that primary care clinicians provide interventions, including education or brief counseling, to prevent initiation of tobacco use in school-aged children and adolescents. Grade: B recommendation
Smoking Cessation Treatment

• Nicotine Gum - OTC
• Nicotine Patch - OTC
• Nicotine Nasal Spray - Rx
• Nicotine Inhaler - Rx
• Bupropion (Zyban) - Rx
• Varenicline (Chantix) - Rx
• Psychosocial Therapy
• Behavior Therapy
Reimbursement

• Coverage for tobacco cessation increases the likelihood of success by a factor of 1.5-2X
• Medicare will reimburse both brief and intensive counseling for cessation services, in outpatient clinic and inpatient hospital settings
• Beneficiary must have a condition* that:
  – Is adversely affected by smoking or tobacco use OR
  – Affects metabolism or dosing of a medication being used to treat the beneficiary’s condition
  – *That condition must be billed as the primary diagnosis; Not health and behavior code
Payment for Tobacco Cessation Services

• Medicare
  – Covers 2 quit attempts per year
    • 4 counseling sessions per attempt
    • Either inpatient or outpatient
  – Prescription treatments are covered by Medicare Part D

• Affordable Care Act – all Medicaid programs to cover
  – All tobacco cessation medications for all individuals
  – Counseling for pregnant women
Methods for Behavioral Change

• **Motivational interviewing**
  − Attempt to move people in need of motivation into the action stage of actual behavior change

• **Stages of change model**
  − Pre-contemplation
  − Contemplation
  − Preparation
  − Action
  − Maintenance and relapse prevention

• **5 As**
  − Ask
  − Advise
  − Assess
  − Assist
  − Arrange
Methods for Behavior Change

• Behavior change is rarely a discrete single event
• Gradual process involving acceptance of factual information being presented
Smoking Cessation

- U.S. Public Health Service Guideline recommends first-line drugs for cessation in all or most smokers who smoke 10–15 cigarettes/day (SOR A)
- Clinical interventions as brief as 3 minutes increase cessation abstinence rates (SOR A)
- Counseling and medication are effective when used by themselves for treating tobacco dependence; combination is more effective than either alone
Meta-analysis (2008): Effectiveness of and estimated abstinence rates for the combination of counseling and medication vs. counseling alone (n = 9 studies)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Odds Ratio</th>
<th>Abstinence Rate%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counseling alone</td>
<td>1.0</td>
<td>14.6%</td>
</tr>
<tr>
<td>Counseling and Medication</td>
<td>1.7</td>
<td>22.1%</td>
</tr>
</tbody>
</table>
Smoking Cessation

- Counseling and medication are effective when used by themselves for treating tobacco dependence
  - Combination of counseling and medication, however, is more effective than either alone
- Telephone quit line counseling is effective with diverse populations and has broad reach
Telephone Quit Lines

• They are free for smokers AND connect smokers with trained counselors who prepare customized cessation plan
• Cochrane review
  − Not proven as effective as Nicotine Replacement Therapy
    • Odds ratio of 1.56
    • Nicotine replacement therapy Odds ratio of 1.74
• Some evidence that it offers an additional benefit when combined with other interventions
  − Physician advice
  − Pharmacotherapy
2. Which one of the following statements is TRUE regarding the use of antidepressants for smoking cessation?

A. Bupropion may only be used as monotherapy for smoking cessation.
B. Bupropion is unsafe to use in patients with heart disease.
C. The U.S. Public Health Service (USPHS) guidelines on tobacco cessation recommend the use of SSRIs for smoking cessation.
D. USPHS guidelines on tobacco cessation recommend against the use of all tricyclic antidepressants for smoking cessation.
E. Bupropion is contraindicated in a patient with an eating disorder.
Smoking Cessation - Pharmacotherapy

• First line agents - reliably increase long-term smoking abstinence rates
  - Bupropion SR (Zyban)
  - Varenicline (Chantix)
  - Nicotine gum
  - Nicotine inhaler
  - Nicotine lozenge
  - Nicotine nasal spray
  - Nicotine patch

• Second line agents (neither FDA-approved for this use)
  - Clonidine 0.1-0.75 mg/day (transdermal or oral)
  - Nortriptyline
Antidepressants and Smoking Cessation

• Cochrane review of antidepressants in smoking cessation
  - Bupropion and nortriptyline are effective
    • Evidence suggests that the mode of action of bupropion and nortriptyline is independent of their antidepressant effect and that they are of similar efficacy to nicotine replacement
  - Other TCAs, anxiolytics, and SSRIs are ineffective
    • 2 large studies - SSRIs did not significantly increase the likelihood of abstinence relative to placebo treatment

Smoking Cessation - Pharmacotherapy

- Special consideration should be given before using pharmacotherapy with selected populations
  - Medical contraindications
  - Smoking fewer than 10 cigarettes per day
  - Pregnant/breastfeeding women
  - Adolescent smokers
FDA-Approved Pharmacotherapy

**Nicotine Replacement Therapy (NRT)**

- Cochrane review (2012), including 150 studies and more than 50,000 participants, compared NRT with placebo.
  - NRT increased successful cessation rates from 10% with placebo to 17% ([NNT] = 15).
- Relative benefit of NRT on smoking cessation independent of delivery method, definition of abstinence, length of treatment, level of support counseling, treatment venue (hospital, clinic, support group), and whether a fixed, variable, or tapered dose was used.
- Benefit of NRT continued at 12 months; the absolute rates of abstinence declined.
  - Separate meta-analysis with follow-up beyond one year found that the absolute benefit of NRT declined from 11% at one year to 7% at four years.

Nicotine Replacement Therapy (NRT)

• Of the 3 classes of pharmacotherapy for nicotine dependence, NRT has the greatest flexibility in dosage forms
• Combinations of different types of NRT can be used together safely
  – Greater abstinence with patch plus an acute form of NRT for breakthrough craving, especially among highly addicted smokers
• A patient using the nicotine patch who complains of early morning cravings should use the 24-hour patch
• Smoking cessation clinic setting
  – Increasing the types of medication use among smokers has been found to result in higher rates of cessation
Antidepressants and Smoking Cessation

*Bupropion (Zyban)*

- Atypical antidepressant
  - *Sustained-release formulations* are approved for smoking cessation
- Inhibits dopamine and norepinephrine reuptake
- **Doubles** the chances of smoking cessation compared with placebo
- Bupropion **and** nicotine replacement therapy? *No significant improvement in cessation rates*
Antidepressants and Smoking Cessation

*Bupropion (Zyban)*

- May be particularly useful in patients with COPD
- *Appears safe for use with patients who have coronary artery disease, including in hospital settings*
  - Improves cessation rates compared with placebo among inpatients with heart disease
  - *Caution is indicated with unstable angina or acute coronary syndrome*
Antidepressants and Smoking Cessation

*Bupropion (Zyban)*

- Contraindicated
  - Seizure disorders
  - Medications that lower the seizure threshold
  - History of significant head injury
  - Anorexia nervosa or Bulimia *(eating disorder)*
**Varenicline (Chantix)**

- Partial alpha$_4$-beta$_2$ nicotinic acetylcholine (Ach) receptor agonist and a nicotine receptor blocker
  - Leads to the release of small amounts of dopamine and other neurotransmitters similarly released by nicotine; relieves cravings
  - Blocks nicotine from nicotine receptor
- Significantly increased 4-week and 1-year continuous abstinence rates compared with placebo or Bupropion
  - 1 mg BID (RR 2.24)
  - 0.5 mg BID (RR 2.08)
- Short- and long-term efficacy of Varenicline exceeded that of Bupropion
Varenicline (Chantix)

- Side effects (NNH 143-165)
  - Nausea (less frequent when taken with meals)
  - Seizures
  - Vivid dreams

- Dosage reductions
  - Required in patients with significant renal disease

- No good data for use in combination with OTHER smoking cessation medications
Varenicline (Chantix)

FDA Alerts

• Serious adverse psychiatric events (depressed mood, agitation, and suicidal behavior/ideation) – FDA black-box warning removed 12/16/2016
• Possible increased risk of adverse cardiovascular events in persons with CV disease
  • Weigh the risks against the benefits of its use
  • Counsel patients to seek medical attention if they experience new or worsening symptoms of cardiovascular disease while taking varenicline
• 2015 - may change the way people react to alcohol (e.g., possible increased drunkenness, unusual behavior, memory lapse), as well as rare accounts of seizures with treatment
Varenicline vs. Bupropion vs. Placebo
(Evidence plus advanced statistical modeling)

- **Varenicline vs. Placebo**
  - 1 mg BID: 2.24
  - 0.5 mg BID: 2.08
  - NNT: 6 (11)

- **Varenicline vs. Bupropion**
  - RR: 1.39
  - NNT: 15

- **Varenicline vs. NRT**
  - RR: 1.25
  - NNT: 20

https://www.aafp.org/afp/2017/0901/od1.html
## Smoking Cessation
### Second Line Drugs

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clonidine</strong></td>
<td>✓ 0.1-0.3 mg/day (oral or transdermal)</td>
<td>✓ Approximately doubles abstinence rates when compared to placebo</td>
</tr>
<tr>
<td></td>
<td>✓ Not FDA-approved for smoking cessation</td>
<td>✓ May lessen menopausal vasomotor symptoms</td>
</tr>
<tr>
<td></td>
<td>✓ Dose-dependent side effects</td>
<td></td>
</tr>
<tr>
<td><strong>Nortriptyline</strong></td>
<td>✓ 50-75 mg HS</td>
<td>✓ As effective as bupropion in studies</td>
</tr>
<tr>
<td></td>
<td>✓ Not FDA-approved for smoking cessation</td>
<td>✓ Useful in both depressed and non-depressed patients</td>
</tr>
<tr>
<td></td>
<td>✓ Anticholinergic side effects common</td>
<td></td>
</tr>
</tbody>
</table>
Optimizing Success

• **Arrange timely follow-up**
  − Within one week of patient’s quit date
  − Risk of relapse is highest during the first few days of abstinence
  − Additional follow-up increases cessation success rates
    • Office visits
    • Letters
    • Phone calls
    • Self-help materials
      • Brochures from professional organizations
      • Free telephone quit lines
      • Internet-based resources
RELAPSE

• Defined
  - Smoking on seven consecutive days
  - Smoking once each week over two consecutive weeks

• Common
  - Most attempt to quit smoking 4-5 times before cessation is successful
  - 6-38% who relapse will attempt to quit again within the next 12 months

• Strategies to help prevent
  - Identify cues and triggers and decide on alternative coping strategies
  - Identify problems or barriers to cessation: negative mood, irritability, alcohol, peer smokers
  - Discuss benefits of cessation
  - Frequently assess progress
  - Highlight and congratulate previous successes
    • Duration of abstinence
    • Effective coping strategies
Prevalence of Interest in Quitting

National Health Interview Survey, United States, 2010

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Interested in quitting</th>
<th>Past year quit attempt</th>
<th>Recent smoking cessation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>68.8% (67.2-70.5)</td>
<td>52.4% (50.7-54.0)</td>
<td>6.2% (5.4-7.0)</td>
</tr>
</tbody>
</table>

Of the 52.4% who had tried:

- 68.3% did so without evidence-based cessation counseling or medications.
- Only 48.3% who had visited a healthcare provider in the past year received advice to quit smoking.
- Only 31.7% had used counseling and/or medications when they tried to quit.
  - 30% had used medications.
  - 5.9% had used counseling.
Obesity

• Adults
  – BMI > 25 is overweight.
  – BMI > 30 is obese.

• Pediatrics
  – Overweight (Risk for overweight): BMI at or above the 85th percentile and lower than the 95th percentile for children of the same age and sex.
  – Obese (Overweight): BMI at or above the 95th percentile for children of the same age and sex.
Obesity Trends* Among US Adults
BRFSS, 1990, 2000, 2010

(*BMI ≥ 30, or about 30 lbs overweight for 5’4” person)
Weight of the Nation

CDC (National Premier. May 14 and 15, 2012)

• Public health campaign from CDC in conjunction with new IOM report (May 8, 2012) on solutions to the obesity crisis
  - “THE WEIGHT OF THE NATION,” A MULTI-PART, MULTI-PLATFORM SERIES ADDRESSING THE NATIONAL OBESITY EPIDEMIC (HBO)
  - The feature films and the 10 shorts stream free of charge on HBO.com (http://HBO.com)
  - The films are also available on YouTube for embedding and sharing
IOM Goals

Weight of the Nation

• Integrating physical activity into people’s daily lives
• Making healthy food and beverage options available everywhere
• Transforming marketing and messages about nutrition and activity
• Making schools a gateway to healthy weights
• Galvanizing employers and healthcare professionals to support healthy lifestyles
IOM

Specific Strategies

• Requiring at least 60 minutes per day of physical education and activity in schools
• Industry-wide guidelines on which food and beverages can be marketed to children and how
• Expansion of workplace wellness programs
• Taking full advantage of physicians’ roles to advocate for obesity prevention with patients and in the community
• Increasing the availability of lower-calorie, healthier children’s meals in restaurants
The 2018 Physical Activity Guidelines for Americans—*Recommendations*

• Adults should move more and sit less throughout the day. Some physical activity is better than none. Adults who sit less and do any amount of moderate-to-vigorous physical activity gain some health benefits.

• For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week.

• Additional health benefits are gained by engaging in physical activity beyond the equivalent of 300 minutes (5 hours) of moderate-intensity physical activity a week.

https://health.gov/PAGuidelines/
The 2018 Physical Activity Guidelines for Americans—*Recommendations*

- Muscle strengthening activity every week (SOR C)
  - All major muscle groups 2 or more days/wk
    - Legs
    - Hips
    - Back
    - Abdomen
    - Chest
    - Shoulders
    - Arms

American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention, 2012

• Achieve and maintain a healthy weight throughout life.
  − Be as lean as possible throughout life without being underweight.
  − Avoid excess weight gain at all ages. For those who are currently overweight or obese, losing even a small amount of weight has health benefits and is a good place to start.
  − Engage in regular physical activity and limit consumption of high-calorie foods and beverages as key strategies for maintaining a healthy weight.

American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention, 2012

• Adopt a physically active lifestyle.
  − Adults should engage in at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity activity each week, or an equivalent combination, preferably spread throughout the week.
  − Children and adolescents should engage in at least 1 hour of moderate or vigorous intensity activity each day, with vigorous intensity activity occurring at least 3 days each week.
  − Limit sedentary behavior such as sitting, lying down, watching television, or other forms of screen-based entertainment.
  − Doing some physical activity above usual activities, no matter what one's level of activity, can have many health benefits.

American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention, 2012

• **Consume a healthy diet, with an emphasis on plant foods.**
  - Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
  - Limit consumption of processed meat and red meat.
  - Eat at least 2.5 cups of vegetables and fruits each day.
  - Choose whole grains instead of refined grain products.

• **If you drink alcoholic beverages, limit consumption.**
  - Drink no more than 1 drink per day for women or 2 per day for men.
USPSTF: Obesity

- Recommends screening all adults for obesity. Grade: *B recommendation (2018)*
  - Clinicians should offer or refer patients with a body mass index (BMI) of 30 kg/m² or higher to intensive, multicomponent behavioral interventions.
- Recommends that clinicians screen children aged 6 years and older for obesity and offer them or refer them to comprehensive, intensive behavioral interventions to promote improvement in weight status. Grade: *B recommendation (2017)*
Excess Weight and CVD Risk Factors

USPSTF 2014 (Update in Progress)

• Recommends offering or referring adults who are overweight or obese and have additional cardiovascular disease (CVD) risk factors to intensive behavioral counseling interventions to promote a healthful diet and physical activity for CVD prevention. (B recommendation)
  • Recommendation applies to adults ≥18 years in primary care settings; CVD risk factors (hypertension, dyslipidemia, impaired fasting glucose, or the metabolic syndrome).
  • In the studies reviewed by the USPSTF, the vast majority of participants had a BMI greater than 25 kg/m².
Alcohol
3. Which of the following statements is true regarding alcohol abuse counseling?

A. The CAGE but NOT the AUDIT tool has been validated as a screening instrument for adult alcohol abuse.
B. The US Preventive Services Task Force (USPSTF) recommends screening and counseling adolescents on the risks of alcohol misuse.
C. The USPSTF recommends screening and counseling adults on the risks of alcohol misuse.
D. While the USPSTF found that screening can accurately identify adults at risk for alcohol misuse, they found insufficient evidence of effectiveness for brief, office-based interventions.
Highest-Ranked Services With the Lowest Delivery Rates

- Tobacco cessation counseling to adults
- Screening older adults for undetected vision impairment
- Offering adolescents an anti-tobacco message or advice to quit
- Counseling adolescents on alcohol and drug abstinence
- Screening adults for colorectal cancer
- Screening young women for chlamydial infection
- **Screening adults for problem drinking**
- Vaccinating older adults against pneumococcal disease
Alcohol Use

• Definitions of patterns of drinking alcohol
  − Excessive drinking includes heavy drinking, binge drinking, and any drinking by pregnant women or underage youth.
  − Acceptable
    • Men < 2 drinks per day
    • Women < 1 drink per day
  − Heavy
    • For women, more than 1 drink per day on average
    • For men, more than 2 drinks per day on average
  − Binge, the most common form of excessive alcohol consumption
    • For women, 4 or more drinks during a single occasion
    • For men, 5 or more drinks during a single occasion
  − Most people who binge drink are not alcoholics or alcohol dependent.

Source: National Institutes of Health
Validated Instruments

**Alcohol Abuse**

• The CAGE and AUDIT tools are two of several validated instruments that can be used in primary care settings to screen for alcohol abuse (SOR A)

*Acceptable* limit of alcohol: Men ≤ 2 drinks per day, women ≤ 1 drink per day
CAGE
CAGE Questionnaire (PDF)

• CAGE test scores ≥ 2 had a sensitivity of 93% and a specificity of 76% for the identification of problem drinkers.

  1. Have you ever felt you needed to cut down on your drinking?
  2. Have people annoyed you by criticizing your drinking?
  3. Have you ever felt guilty about drinking?
  4. Have you ever felt you needed a drink first thing in the morning (eye-opener) to steady your nerves or to get rid of a hangover?

AUDIT

• Ten-question test developed by the World Health Organization to determine if a person's alcohol consumption may be harmful
• Test designed to be used internationally; validated in a study using patients from six countries.
• **Questions**
  • 1-3 deal with alcohol consumption
  • 4-6 relate to alcohol dependence
  • 7-10 consider alcohol-related problems
• **Scoring**
  • A score of 8 or more in men (7 in women) indicates a strong likelihood of hazardous or harmful alcohol consumption.
  • A score of 20 or more is suggestive of alcohol dependence.

Adverse Effects of Excessive Alcohol

• **Long-term health risks**: Over time, excessive alcohol use can lead to the development of chronic diseases, neurological impairments, and social problems.
  − Neurological problems, including dementia, stroke, and neuropathy
  − Cardiovascular problems, including myocardial infarction, cardiomyopathy, atrial fibrillation, and hypertension
  − Psychiatric problems, including depression, anxiety, and suicide
  − Social problems, including unemployment, lost productivity, and family problems
Adverse Effects of Excessive Alcohol

• **Long-term health risks:** Over time, excessive alcohol use can lead to the development of chronic diseases, neurological impairments, and social problems.
  
  − Cancer of the mouth, throat, esophagus, liver, colon, and breast
  − In general, the risk of cancer increases with increasing amounts of alcohol
  − Liver diseases, including:
    
    • Alcoholic hepatitis
    • Cirrhosis, which is among the 15 leading causes of all deaths in the United States
    • Among persons with hepatitis C virus, worsening of liver function and interference with medications used to treat this condition
  
  − Other gastrointestinal problems, including pancreatitis and gastritis
Alcohol Use and CVA

• Effects of alcohol on stroke risk are controversial but:
  – The negative effects of heavy use (> 5/d) are well documented.
  – Heavy use increases the risk for all forms of stroke, not just ischemic.
Secondary Stroke Prevention

• The American Heart Association/American Stroke Association 2006 guideline on stroke prevention in patients with a previous stroke or TIA lists elimination or reduction of alcohol consumption in heavy drinkers as one of the primary goals.
Heavy Alcohol Consumption: CVA

• Mechanisms for the negative effects
  – More vulnerable to cerebral atrophy
  – Atrial fibrillation
  – Reduced cerebral blood flow
  – Alcohol-induced hypertension
  – Hypercoagulable state
Light to Moderate Alcohol Consumption: CVA

• Mechanisms for reduced risk of stroke
  – Increases in HDL
  – Decreases in platelet aggregation
  – Lower plasma fibrinogen concentration
Prevention

• Primary
• Secondary (Screening)
• Tertiary
• Quaternary
Prevention

*Primary*

- Avoids the development of a disease. Most population-based health promotion activities are primary preventive measures.
- Example: *Immunizations*
CDC Estimates

• Estimated that 50,000 adult lives could be saved per year if the ACIP immunization schedule was followed
• Among children born in the past 20 years
  • Prevent > 21 million hospitalizations
  • Prevent 730,000 deaths
General Principles

• Serious side effects are exceedingly rare
• Every visit is an opportunity for primary prevention
• A 25-mm needle should be used instead of a 16-mm needle to reduce the risk of adverse reactions to vaccinations (SOR A)
• Immunization series do not need to be restarted
• Antipyretics are not recommended for routine prophylaxis before immunizations (SOR A)
• Breastfeeding is NOT a contraindication to vaccines
General Principles

• Successful dialogue
  – Take time to LISTEN.
  – Solicit and welcome questions.
  – Keep the conversation going.

• www.aafp.org/immunizations
  – Ages 0-18
  – Adult
### Table 1
Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger
United States, 2019

These recommendations must be read with the Notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars in Table 1. To determine minimum intervals between doses, see the catch-up schedule (Table 2). School-entry and adolescent vaccine age groups are shaded in gray.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Birth</th>
<th>1 mo</th>
<th>2 mos</th>
<th>4 mos</th>
<th>6 mos</th>
<th>9 mos</th>
<th>12 mos</th>
<th>15 mos</th>
<th>18 mos</th>
<th>19-23 mos</th>
<th>2-3 yrs</th>
<th>4-6 yrs</th>
<th>6-10 yrs</th>
<th>11-12 yrs</th>
<th>13-15 yrs</th>
<th>16 yrs</th>
<th>17-18 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B (HepB)</td>
<td>1st</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Rotavirus (RV) BTV (2-dose series); RSV (3-dose series)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td></td>
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<tr>
<td>Diphtheria, tetanus, &amp; acellular pertussis (DTaP; &lt;7 yrs)</td>
<td>1st</td>
<td>2nd</td>
<td>2nd</td>
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<tr>
<td>Haemophilus influenza type b (Hib)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
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<tr>
<td>Pneumococcal conjugate (PCV13)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
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<tr>
<td>Inactivated poliovirus (IPV; &lt;18 yrs)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
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<td>Annual vaccination 1 or 2 doses</td>
<td>Annual vaccination 1 dose only</td>
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<tr>
<td>Influenza (LI)</td>
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<tr>
<td>Measles, mumps, rubella (MMR)</td>
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<td>See Notes</td>
<td>1st dose</td>
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<tr>
<td>Varicella (VAR)</td>
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<td>Hepatitis A (HepA)</td>
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<tr>
<td>Meningococcal (MenACWY-D; 29 caps; MenACWY-CRM; 22 caps)</td>
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<td>1st dose</td>
<td>2nd dose</td>
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<tr>
<td>Tetanus, diphtheria, &amp; acellular pertussis (Tdap; &gt;7 yrs)</td>
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<td>Totapi</td>
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<tr>
<td>Human papillomavirus (HPV)</td>
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<tr>
<td>Meningococcal C</td>
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<tr>
<td>Pneumococcal polysaccharide (PPSV23)</td>
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<td>See Notes</td>
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</tbody>
</table>

Range of recommended ages for all children
Range of recommended ages for catch-up immunization
Range of recommended ages for certain high-risk groups
Range of recommended ages for other high-risk groups that may receive vaccine, subject to individual clinical decision making
No recommendation
### Table 3: Recommended Child and Adolescent Immunization Schedule by Medical Indication

#### United States, 2019

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>Pregnancy</th>
<th>Immuno compromised status (excluding HIV infection)</th>
<th>HIV infection CD4+ count$^1$</th>
<th>&lt;15% and total CD4 cell count of &lt;200/mm$^3$</th>
<th>≥15% and total CD4 cell count of ≥200/mm$^3$</th>
<th>Kidney failure, end-stage renal disease, on hemodialysis</th>
<th>Heart disease, chronic lung disease</th>
<th>CSF leaks/ shunt implants</th>
<th>Angiomyolipoma with characteristic component deficiencies</th>
<th>Chronic liver disease</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td></td>
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<tr>
<td>Rotavirus</td>
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<tr>
<td>Diphtheria, tetanus, &amp; acellular pertussis (DTaP)</td>
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<tr>
<td>Haemophilus influenzae type b</td>
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<tr>
<td>Pneumococcal conjugate</td>
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<td>Inactivated poliovirus</td>
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<tr>
<td>Influenza (IV)</td>
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<td>Influenza (IIV)</td>
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<tr>
<td>Measles, mumps, rubella</td>
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<tr>
<td>Varicella</td>
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<tr>
<td>Hepatitis A</td>
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<tr>
<td>Meningococcal ACWY</td>
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<tr>
<td>Tetanus, diphtheria, &amp; acellular pertussis (Tdap)</td>
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<tr>
<td>Human papillomavirus</td>
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<tr>
<td>Meningococcal B</td>
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<tr>
<td>Pneumococcal polyvalent</td>
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</tbody>
</table>

1. For additional information regarding HIV laboratory parameters and use of live vaccines, see the General Best Practice Guidelines for Immunization "Altered Immunocompetence" at [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/immunocon.html](https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/immunocon.html), and Table 4-1 (footnote D) at [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html](https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html).

2. Severe Combined Immunodeficiency

3. LAV contraindicated for children 2-4 years of age with asthma or wheezing during the preceding 12 months.

4. Recommended for persons with an additional risk factor for which the vaccine would be indicated.

5. Additional doses may be necessary based on medical condition. See Notes.

6. Contraindicated or use not recommended—vaccine should not be administered because of risk for serious adverse reaction.

7. Precaution—vaccine might be indicated if benefit of protection outweighs risk of adverse reaction.

8. Delay vaccination until after pregnancy if vaccine indicated.

9. SCID$^2$

10. Asthma, wheezing 3-days$^3$
Key Points to the Schedule
(Age 0-18)

- Intranasal live attenuated influenza vaccine (LAIV/FluMist®) is again an option for children ≥ 2 years of age
  - due to the addition of a new H1N1 strain that is expected to improve the vaccine's effectiveness against H1N1 viruses
- Persons 16-23 years of age may be vaccinated to provide short-term protection against most strains of meningococcal B disease. (SOR B)
- There is no contraindication to giving the meningococcal B and quadrivalent meningococcal conjugate vaccines on the same day as long as different administration sites are used. (SOR B)
Key Points to the Schedule

(Age 0-18)

• Hepatitis A Vaccine
  • Homelessness has been added as an indication for vaccinating children and adults against Hepatitis A
  • Children ages 6-11 months, as well as unvaccinated people ≥12 months, should receive the vaccine before traveling internationally

• Clarification about Hepatitis B
  • Change in wording to emphasize the importance that the first dose of the vaccine should be administered to every medically stable infant who weighs ≥2000 g who is born to a mother who has surface antigen-negative HBV
  • Still ~1000 babies/year born with [HBV]; contract it from their mother at the time of delivery, primarily. The previous recommendation gave more latitude; first dose could be given up to 2 or 3 or 4 weeks of age in a clinician’s office.
  • The problem: some children were slipping through the net and did not get a dose of the vaccine early on if they were born to a mother who is known to be positive. This way, every infant gets the vaccine, even if there is a misinterpretation of the blood result’s serology or the testing done on the mother.

Vaccine Refusal

• AAFP
  – Does NOT support immunization exemption policies except in cases of allergic and medical contraindication
  – **Sign a refusal to vaccinate form**, declination should be documented with provision of vaccine information statement (SOR C)*

• AAP
  – Has developed form that can be used to document vaccine refusal  

• **Dismiss from practice?**
  – CDC recommends **AGAINST** dismissing the patient or family from the practice if they refuse vaccination*
  – AAP now accepts this practice if done in a conscientious way

# Table 1: Recommended Adult Immunization Schedule by Age Group

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>19–21 years</th>
<th>22–26 years</th>
<th>27–49 years</th>
<th>50–64 years</th>
<th>≥65 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza inactivated (IIV) or Influenza recombinant (RIV)</td>
<td>1 dose annually</td>
<td>or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza live attenuated (LAIV)</td>
<td>1 dose annually</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Tdap or Td)</td>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)</td>
<td>1 or 2 doses depending on indication (if born in 1957 or later)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Varicella (VAR)</td>
<td>2 doses (if born in 1980 or later)</td>
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<tr>
<td>Zoster recombinant (RZV) (preferred)</td>
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<tr>
<td>Zoster live (ZVL)</td>
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<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV) Female</td>
<td>2 or 3 doses depending on age at initial vaccination</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV) Male</td>
<td>2 or 3 doses depending on age at initial vaccination</td>
<td></td>
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<tr>
<td>Pneumococcal conjugate (PCV13)</td>
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<tr>
<td>Pneumococcal polysaccharide (PPSV23)</td>
<td>1 or 2 doses depending on indication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A (HepA)</td>
<td>2 or 3 doses depending on vaccine</td>
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<tr>
<td>Hepatitis B (HepB)</td>
<td>2 or 3 doses depending on vaccine</td>
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</tr>
<tr>
<td>Meningococcal A, C, W, Y (MenACWY)</td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
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<tr>
<td>Meningococcal B (MenB)</td>
<td>2 or 3 doses depending on vaccine and indication</td>
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</tr>
<tr>
<td>Haemophilus influenzae type b (Hib)</td>
<td>1 or 3 doses depending on indication</td>
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</tr>
</tbody>
</table>

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection
Recommended vaccination for adults with an additional risk factor or another indication
No recommendation
# Table 2
Recommended Adult Immunization Schedule by Medical Condition and Other Indications
**United States, 2019**

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Pregnancy</th>
<th>Immuno-compromised (excluding HIV infection)</th>
<th>HIV infection</th>
<th>CD4 count</th>
<th>Asplenia, complement deficiencies</th>
<th>End-stage renal disease, on hemodialysis</th>
<th>Heart or lung disease, alcoholism*</th>
<th>Chronic liver disease</th>
<th>Diabetes</th>
<th>Health care personnel?</th>
<th>Men who have sex with men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tdap</td>
<td>1 dose Tdap each pregnancy</td>
<td>1 dose annually</td>
<td>PRECAUTION</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
</tr>
<tr>
<td>MMR</td>
<td>CONTRAINDICATED</td>
<td>CONTRAINDICATED</td>
<td>CONTRAINDICATED</td>
<td>CONTRAINDICATED</td>
<td>CONTRAINDICATED</td>
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<td>CONTRAINDICATED</td>
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<tr>
<td>RZV (preferred)</td>
<td>DELAY</td>
<td>2 doses at age ≥50 yrs</td>
<td>2 doses at age ≥60 yrs</td>
<td>2 doses at age ≥60 yrs</td>
<td>2 doses at age ≥60 yrs</td>
<td>2 doses at age ≥60 yrs</td>
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<td>2 doses at age ≥60 yrs</td>
<td>2 doses at age ≥60 yrs</td>
<td>2 doses at age ≥60 yrs</td>
<td>2 doses at age ≥60 yrs</td>
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<tr>
<td>ZVL</td>
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<tr>
<td>HPV Female</td>
<td>DELAY</td>
<td>2 doses through age 26 yrs</td>
<td>2 doses through age 26 yrs</td>
<td>2 doses through age 26 yrs</td>
<td>2 doses through age 26 yrs</td>
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<td>HPV Male</td>
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<td>1 dose</td>
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<tr>
<td>PP/SV23</td>
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<td>1, 2, or 3 doses depending on age and indication</td>
<td>1, 2, or 3 doses depending on age and indication</td>
<td>1, 2, or 3 doses depending on age and indication</td>
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</tr>
<tr>
<td>HepA</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
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<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
</tr>
<tr>
<td>HepB</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
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<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
</tr>
<tr>
<td>MenACWY</td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
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<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
</tr>
<tr>
<td>MenB</td>
<td>PRECAUTION</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td>2 or 3 doses depending on vaccine and indication</td>
</tr>
<tr>
<td>Hib</td>
<td>Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection</td>
<td>Recommended vaccination for adults with an additional risk factor or another indication</td>
<td>Precaution—vaccine might be indicated if benefit of protection outweighs risk of adverse reaction</td>
<td>Delay vaccination until after pregnancy if vaccine is indicated</td>
<td>Contraindicated—vaccine should not be administered because of risk for serious adverse reaction</td>
<td>No recommendation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Precaution for LAIV does not apply to alcoholism. 2. See notes for influenza; hepatitis B; measles, mumps, and rubella; and varicella vaccinations. 3. Immunosuppressive stem cell transplant.
4. Which immunization would be considered safe to administer during pregnancy?

A. MMR
B. HPV
C. Tdap
D. Varicella
Vaccines and Pregnancy

• Safe
  • Tdap*
  • Influenza IV
  • Hepatitis A, if at risk
  • Hepatitis B, if at risk
  • Meningococcal, if indicated
  • Pneumococcal polysaccharide, if indicated

• Wait until after pregnancy
  • MMR
  • Varicella
  • HPV
  • Influenza LAV

*ACIP Recommendations for Pregnant Women - 2013
Administer a dose of Tdap during each pregnancy, irrespective of the patient’s prior history of receiving Tdap.

Guidance for Use:
To maximize maternal antibody response and passive antibody transfer to the infant, optimal timing for Tdap administration is between 27 and 36 weeks’ gestation, although Tdap may be given at any time during pregnancy. Vaccinate AS EARLY AS POSSIBLE in the gestational age window – immunization closer to 27 weeks – infant born with higher concentration of maternal antibodies.
Key Points to the Schedule

(Adult)

- Any licensed influenza vaccine appropriate for a patient’s age and health status may now be administered.
  - The recommendation supersedes those for the previous two seasons, in which the use of the intranasal live attenuated influenza vaccine (LAIV), such as FluMist Quadrivalent (AstraZeneca), was not recommended.

- Homeless individuals are the latest addition to the list of those who should be routinely vaccinated against hepatitis A. They can receive a two-dose series of single-antigen hepatitis A vaccine (Havrix, GlaxoSmithKline; Vaqta, Merck) or a three-dose series of combination hepatitis A and B vaccine (Twinrix, GlaxoSmithKline).
  - The addition came after the CDC received reports of an outbreak of hepatitis A in multiple states in October 2018. There were 2500 cases and most occurred among people who were homeless, drug users, or both.

- For adults aged 19 years and older, ACIP recommends use of a new yeast-based single-antigen recombinant hepatitis B vaccine (Heplisav-B, Dynavax), which contains the novel cytosine-phosphate-guanine oligodeoxynucleotide 1018 adjuvant.
  - Approved by the US Food and Drug Administration in November 2017, the vaccine offers the advantage of a more rapid dosing schedule and a shorter time to protection. It's effective with two doses given 1 month apart and can also be used as part of a series with older vaccines. It costs about twice as much as its older counterparts, however.
  - There is an absence of safety data on use during pregnancy, and pregnant women should not receive Heplisav-B.

HPV Vaccine

• Begin series BEFORE age 15 (well known – antibody response STRONGER in young children)
  – Two-dose vaccine series
  – Time zero and 6-12 months
• Routine vaccination at age 11-12
  – Can begin as young as age 9 REGARDLESS of whether they have a history of sexual assault or abuse (starting at a younger age helps take the question of sexual activity out of the discussions?)
• To be considered immunized, 5 or more months MUST have passed between the first and second doses, otherwise third dose should be given at 6 months
• Immunocompromised persons (regardless of age) and ANYONE starting series AFTER age 15, 3 doses (Time 0, 1-2 months, 6 months)

Gardasil 9 for Use in Women and Men Aged 27-45 Years

- **FDA**
  - “…approval represents an important opportunity to help prevent HPV-related diseases and cancers in a broader age range” *(October 5, 2018)*

- **ACIP**
  - **June 26, 2019**
  - 10-to-4 vote, the advisory committee agreed to recommend HPV vaccination for women and men ages 27 to 45 who are not adequately vaccinated, through “shared clinical decision-making”

- **Effectiveness**
  - Study: 3200 women aged between 27 and 45 years followed for an average of 3.5 years
  - Gardasil was 88% effective in preventing the combined endpoint of persistent infection, genital warts, vulvar and vaginal precancerous lesions, cervical precancerous lesions, and cervical cancer related to HPV types covered by the vaccine
Hepatitis B Vaccine (2018)

• Adults with **chronic liver disease** (including those with Hep C infection and those with liver function enzymes twice the normal level)
  – Cirrhosis
  – Fatty liver disease
  – Alcoholic liver disease
  – Autoimmune hepatitis
• Immunize with Hep B Vaccine
Meningococcal Vaccines (2018)

• Adults with HIV (not previously vaccinated)
  – Two-dose primary series of serogroup A,C,W, and Y meningococcal conjugate vaccine (MenACWY)
  – Minimum of 2 months apart
  – Revaccinate every 5 years

• No meningococcal B vaccination routinely for adults with HIV
Herpes Zoster Subunit Vaccine

- Shingrix Vaccine (Zoster Vaccine Recombinant Adjuvanted)
  - GlaxoSmithKline
  - FDA Approved **October 23, 2017** – Adults aged 50 years and older
    - 1 million cases of shingles in US each year
  - Developed specifically to overcome the age-related decline in immune response
    - Combines an antigen, glycoprotein E, and an adjuvant system, AS01B, intended to generate a strong and long-lasting immune response that can help overcome the decline in immunity as people age

- Non-live, recombinant subunit vaccine
  - Given IM
  - Two doses (Time 0 and 2-6 months later)

- Efficacy across all age groups in prevention of shingles
  - >90%; over 4-year follow-up
  - Decreased overall incidence of postherpetic neuralgia
Prevention

Secondary

• Activities are aimed at early disease detection, thereby increasing opportunities for interventions to prevent progression of the disease and emergence of symptoms.
  – Breast cancer
Screening Tests

Effectiveness

• The disease must have serious consequences, a long preclinical phase, and effective treatment.
• The screening test must have high sensitivity and specificity, be low in cost, and be acceptable to patients.
• The risks and costs of false (+) and false (−) results must be low, there must be a consensus on management of patients with (+) results, and there must be a system in place for referral and treatment.
Screening Tests

**Sequence**

- A highly sensitive (and usually relatively inexpensive) test should be used first, almost guaranteeing the detection of all cases of the disease (albeit at the expense of including a number of false-positive results).
- This should be followed by a more specific test (and usually more expensive test) to eliminate the false-positive results.
  - Eg, this is the usual sequence if testing for HIV, hepatitis B, and many other common but serious diseases.
Breast Cancer

Screening
Breast Cancer

- Most common cause (with exception of skin) of cancer in women and the 2nd leading cause of cancer death
  - 1/8 women will develop breast cancer.
  - 1/30 will die.
- Presence of dominant inherited cancer susceptibility genes (BRCA 1 and BRCA 2) occur in about 1/300-500 of general population
  - Screening for inherited risk (USPSTF 2013)
    - Assessment of risk for significant BRCA mutations
    - Genetic testing of high-risk women (Level A)
USPSTF
August 2019

• Recommends that primary care clinicians assess women with a personal or family history of breast, ovarian, tubal, or peritoneal cancer or who have an ancestry associated with breast cancer susceptibility 1 and 2 (BRCA1/2) gene mutations with an appropriate brief familial risk assessment tool. Women with a positive result on the risk assessment tool should receive genetic counseling and, if indicated after counseling, genetic testing. B Recommendation

• The USPSTF recommends AGAINST routine risk assessment, genetic counseling, or genetic testing for women whose personal or family history or ancestry is not associated with potentially harmful BRCA1/2 gene mutations. D Recommendation
Since 2005, family history risk stratification tools have been developed and validated for use in primary care practice to guide referral for BRCA genetic counseling. In addition, the potential benefits and harms of medications for breast cancer risk reduction have been studied for longer follow-up periods, and more information is available about the potential psychological effects of genetic counseling and risk-reducing surgery.

http://www.uspreventiveservicestaskforce.org/uspstf12/brcatest/brcatestfinalrstab.htm#tab1
BRCA1 or BRCA 2 Mutation

• Can be considered for prophylactic oophorectomy and mastectomy
  – Prophylactic therapy
    • Decreases incidence of breast and ovarian cancer
    • Inadequate evidence for mortality benefits
  • Cancer Genetics Studies Consortium Recommendations for Screening
    – Monthly BSE: Age 21
    – CBE q 6-12 m starting at age 25-35 years
    – Annual mammograms starting at age 25-35 years
    – Ovarian cancer screening (US, CA-125 levels) q 6-12 months starting at age 25-35 years
Breast Cancer: Screening *(USPSTF-2016)*

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women aged 50-74 years</td>
<td>The USPSTF recommends biennial screening mammography for women aged 50 to 74 years.</td>
<td>B</td>
</tr>
<tr>
<td>Women aged 40-49 years</td>
<td>The decision to start screening mammography in women prior to age 50 years should be an individual one. Women who place a higher value on the potential benefit than the potential harms may choose to begin biennial screening between the ages of 40 and 49 years.</td>
<td>C</td>
</tr>
<tr>
<td>Women aged 75 years or older</td>
<td>The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening mammography in women aged 75 years or older.</td>
<td>I</td>
</tr>
<tr>
<td>All women</td>
<td>The USPSTF concludes that the current evidence is insufficient to assess the benefits and harms of digital breast tomosynthesis (DBT) as a primary screening method for breast cancer.</td>
<td>I</td>
</tr>
<tr>
<td>Women with dense breasts</td>
<td>The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of adjunctive screening for breast cancer using breast ultrasonography, magnetic resonance imaging, DBT, or other methods in women identified to have dense breasts on an otherwise negative screening mammogram.</td>
<td>I</td>
</tr>
</tbody>
</table>
Women Aged 40-49

- Individualize decision to begin biennial screening according to the patient’s context and values.
- The recommendation applies to women who are NOT at increased risk by virtue of a known genetic mutation or history of chest radiation.
## Decision Analysis

### Reduction of Mortality

- **Biennial Screening**

<table>
<thead>
<tr>
<th>Age</th>
<th>Reduction in mortality (compared with no screening) [Range]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-69</td>
<td>17% [15%-23%]</td>
</tr>
<tr>
<td>40-69</td>
<td>20% (considered a minor improvement)</td>
</tr>
<tr>
<td>50-79</td>
<td>24% (additional 7%)</td>
</tr>
</tbody>
</table>

*Extending the age range produced only minor improvements: Additional 3% reduction starting at age 40 years and 7% extending to age 79 years.*
Decision-Making

• How many 40-year-old women who start having screening mammograms every two years will die from breast cancer in the next 10 years?
  - 2 per 1000

• How many 40-year-old women who DO NOT start having screening mammograms every two years will die from breast cancer in the next 10 years?
  - 2.5 per 1000
Special Considerations

- Estimated lifetime risk > 20% or who have a BRCA mutation
  - Screening begins at age 25 or at the age that is 5-10 years younger than the earliest age that breast cancer was diagnosed in the family.
Timing of Screening

• Evidence indicates that biennial screening is optimal.
• Biennial schedule preserves most of the benefit of annual screening AND cuts the harms nearly in half.
Breast Cancer

Screening Methods

• Breast self-examination (BSE)
  - Studies have not clearly demonstrated BSE as beneficial for cancer screening.
  - Any benefits must be balanced against potential harms – such as excessive invasive procedures performed as a result of the discovery of noncancerous lesions.
Breast Cancer

Screening Methods

• Clinical breast exam (CBE)
  – Insufficient evidence to recommend it as a singular screening modality.
  – RCTs demonstrate varying detection rates: 3%-57%.
  – Most advocates have supported CBE as a complementary technique to mammography.
  – About 5% of screening-detected cancers are found using CBE alone.
## Recommendations of Others

<table>
<thead>
<tr>
<th>Organization</th>
<th>Year</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS</td>
<td>2015$</td>
<td>Women with average risk of breast cancer should undergo regular screening mammography starting at age 45. (45-54 years, annual; ≥55 biennial). <strong>NO CBE for screening at ANY AGE</strong></td>
</tr>
<tr>
<td>AMA</td>
<td>2002</td>
<td>Similar to ACS, except for inclusion of a Positive recommendation for BSE</td>
</tr>
<tr>
<td>AAFP</td>
<td>2009</td>
<td>Endorsed the USPSTF recommendation</td>
</tr>
<tr>
<td>ACOG</td>
<td>2011*</td>
<td>Mammography (Level B) and CBE (Level C) <strong>annually starting at the age of 40</strong>. No consensus on upper age limit of mammograms. All women should be encouraged to practice breast “self-awareness.”</td>
</tr>
<tr>
<td>WHO</td>
<td>2009</td>
<td>Mammography q 1-2 years (age 50-59). Does NOT recommend CBE or BSE</td>
</tr>
</tbody>
</table>

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$JAMA$ 2015;314(15)1599-1614.  
$Obstet Gynecol.$ 2011;118:372-382
Screening Breast MRI

• The American Cancer Society recommends screening breast MRI (impact on breast cancer mortality is uncertain):
  • Women with BRCA1 or BRCA2 gene mutations
  • Women with a first-degree relative with BRCA1 or BRCA2 gene mutations who have not as yet had genetic testing
  • Women with a lifetime risk of more than 25% as defined by risk assessment tools largely dependent on family history
  • Women who underwent radiation to the chest between ages 10-30 for Hodgkin’s disease
  • Women known to have a hereditary breast cancer syndrome, eg, Li-Fraumeni, Cowden, and Bannayan-Riley-Ruvalcaba, and their first-degree relatives
Cancer Screening 2010
CDC. *MMWR.* January 27, 2012;61(3).

• Data from the 2010 National Health Interview Survey
  – Breast cancer screening rate: 72.4% (*Healthy People 2020* target: 81.1%)
  – Other breast cancer screening rates
    • No usual source of health care: 36.2%
    • No health insurance: 38.2%
  – Overall, the proportion of women aged 50-74 years who reported having had a mammogram in the past 2 years remained stable during 2000-2010.
Informed Decision-Making

<table>
<thead>
<tr>
<th>Screening for</th>
<th>Target population</th>
<th>Age recommended to stop screening</th>
<th>Target population screening</th>
<th>Screened and age 75-79</th>
<th>Screened and age &gt; 80</th>
<th>Reported advised by physician (age 75-79)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>50-74</td>
<td>75</td>
<td>74%</td>
<td>62%</td>
<td>50%</td>
<td>62%</td>
</tr>
<tr>
<td>Prostate</td>
<td>50-74</td>
<td>75</td>
<td>40%</td>
<td>57%</td>
<td>42%</td>
<td>62%</td>
</tr>
<tr>
<td>Colorectal</td>
<td>50-74</td>
<td>75</td>
<td>48%</td>
<td>57%</td>
<td>47%</td>
<td>65%</td>
</tr>
<tr>
<td>Cervix</td>
<td>21-64</td>
<td>65</td>
<td>83%</td>
<td>53%</td>
<td>38%</td>
<td>48%</td>
</tr>
</tbody>
</table>

• National Health Interview Survey (2005 and 2008); 49,575 adults
  ~50% of these older adults report their physicians recommended the cancer screening.
  Physician recommendation was the strongest predictor of obtaining the screening.

• Critical role for healthcare providers to make informed screening decisions for older adults
  Functional status, comorbidities, life expectancy, personal preferences
Breast Cancer Screening

Conclusions

• Has resulted in an increase in diagnosis of localized disease without a commensurate decrease in the incidence of more widespread disease
• It cannot predict which of the discovered cancers are more aggressive, and cannot accurately detect premalignant lesions
• The decrease in the mortality rate of breast cancer is due BOTH to earlier detection and better follow-up medical care
<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women at increased risk for breast cancer*</td>
<td>Clinicians offer to prescribe risk-reducing medications, such as tamoxifen, raloxifene, or aromatase inhibitors, to women who are at increased risk for breast cancer and at low risk for adverse medication effects.</td>
<td>B</td>
</tr>
<tr>
<td>Women not at increased risk for breast cancer</td>
<td>Recommends against the routine use of risk-reducing medications, such as tamoxifen, raloxifene, or aromatase inhibitors, in women who are not at increased risk for breast cancer.</td>
<td>D</td>
</tr>
</tbody>
</table>

- **National Cancer Institute (NCI) Breast Cancer Risk Assessment Tool**, estimates a woman’s risk of developing breast cancer over the next 5 years. There is no single cutoff for defining increased risk for all women.*
- **Women at greater risk, at least a 3% risk for breast cancer in the next 5 years, are likely to derive more benefit than harm from risk-reducing medications and should be offered these medications if their risk of harms is low.**
- Some women at lower risk for breast cancer have also been included in trials documenting reduced risk for breast cancer when taking tamoxifen, raloxifene, or aromatase inhibitors. However, when balancing the harms associated with these medications, the net benefit will be lower among women at lower risk.
The Breast Cancer Risk Assessment Tool allows health professionals to estimate a woman's risk of developing invasive breast cancer over the next 5 years and up to age 90 (lifetime risk).

This tool cannot accurately estimate breast cancer risk for:
- Women carrying a breast-cancer-producing mutation in BRCA1 or BRCA2
- Women with a previous history of invasive or in situ breast cancer
- Women in certain other subgroups

The tool has been validated for white women, black/African American women, Hispanic women and for Asian and Pacific Islander women in the United States. The tool may underestimate risk in black women with previous biopsies and Hispanic women born outside the United States. Because data on American Indian/Alaska Native women are limited, their risk estimates are partly based on data for white women and may be inaccurate. Further studies are needed to refine and validate these models.

https://bcrisktool.cancer.gov/
<table>
<thead>
<tr>
<th>Agent</th>
<th>Type</th>
<th>Comment</th>
<th>SOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamoxifen</td>
<td>SERM</td>
<td>FDA-approved; primary prevention of breast cancer in high-risk women. It can decrease the risk of developing breast cancer (specifically estrogen-receptor–positive breast cancer) by up to 48%; only FDA-approved medication for the chemoprevention of breast cancer in premenopausal women</td>
<td>A</td>
</tr>
<tr>
<td>Raloxifene</td>
<td>SERM</td>
<td>Approved for the chemoprevention of breast cancer in postmenopausal women, but not premenopausal women</td>
<td>A</td>
</tr>
<tr>
<td>Letrozole</td>
<td>Aromatase inhibitor</td>
<td>Approved for chemoprevention of breast cancer in postmenopausal women but are not approved for premenopausal women. Aromatase inhibitors block the conversion of androgens to estrogen but cannot block ovarian production of estrogen, so they do not work in premenopausal women unless the woman is also taking a gonadotropin-releasing hormone inhibitor.</td>
<td>A</td>
</tr>
<tr>
<td>Combined OCPs</td>
<td>-</td>
<td>Can be used for the prevention of ovarian cancer and endometrial cancer but does NOT prevent breast cancer</td>
<td>C</td>
</tr>
<tr>
<td>Progesterone</td>
<td>-</td>
<td>Does NOT reduce the risk for breast cancer</td>
<td>A</td>
</tr>
</tbody>
</table>
Prevention

Tertiary

• Reduces the negative impact of an already established disease by restoring function and reducing disease-related complications

• e.g. Heart Failure

➢ The definition of HF has now expanded to:
  ▪ HF with reduced ejection fraction (HFrEF, EF ≤40%)
  ▪ HF failure with preserved ejection fraction (HFpEF, EF ≥50%)
  ▪ HFpEF, borderline (EF 41-49%)
  ▪ HFpEF, improved (EF >40%)
5. A 74 yo female with New York Heart Association class II heart failure and a left ventricular ejection fraction of 34% is on optimal dosages of an ACE inhibitor, a β-blocker, and rosuvastatin. Her past medical history is notable only for a long history of hypertension. She is a nonsmoker and reports that she has a small glass of blush wine with dinner each evening. On examination, she has a blood pressure of 126/72 mm Hg and a BMI of 28.2 kg/m². Her chest is clear and her cardiac examination is notable only for an S₄. **Self-help measures recommended for patients such as this include which one of the following?**

A. A sodium intake ≤ 4000 mg/day  
B. Strict avoidance of alcohol consumption  
C. Avoiding NSAID use  
D. A weight-loss program with a goal BMI of 25 kg/m² or less
The following are 10 points to remember about the ACCF/AHA 2013 guideline for the management of heart failure (HF):

• The definition of HF has now expanded to: a. HF with reduced ejection fraction (HFrEF, EF ≤40%) b. HF failure with preserved ejection fraction (HFpEF, EF ≥50%) c. HFpEF, borderline (EF 41-49%) d. HFpEF, improved (EF >40%).
• The number of patients with HF, as well as the cost to treat patients with HF, is expected to increase in the future.
• All causes of HF must be evaluated, with consideration of multigenerational family histories and genetic testing.
• Risk factors need to be continually addressed when managing a patient with HF: hypertension, lipid disorders, obesity, diabetes mellitus, tobacco use, and known cardiotoxic agents.
• There is a clear mortality benefit from using guideline-directed medical therapy.
The following are 10 points to remember about the ACCF/AHA 2013 guideline for the management of heart failure (HF):

• Anticoagulation should not be used in patients with chronic HFrEF with no risk factors (atrial fibrillation, thromboembolic event, or cardioembolic source).
• Aim for control of systolic and diastolic blood pressures, as well as volume status, to treat HFpEF.
• Re-evaluate patients with left ventricular EF ≤35%, New York Heart Association class II-IV, left bundle branch block, and a QRS ≥150 ms for cardiac resynchronization therapy.
• HF education, dietary restrictions, and exercise training should be provided for all patients to enhance self-care.
• An HF multidisciplinary team, including a palliative care team, should be involved when treating patients with advanced HF.
Heart Failure

- Daily weight
- Low sodium diet
  - ≤ 2400 mg per day
- Medications
  - Beta blocker
  - ACE inhibitor
  - Diuretic
  - (+/-) Digoxin
- Echocardiogram

ACC/AHA 2013 Guideline for the Diagnosis and Management of Chronic Heart Failure in the Adult
Self-Help and Chronic Disease

• HF patient must deal with his/her condition on a daily basis; help from clinicians is not always available.
  • Partnership model of care
  • Responsibility shifts from the physician to the patient, encouraging shared decision-making and steering away from the passive patient/expert doctor paradigm.
• Patients have been found to have better outcomes simply by wielding more power in the doctor/patient encounter.
• Educating patients to self-manage their chronic diseases has been shown to lead to increased levels of functioning, reduced pain, and decreased health care costs (Hibbard, 2003).
Self-Help

• *Advocated as a Method of Improving Outcomes in Patients with Heart Failure*
• Sodium Intake $\leq$ 2400 mg daily (AHA)
  • Same amount recommended for healthy adults
• Fluid restriction to $< 2$ L/day may be appropriate for patients with hyponatremia or persistent or recurrent fluid retention; more liberal intake appropriate for stable HF patients.
Self-Help

• Avoid NSAID use.
  - Shown to increase the risk for renal insufficiency and hospitalization
• Available studies indicate that survival is highest in patients with a BMI of 30-32 kg/m$^2$; no studies have demonstrated a survival benefit from weight loss in patients with heart failure.
  - AHA guidelines currently recommend that weight loss be encouraged only in patients with a BMI > 40 kg/m$^2$. 
Self-Help

• Several epidemiologic studies have failed to demonstrate a correlation between alcohol consumption and the development of heart failure.
  - Exception: Patients with alcoholic cardiomyopathy, who should abstain from alcohol use
  - Heart failure patients who choose to drink should be advised to limit their alcohol intake to no more than 1-2 drinks a day.
Avoidance of physical exertion has been advised in the past; it is now thought that a reduction in physical activity leads to physical deconditioning and an unnecessary worsening of symptoms.

Exercise training 3-5 days a week should be considered in all stable outpatients with chronic heart failure.
Symptoms of Heart Failure

Recommended Therapy

Known structural heart disease AND shortness of breath and fatigue, reduced exercise tolerance

Goals
- Treat hypertension.
- Encourage smoking cessation.
- Treat lipid disorders.
- Encourage regular exercise.
- Discourage alcohol intake, illicit drug use.
- Control metabolic syndrome.

Therapy

Drugs for routine use
- Diuretics
- ACE I
- Beta blockers

Drugs in selected patients
- Aldosterone antagonist
- ARBs
- Digitalis
- Hydralazine/nitrates

Devices in selected patients
- Biventricular pacing
- Implantable defibrillators

AMERICAN ACADEMY OF FAMILY PHYSICIANS
CRT

• Keeps the right and left ventricles pumping together by sending small electrical impulses through the leads
Cardiac resynchronization therapy (CRT) and implantable cardioverter defibrillator (ICD) for HF patients with either sinus rhythm (SOR A) or atrial fibrillation (SOR B) who meet the following criteria:

- LVEF ≤35%
- NYHA class II (LOE-B; 2013), class III or ambulatory class IV (LOE A) heart failure symptoms despite optimal medical therapy
- QRS interval of ≥0.12 seconds (2013 ≥ 0.15 seconds)
Resynchronization-Defibrillation for Ambulatory Heart Failure Trial

- Addition of CRT to ICD resulted in reduced rates of hospitalization and death among patients with NYHA class II or III heart failure, a wide QRS complex, and an LVEF ≤ 30% (SOR A).
  
- Meta-analysis has confirmed that CRT improves LVEF and reduces all-cause mortality and HF hospitalization in all patients with a reduced LVEF, symptoms of HF, and a prolonged QRS interval, regardless of NYHA class.

Refractory Heart Failure

• Patients who have marked symptoms at rest despite maximal medical therapy

• Options:
  – Compassionate end-of life care, hospice

• Extraordinary measures
  • Chronic inotropes
  • Permanent mechanical support
  • Experimental surgery or drugs
  • Heart transplant
Heart Transplantation

• Generally not performed in patients over the age of 65–70
• No shortage of recipients; primary limiting factor is lack of donors
• Recipients need lifelong immunosuppressant therapy
Summary

• Effective health promotion
  − Lifestyle modification: 3 leading causes of morbidity in the US
  − Counseling

• Prevention
  − Primary e.g., Immunizations
  − Secondary e.g., Breast cancer
  − Tertiary e.g., Heart failure

− Quaternary
  • Set of health activities to mitigate or avoid the consequences of unnecessary or excessive intervention of the health system. It is the practice of “first do no harm.”

• Screening
  − Done in asymptomatic persons, typically secondary prevention
Thank you!
References


Answers

1. B
2. E
3. C
4. C
5. C
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Obesity and Metabolic Syndrome

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Disclosure Statement

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Learning Objectives

1. Define metabolic syndrome and its link to overweight and obesity.
2. List the diagnostic criteria for metabolic syndrome.
Obesity/Metabolic Syndrome

40% of U.S. adults are obese; 20% of children; 47% of blacks and Hispanics
2/3 of Americans are overweight or obese (75% of men and 67% of women)
12.7% of American children are obese (highest rate in the world)

In 1980 no state was >15%

Worldwide obesity trends in children
1975: 11 million
2016: 213 million

$147 billion yearly in health care costs

CDC data
1. A 10 yo male has a BMI of 20. He is considered overweight because:

A. His BMI is $>95^{\text{th}}$ percentile for height and age
B. His BMI is $>95^{\text{th}}$ percentile for gender and height
C. His BMI is $>85^{\text{th}}$ percentile for age and gender
D. This is a normal BMI
Overweight and Obesity

• Overweight: ≥25 kg/m²
• Obesity: ≥30 kg/m²
• Children
  – Overweight >85th % for age and gender** (25% in U.S.)
  – Obese >95th % for age and gender (7% in U.S.)

Boys BMI charts: http://www.cdc.gov/growthcharts/data/set1clinical/cj41l023.pdf
Obesity Implications

• 2 times risk of/mortality from cardiovascular disease – 2/3 of obesity-related deaths
• 5 times the risk of diabetes
• Increases risk for
  – Osteoarthritis, sleep disturbance
  – Fatty liver and cholesterol gallstones
  – Asthma and other respiratory disturbances
  – PCOS, abnormal menses, infertility, menstrual disorders
  – *Cancers: obesity related increasing and others are decreasing
    • GI: esophagus, stomach, colorectal, liver, gallbladder, pancreas
    • Female: breast (postmenopausal), uterus, ovary
    • Others: kidney, meningioma, thyroid, multiple myeloma
• Psychological implications
  – Behavior and learning problems, depression, low self-esteem, eating disorders, altered body image, more likely to be bullied

46% increase inpatient costs
27% more physician visits
80% increase in prescription drug costs
Screening and Prevention

USPSTF and AAFP recommend screening everyone ≥ age 6 for obesity

• Preventing obesity from conception through childhood
  – Limit gestational weight gain
  – No maternal smoking
  – Infants should sleep at least 12 hours daily
  – Breastfeed at least 12 months
  – Delay solid foods until at least 4 months of age
  – Daily activity for at least one hour
  – Limit screen time to 2 hours/day

• Offering teens comprehensive, intensive behavioral interventions to promote healthy weight
  • 26 patient contact hours
  • Child and parents
  • Healthy eating and safe exercise
  • Stimulus control
  • Supervised physical activity
Metabolic Syndrome*

• National Cholesterol Education Program’s Adult Treatment Panel III (NCEP/ATP III) guidelines
• Combination of 3 of the following

  - Fasting glucose $\geq 110$ mg/dL
  - Waist circumference $>40$” men, $>35$” women (Asians ♂ $>35.4”$, ♀ $>31.5”$)
  - HDL $<50$ mg/dL women, $<40$ mg/dL men
  - Triglycerides $\geq 150$ mg/dL
  - Blood pressure $\geq 130/85$ mm Hg

• Abdominal obesity and insulin resistance
• Atherogenic dyslipidemia and elevated BP
• Worse endothelial function and greater arterial stiffness
• Pro-inflammatory and pro-thrombotic state

WHO includes microalbuminuria
Obesity and the Metabolic Syndrome

• Development of obesity involves
  − Genetics, metabolic factors, gut bacteria, sleep dysfunction
  − Physical inactivity
  − Calorie-dense and ultra-processed foods
  − Psychological and behavioral (18-30% increased risk with PTSD)

• Medical
  − Thyroid disease
  − Cushing syndrome
  − PCOS

• Medications
  − Corticosteroids
  − Antidiabetic agents (sulfonylureas, insulin)
  − Anti-seizure (gabapentin, divalproex)
  − Anxiolytics (alprazolam)
  − 2nd generation antipsychotics (olanzapine)
  − Antidepressants (amitriptyline, mirtazapine)

Adverse outcomes with 10-20 lb weight gain in young adults

Highest quartile for consumption of ultra-processed foods had 25% increase in cardiovascular and cerebrovascular disease
Treatment Target and Benefits

• Obesity is the primary target for treatment of metabolic syndrome
  – Weight reduction
  – Increased physical activity

• Benefits of weight loss
  – Lowers cholesterol and triglycerides; raises HDL
  – Lowers blood pressure
  – Decreases glucose and insulin resistance
  – Lowers diabetes risk, HgbA1c levels
  – Decreases need for diabetes and cholesterol medications
  – Decreases CRP and PAI-1
  – Improves sexual function and sex hormones

Counsel overweight and obese adults with CV risk factors that lifestyle changes producing even modest sustained weight loss of 3-5% results in clinically significant health benefits; greater weight loss produces greater benefits. (A recommendation)
Prediabetes

• Based solely on plasma glucose
• Increased risk of developing diabetes
  – A1c 5.7-6.4%
  – Impaired fasting glucose (100-125 mg/dL)
  – Impaired glucose tolerance (140-199 mg/dL after 75 g load)

• Increases cardiovascular and all-cause mortality even at lowest A1c

• In Chinese study associated with high levels of IgE

• Weight stabilization prevents progression to diabetes in both adolescents and adults

Drinking sugared beverages and smoking increase risk for diabetes
2. A 23 yo male presents for a work physical. His blood pressure is 140/85 mm Hg, and his waist measures 47 inches. A lipid panel reveals an LDL of 138 mg/dL, HDL of 35 mg/dL, and triglycerides of 237 mg/dL. When you call with his lab results, you recommend

A. Starting the DASH diet
B. Starting monthly visits for weight loss counseling
C. Starting metformin at 500 mg/day
D. Starting simvastatin at 10 mg/day
The USPSTF recommends**: Advise overweight and obese individuals who would benefit to participate for ≥6 months in a comprehensive “high-intensity’ lifestyle program that assists participants in adhering to a lower calorie diet and increasing physical activity through the use of behavioral strategies (A recommendation)

- Intensive counseling: >1 session/month for >3 months*
- Obesity Society Guidelines: ≥14 face-to-face sessions over 6 months
- Individualized lifestyle interventions better than group or social networks
  - Reduced calorie intake (≥500 kcal/day)
  - Aerobic physical activity ≥150 min/week (200-300 min/week)
  - Resistance training ≥2 times/week
- Weight loss (cut calories 500-1000 kcal/d)
  - 3500 kcal = 1 pound** (20 oz soda = 250 kcal)
3. A 27 yo female with a BMI of 39 requests help with a diet. You tell her:

A. There is no weight loss diet that is better than the others
B. The Mediterranean Diet is the best weight loss diet
C. Decreasing intake by 500 calories a day will result in the recommended 2-pound weekly weight loss
D. Avoid the commercial weight loss programs because they don’t produce results
Diets

• No diet has been shown to be better than others for weight loss
  − Low carb are fastest and reduce insulin resistance; that edge is lost by 6 months
  − Structured plans (Weight Watchers, Biggest Loser, Jenny Craig, etc.) good long term, but only if they stay on the plan (can be very costly)
  − Satiety plans (AmIHungry.com, Volumetrics) successful long term
  − Raw food, vegetarian, Paleo diets are all effective due to reduced calories
  − HCG: just an extremely low-calorie diet – 500 calories/day
  − More frequent smaller meals
  − Intermittent fasting

• Mediterranean diet and DASH (not weight loss diets) are healthiest
  − Decreases risk of DM, CVD, PVD
  − Improves diabetes even in the absence of weight loss

• Energy deficit of 500-750 kcal/day or 30% energy deficit
  − Women 1200-1500 kcal/day; Men 1500-1800 kcal/day

• Maximal weight loss at 6 months is 4-12 kg (5-10%)
• Lesser losses up to 2 years of 3-4 kg due to slow weight regain
• No benefit from artificial sweeteners
• Therapeutic Lifestyle Changes (TLC)
  – National Heart, Lung, and Blood Institute
  – ADA, AHA, Obesity Society
  – Designed to decrease risk of developing heart disease
  

• TLC Dietary Guidelines
  
  <7% of daily calories from saturated fat (no trans fats)
  25-35% of total daily calories from fat
  <200 mg of dietary cholesterol daily
  <2400 mg of sodium daily
  2 grams/day of plant stanols or sterols
  10-25 grams/day of soluble fiber
  Just enough calories to maintain a healthy weight

Calories/gram
Carbohydrates 4
Alcohol 7
Fat 9
Other Dietary Changes for Diabetes

- Healthy diet (Mediterranean style – rich in monounsaturated fats) decreases mortality
- Increase amount and variety of seafood
- Whole grains, fruits, veggies, low fat dairy
  - 2 servings whole grains = 21% ↓ diabetes
- Limit alcohol
- Increase potassium, calcium, Vitamin D, magnesium in food sources
- Increase B12 as patients age and with metformin
- 5% weight loss decreases fasting glucose
- Diet and exercise continue to be the best way to prevent type 2 diabetes (27% reduction at 15 years vs 18% for metformin)
- Excess use of sugar-sweetened beverages increases risk for diabetes*
- Non-nutritive sweeteners are acceptable*

Treat hypoglycemia with carbohydrate sources high in protein
Exercise

• 5-7 times/wk, 30 minutes (45-60 min for weight loss)
  − 150 min/wk of **moderate** aerobic activity
  − 55-69% predicted max. heart rate
  − Resistance training – 5 major muscle groups twice weekly
  − At least 1 hour daily for children (reduce screen time to <2 hr/day)

• 10% decrease in cardiovascular risk for every 10,000 steps/day at baseline

• **Aerobic and resistance training** best approach

• Exercise enhances insulin action in skeletal muscles

• Structured: 2-5 supervised sessions for 12-16 weeks

• Exercise before and during *pregnancy* reduces risk of developing gestational diabetes; exercise after pregnancy decreases risk of developing diabetes

In type 1 diabetes: *Athletes* should not participate in strenuous activity if glucose >300 mg/dL or >250 mg/dL with urine ketones*
Weight Loss Maintenance

• Eat breakfast daily* – new data disputes this (*BMJ 2019;364:l42)
• Face-to-face or telephone-delivered maintenance programs
• Provide at least monthly contact with interventionist
• Learn to eat when hungry and eat slowly
• Maintain high levels of physical activity (200-300 min/wk)
• Monitor body weight at least once a week
• Consume a reduced calorie diet to maintain body weight
  (National Weight Control Registry: lost substantial weight and maintained for ~ 5 yr)
Pharmacologic Treatment of Metabolic Syndrome

- **Metformin** and pioglitazone
  - Decrease insulin resistance
  - No data on CVD risk reduction
- **Statins** reduce CVD risk but increase DM risk
- **Fibrates** modify atherogenic dyslipidemia
- **Antihypertensives** (ACE inhibitors)
- Low-dose aspirin is promising
  - No medications target PAI-1 and fibrinogen
  - Treat prothrombotic state with antiplatelet meds
- **Delay onset of diabetes**
  - Lifestyle, metformin (especially after gestational diabetes), acarbose*, liraglutide, orlistat, pioglitazone, SGLT-2 inhibitors, Tianqi (Chinese herbal)
4. A 57 yo female with a BMI of 37 has tried 6 months of intensive behavior weight change and has only lost 7 pounds. She has adequately treated hypertension (135/85) and diabetes with A1c in the 8 range. She is on sertraline (Zoloft) for depression. She is requesting weight loss medication. What would be the best choice?

A. Topiramate (Topamax)

B. Phentermine (Adipex)

C. Lorcaserin (Belviq)

D. Liraglutide (Saxenda)
General Principles for Medications

• Indicated for BMI ≥30 or ≥27 with comorbid conditions
• Use only approved weight loss medications
• Monitor monthly for 3 months then every 3 months
• Continue use only if weight loss is >5% in 3 months
• Recommended diabetes medications for patients on a weight loss program: metformin, GLP-1 analogs, or SGLT-2 inhibitors
• In patient with cardiovascular disease, consider orlistat and lorcaserin
• Consider weight gain when choosing antidepressants, antipsychotics, anti-seizure medications, injectable contraceptives
Weight Loss Medications

• Orlistat (Xenical) 120 mg tid or OTC as alli 60 mg tid (with meals) – approved in children ≥12 years of age
  – Blocks fat breakdown and absorption; GI side effects (diarrhea, gas)
  – Supplement with vitamins if taking long-term
  – ? Severe liver damage ?

• Lorcaserin (Belviq) 5-HT$_{2c}$ serotonin receptor agonist 10 mg bid
  – Controlled substance, promotes satiety
  – Side effects: dizziness, fatigue, headaches, memory problems, constipation, possible serotonin syndrome with SSRI
  – Responders >5% weight loss, non-responders <2%
Weight Loss Medications

• **Phentermine** (Adipex) 15, 30, 37.5 mg daily
  - Appetite suppressant, amphetamine derivative
  - Don’t use in hypertensive patients
  - Licensed for short-term use only

• **Phentermine/Topiramate** (Qsymia) 3.75/23 mg starting; increase to 7.5/46 mg/d
  - Approved for long-term use; 10-14% weight loss
  - Taper when stopping
  - Side effects: numbness, dizziness, insomnia, constipation
  - Not for use in pregnancy (cleft palate) or in hyperthyroidism or glaucoma
Weight Loss Medications

• **Bupropion-naltrexone** (Contrave) 8 mg/90 mg 2 bid
  – Decreases appetite and food cravings
  – Increases seizure and suicide risk, increases blood pressure/heart rate
  – GI side effects, headache, dizziness, dry mouth

• **Liraglutide** (Saxenda) 0.6 mg/d SC; increase weekly to 3 mg/d
  – GLP-1 agonist, increases satiety, slow gastric emptying
  – 1/3 lose 10% of body weight
  – Little CNS effect, risk of pancreatitis, nausea, vomiting, diarrhea, constipation

• No evidence for hoodia, green tea, guar gum, raspberry extract, garcinia, guarana
Bariatric Surgery

• Most effective form of weight loss***
  • Patients with a BMI of 40 kg per m² or greater and those with a BMI greater than 35 kg per m² who also have obesity-related comorbidities should be referred for consideration of bariatric surgery
    – Generally indicated ages 18-65
    – Psychological and Motivation evaluation
    – Average weight loss 12-17 BMI units
      80% less likely to develop diabetes

Reduces all-cause mortality (primarily cardiac)*
Gastric Balloon

• Naturally swallowed.
• Filled with water through an attached tube that is then removed.
• Effectively reduces stomach capacity.
• Designed to burst in about 16 weeks and pass through the gut.
5. Which is a common complication of bariatric surgery?

A. Pulmonary embolus
B. Cholelithiasis
C. Malnutrition
D. Myocardial infarction
Complications

• <0.3% mortality after bariatric surgery
  – Lowest with gastric sleeve; Highest with gastric bypass
  – #1 cause of death following bariatric surgery is pulmonary embolus**

• Most common complications
  – Gallstones up to 50% (prophylactic cholecystectomy; bile salt therapy)
  – Dumping syndrome NVD, tachycardia, salivation, dizziness – caused by influx of undigested carbohydrates into the jejunum
  – Nausea and vomiting (restrictive procedures)
  – Iron deficiency anemia (15% with malabsorptive surgery)
  – Nutritional deficiencies (malabsorptive surgery)
  – Wound site infections
  – Reoperations 8%
  – Hernias

Rates of serious complications are inversely associated with hospital and surgeon procedure volume.
Gastric Banding

• Restrictive procedure
• Most effective for overeaters with lower BMI
• Band can be adjusted by changing amount of saline
• Least mortality; fewest complications; least weight loss; and least effect on diabetes, hypertension and lipids
• 47.6% of Medicare costs for this surgery are for re-operations

Complications
- Port complications (infection, stenosis)
- Band slippage, Erosion of gastric wall
- Gastritis, GERD
- Hernia

Most common reason for removal: inadequate weight loss
Sleeve Gastrectomy

Restrictive procedure; done by laparoscopy
More weight loss than gastric banding
Slower and steadier weight loss
Weight gain after 5-6 years
Fewest complications

Reduces the “hunger hormone” ghrelin

75% of stomach removed
Roux en Y

- Both restrictive and malabsorptive
- Long-term weight loss in adolescents

- Laparoscopic approach has fewer complications than open approach

- Adverse outcomes
  - Mortality: 0.2%
  - DVT and/or PE: 0.4%
  - Reoperation: 3-5%
  - Any complication: 2-18%
  - Laparoscopy complications: 4-5%
  - More food intolerance and GI side effects
Psychological Evaluation

• Reasons for seeking surgery
• Weight and diet history
• Current eating behaviors
  − 10-25% meet criteria for binge eating disorder
  − Attitudes and feelings toward exercise
• Understanding of the surgery
• Social supports and history
• Psychiatric history
  − 5 times rate of depression
  − 23-47% are using psychotropic medications
  − Millon Behavioral Medicine Diagnostic
Monitoring and Supplementation
(Roux en Y)

• Labs every 3 months for 1st year
  − CBC
  − Glucose, electrolytes
  − Creatinine

• Every 6 months for 1st year
  − LFTs
  − Protein and albumin
  − Iron, TIBC, ferritin
  − Vitamin B12, folic acid, thiamine
  − Calcium, parathyroid hormone, vitamin D
  − Lipids

Supplement with:
- Calcium
- Vitamin D
- B12
- Folate
- Iron
- Multivitamin

60-120 g protein

Yearly DEXA scan
Am. Society of Endocrinology
After Bariatric Surgery

**NSAIDs should be avoided**
- Increased risk of anastomotic ulcers and perforation

• Pregnancy should be avoided for 12-18 months
  - Decreased absorption of oral contraceptives so consider an alternative treatment

• Avoid insulin secretagogues and decrease insulin
• Extended release or enteric coated medicine should be avoided postoperatively
Efficacy of Bariatric Surgery

• Weight loss 3 years post surgery
  – Gastric banding: 16-55%
  – Gastric bypass: 32-71%

• Resolution of diabetes
  – Gastric banding: 31-77%
  – Sleeve gastrectomy: 80-93%
  – Gastric bypass: 72-100%

• Others
  – Improved quality of life
  – Reduction in medication use
  – Significantly lower risk of MACE (major adverse cardiovascular event)
  – Improved lipids and blood pressure
  – Improvements in obstructive sleep apnea
  – Improved fertility in women
  – Improved physical function
Bariatric Surgery and Diabetes

• Up to 75% of obese patients have complete resolution of diabetes following bariatric surgery
• Roux-en-Y is most effective
• Mortality rates 3-4 X higher in those treated with oral medications vs. surgery**
• Best chance for diabetes remission
  – Young
  – Lower A1c concentrations
  – Not using insulin
  – Not using sulfonylureas or insulin sensitizers
• Only long-term study showed sustained remission after 15 years at 30%
6. The USPSTF recommends screening for diabetes in which of the following groups?

A. All persons with a BMI $>30 \text{ kg/m}^2$
B. All obese persons beginning at age 35
C. All children who are above the 85th percentile for weight
D. All persons age 40-70 who are overweight
USPSTF Screening Recommendations

• Screen asymptomatic adults age 40-70 years who are overweight or obese as part of a cardiovascular risk assessment
• If abnormal, offer intensive behavioral counseling interventions to promote healthful diet and physical activity
• Rescreen every 3 years
• A1c is not sensitive or specific – population interventions might be a better option – but point of care A1c does identify more diabetes and prediabetes
American Diabetes Association Screening Recommendations

• Screen at age 45 then every 3 years if normal
• Screen if BMI ≥25 (Asians BMI ≥23) and 1 additional risk factor
  – Physical inactivity
  – Family history of diabetes (esp. in 1st degree relative)
  – High-risk ethnic population
  – Previous Gestational Diabetes or baby >9 lbs
  – Hypertension
  – History of vascular disease
  – Dyslipidemia (HDL <35 / triglycerides >250)
  – History of impaired glucose tolerance
  – Clinical conditions associated with diabetes (acanthosis nigricans)
  – PCOS (polycystic ovary syndrome)
  – History of cardiovascular disease

Note that these are the risk factors for diabetes.
Screening for Type 2 Diabetes in Children*

• Every 2 years at age 10 or puberty if
  • BMI or weight >85% (>120% of ideal)*
  • 2 of the following risk factors
    • Family history 1\textsuperscript{st} or 2\textsuperscript{nd} degree relative
    • High-risk ethnic/racial group
    • Signs or symptoms of insulin resistance (acanthosis nigricans, hypertension, dyslipidemia, polycystic ovarian disease)
Summary

• Provide intensive diet and exercise counseling
• Multidisciplinary team approach (dietitian, personal trainer, psychologist, behavioral therapist)
• Intervention should last at least 3-4 months
• Consider adding medication when patients are at a plateau
• Consider bariatric surgery when the above fail, particularly if BMI >40 or with comorbid conditions.
References


References

• Grief SN, Miranda RL. Weight loss maintenance. Am Fam Physician 2010;2(6):630-4
• Kuehn BM. Heritage diets and culturally appropriate dietary advice may help combat chronic diseases. JAMA November 27, 2019. doi:https://doi.org/10.1001/jama.2019.18431
Intensive Behavioral Counseling Example

**Assess:** Obesity risks and comorbidities, motivation for weight loss, previous weight loss efforts, current behavior

**Advise:** Method and amount of weight loss, dietary counseling, physical activity counseling

**Agree:** Goal setting – 1-3 goals mutually agreed upon

**Assist:** Behavioral therapy, motivational interviewing, addressing barriers, weight loss medicines, meal replacements, bariatric surgery referral

**Arrange:** Follow-up and referrals
Answers

• C
• B
• A
• D
• B
• D
The Major Arthritides

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University of North Carolina SOM
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Learning Objectives

1. Cite a systematic approach to the diagnosis of arthritic disorders.
2. Discuss the Dx & management of RA, OA, & gout.
3. Identify indications and use of disease-modifying antirheumatic drugs.
1. A 34 yo F with Hx of lupus presents with acute pain, rubor, calor and swelling in her left knee. She denies recent trauma and is currently taking hydroxychloroquine and prednisone. Her other SLE sx have been well-controlled. The most likely cause of this patient’s knee pain is:

A. Infectious arthritis  
B. Patellofemoral syndrome  
C. Rheumatoid arthritis  
D. Sjögren syndrome  
E. Systemic lupus erythematous flare
An Approach to Articular Disease

Look for 1 of 3 patterns

• Monoarticular
• Symmetric Polyarticular
• Asymmetric Polyarticular
Acute Monoarthritis

• Inflammation (swelling, tenderness, warmth) in one joint
• Occasionally polyarticular diseases can present with monoarticular onset: (RA, JRA, reactive and enteropathic arthritis, sarcoid, viral, psoriatic arthritis)
• The most critical diagnosis to consider is – acute infection
# Monoarticular Differential

<table>
<thead>
<tr>
<th>Common</th>
<th>Less Common</th>
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<tbody>
<tr>
<td>Osteoarthritis</td>
<td>Rheumatologic</td>
</tr>
<tr>
<td>Crystals (Gout)</td>
<td>- Ankylosing spondylitis</td>
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<tr>
<td>Trauma</td>
<td>- JRA</td>
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<tr>
<td>Infectious</td>
<td>- Psoriatic arthritis</td>
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<tr>
<td>Septic</td>
<td>- Reactive arthritis</td>
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<td>Viral</td>
<td>- Sarcoidosis</td>
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<td>Neoplastic</td>
<td>- SLE</td>
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<tr>
<td>Overuse</td>
<td>Hemoglobinopathies</td>
</tr>
<tr>
<td>Vascular (Necrosis)</td>
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</tbody>
</table>
Symmetric Polyarthritis

- Rheumatoid Arthritis
- Systemic Lupus Erythematosus (Skin findings)
- Psoriatic Osteoarthritis
- Scleroderma
- Polymyalgia Rheumatica (older pt with shoulder/hip symptoms)
- Lyme disease
- CPPD (pseudogout)
- Sarcoid (CXR)
- Spondyloarthropathy (IBD)
Key Points in the Approach to Arthritides

1. Distinguish arthritis from non-articular, soft tissue syndromes
   - “Active” ROM restriction implies soft tissue
   - “Passive” ROM (intra-articular) implies joint involvement

2. Distinguish single-joint from multiple-joint involvement

3. Mechanical vs. inflammatory mechanism
<table>
<thead>
<tr>
<th>Diagnostic Clues</th>
<th>Conditions</th>
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</thead>
<tbody>
<tr>
<td>Active ROM restricted</td>
<td>Periarticular</td>
</tr>
<tr>
<td>Back pain/eye inflammation</td>
<td>Ankylosing spondy</td>
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<tr>
<td>Coagulopathy</td>
<td>Hemarthrosis</td>
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<td>Diuretics/renal stones/tophi</td>
<td>Gout</td>
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<td>Sarcoidosis</td>
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</tbody>
</table>
2. A 59 yo F presents with symptoms of fatigue, mild weight loss, and morning stiffness in both hands lasting more than an hour. She notes worsening tenderness in her MCPs and DIP’s bilaterally. Which of the following is the most specific to the diagnosis of this inflammatory process?

A. High ESR
B. Positive ANA
C. Rheumatoid joint erosions
D. Rheumatoid factor
Rheumatoid Arthritis

Rheumatoid joint erosions most specific to RA diagnosis

Typically associated with RA
- High ESR
- Positive ANA
- Positive RF
3. When using the Joint Score Classification, which of the following does not contribute toward a diagnosis of RA?

A. 4-10 small joints affected
B. + Rheumatoid factor
C. + Sedimentation rate
D. Duration of symptoms less than 6 weeks
E. + Anticyclic citrullinated peptide antibodies
Criteria for RA

Every patient with \( \geq 6 \) points is unequivocally positive for RA
- Patients with sx in \( \geq 1 \) joint with clinical synovitis not explained by another diagnosis.

4 areas considered in diagnosis
- **Number of Joints:**
  - 2-10 large joints = 1; 1-3 small joints = 2; 4-10 small joints = 3; > 10 small joints = 5
- **Serology:** + RF and ACPA
- **Acute Phase reactants:** + CRP/ESR
- **Duration of symptoms:** \( \geq 6 \) weeks
4. After diagnosing RA, when should disease modulating anti-rheumatic drugs (DMARDs) be initiated?

A. Promptly upon making the diagnosis
B. Following 3 months of NSAID therapy
C. Following a 5-day steroid burst.
D. Only after the patient has failed conservative therapy
DMARDs (Nonbiologics)

- **Methotrexate**: Inhibits dihydrofolate reductase: First line!
  - Need 1000 mg of folate daily
- **Leflunomide** (Arava): Inhibits pyrimidine synthesis
- **Hydroxychloroquine** (Plaquenil): Antimalarial, blocks toll-like receptors
- **Sulfasalazine** (Azulfidine): Folate depletion
- **Minocycline** (Minocin): Antimicrobial. MOA unknown.
DMARDs (Anti-TNF-α Biologics)

- Adalimumab (Humira)
- Certolizumab (Cimzia)
- Etanercept (Enbrel)
- Golimumab (Simponi)
- Infliximab (Remicade)
Key Recommendations for Practice (SORT)

• Combination therapy with two or more DMARDs is more effective than monotherapy. However, more than one biologic agent should not be used at one time. (A)
• No regimen of monotherapy is clearly superior to any other. (A)
• A guided exercise program can improve quality of life and muscle strength. (B)
• Patients with inflammatory joint disease should be referred to rheumatology if symptoms last more than six weeks. (C)
Key Recommendations for Practice (SORT)

• Cardiovascular disease is the main cause of mortality in persons with RA; therefore, risk factors for coronary artery disease should be addressed in these patients. (C)

• Corticosteroids are effective but have high toxicity. Use lowest dose possible for shortest time. (A)
Extraarticular Manifestations of RA

- Accelerated CAD
- Pericarditis
- Scleritis
- Keratoconjunctivitis
- Ulcerative keratitis
- Amyloidosis
- Splenomegaly
- Neuropathy
- Pleural effusion
- Interstitial lung disease
- Pulmonary nodules
- Rheumatoid nodules
- Vasculitis
Major Spondyloarthropathies

- Ankylosing spondylitis
- Reactive arthritis (Reiter’s syndrome)
- Psoriatic arthritis
- Inflammatory bowel disease – associated spondyloarthropathy
- Undifferentiated spondyloarthropathy
Ankylosing Spondylitis

- The most common spondyloarthropathy 0.1-0.2%
- Related to the prevalence of HLA-B27
- Most often affects white males between 15-40
- Back pain insidious, dull, radiates to gluteal, worse in AM, improves with activity, but nocturnal sx
- Enthesitis common – Achilles and plantar fascia
- Anterior uveitis is common
- First-line tx: NSAIDs
5. A 35 yo M presents with a 3-month history of an asymmetric polyarthritis noted in 6 separate joints. PE reveals pitting of the fingernails along with a scaly, silver rash noted on both elbows. Which tx has been shown to delay further progression of this patient’s joint erosion?

A. Aspirin
B. Etanercept
C. Methotrexate
D. Naproxen sodium
E. Sulfasalazine
Psoriatic Arthritis

© American Academy of Dermatology

© Richard Usatine, MD
Psoriatic Arthritis

- Asymmetric, oligoarticular-associated dactylitis
- Predominant DIP involvement – nail changes
- Polyarthritis “RA-like” – lacks RF or nodules
- Arthritis mutilans – destructive erosive hands/feet
- Axial involvement – spondylitis
- HIV-associated – more severe
Psoriatic Arthritis

• Prevalence of arthritis in psoriasis: 5-20%
  - Psoriasis usually precedes PSA – 75%
  - In 15-20%, arthritis precedes psoriasis
  - Nail changes common
  - Usually insidious, but 1/3 have acute onset
  - Dactylitis
  - Uveitis

• Psoriatic plaques
  - Scalp, extensor surfaces, anal cleft, umbilicus
Diagnosis of Psoriatic Arthritis

Point system: Need to have established inflammatory articular disease with ≥3 points from

- Current psoriasis: 2 points
- Hx of psoriasis: 1 point
- FHx of psoriasis: 1 point
- Dactylitis: 1 point
- RF negative: 1 point
- Nail dystrophy: 1 point
- Juxta-articular new bone formation: 1 point
- No specific lab findings
Treating Psoriatic Arthritis

• Physical therapy: Start early!
• Treatment
  - DMARDs for slowing down joint erosions
  - Methotrexate
  - Sulfasalazine: Cochrane, 2009

Cochrane, 2009
Reactive Arthritis (Reiter’s)

- Triggered by an extra-articular infection
- Reiter’s triad: (1) nongonococcal urethritis, (2) conjunctivitis and (3) arthritis
- Sx usually occur 1-4 weeks after infection
- Typically oligoarticular (lower extremities)
- Onset is acute (days), 2-4 joints become painful and swollen in asymmetric distribution
Key Clinical Recommendations

- Clinical criteria supported by laboratory tests, synovial fluid analysis, and radiographs help to establish the presence of spondyloarthropathies. (C)
- Initial management begins with NSAIDs. (C)
- Sulfasalazine (Azulfidine) may be an effective second-line agent that provides short-term relief. (B)
- DMARDs such as etanercept (Enbrel) and infliximab (Remicade) are effective in treating inflammatory symptoms. (B)
- Despite the possibility of a bacterial etiology in reactive arthritis, antibiotic therapy has been ineffective. (B)
- Second-line treatment of psoriatic arthritis (after NSAIDs) includes systemic corticosteroids, methotrexate, sulfasalazine, cyclosporine, and tumor necrosis factor-α inhibitors. (B)
6. Right-handed 80 yo M, previous painter, presents with chronic right, dull hand pain. States his DIPs and PIPs most tender, but not his MCPs. On exam, there is mild swelling in DIP/PIP distribution but no rubor or calor. Which of the following is NOT consistent with this diagnosis?

A. Osteophytes at the joint margins
B. Changes in joint alignment
C. Heberden’s nodes
D. MCP inflammation
Osteoarthritis

A chronic joint disorder in which there is progressive softening and disintegration of articular cartilage accompanied by new growth of cartilage and bone at the joint margins (osteophytes) and capsular fibrosis.

- Primary or idiopathic
- Secondary
  - Posttraumatic, childhood anatomic abnormality, metabolic, neuropathic, endocrinopathy, Paget’s, gout, septic arthritis
Osteoarthritis Symptoms

- Absence of systemic findings
- Minimal articular inflammation
- Distribution: DIP and PIP but not wrist and MCP
- Insidious onset, “aching or burning”
- Transient stiffness
- More common in hands and large weight-bearing joints
Osteoarthritis X-Ray Changes

- Joint space narrowing
- Subchondral sclerosis
- Osteophytes
- Cysts
Osteoarthritis X-Ray Changes
OA Medical Management

- NSAIDs
- APAP – no longer has great data for OA of large joints
- Walking aids
- Weight loss
- Physiotherapy – aquatics
- Altered activity
- Injections: Steroids vs. Hyaluronic Acid
  - Weaker data to support the use of hyaluronic acid
Persons with symptomatic knee osteoarthritis should participate in self-management programs, strengthening, low-impact aerobic exercise, and neuromuscular education.

- Acupuncture, glucosamine, and chondroitin are not recommended therapies for knee osteoarthritis.
- Recommended pharmacologic therapies include oral or topical nonsteroidal anti-inflammatory drugs or tramadol.
- Hyaluronic acid injections are not recommended, and evidence to support corticosteroid injections is inconclusive.
7. A 53 yo M with hx of renal stones presents with an exquisitely painful left great toe and heel that started last night. Patient denies fever, rash and other systemic symptoms. Which diagnostic feature is most specific to this inflammatory disorder?

A. A serum uric acid >6.8 mg/dL  
B. Negatively birefringent crystals in tissues  
C. Radiographic evidence of joint erosion  
D. Positively birefringent crystals in the tissues
Gout: Common Clinical Symptoms

- Acute gout often begins at night.
- Rapid onset of rubor, calor, swollen, intensely tender.
- Rare fever, rash or other systemic signs.
- Involvement of 2 or more joint is uncommon in early flares.
- MTP of the great toe (podagra) is the first joint affected in half of all cases.
- 20% of patients have renal stones.
Gout: A Chronic Disease of 4 Stages

1. Asymptomatic hyperuricemia
2. Acute flares of crystallization
3. Intervals between flares
4. Advanced gout & complications
Gout and Serum Uric Acid

• Hyperuricemia alone is insufficient to diagnose gout!

• Gout risk increases when serum levels persistently exceed 6.8 mg/dL – at which point extracellular fluids become saturated and hyperuricemia occurs.
Microscopy and the Boards

- **Gout**: MSU crystals appear as needle-shaped intracellular and extracellular crystals. When examined with a polarizing filter and red compensator filter, they are *negatively birefringent*.
- **Pseudogout**: CPP crystals appear shorter than MSU crystals and are often rhomboidal and *positively birefringent*.
Foods That Increase Gout Risk

• Foods high in protein
  - Beef, pork, lamb (RR 1.41)
  - Seafood (RR 1.51)

• High-fructose corn syrup
  - In women, one fructose-sweetened soft drink daily raises risk for gout by 74% (RR 1.74)
  - 2 drinks per day 139% (RR 2.39)
Antihypertensives and Gout

• After adjusting for multiple confounders
  • CCBs RR 0.9
  • Losartan RR 0.8
  • Thiazides RR 2.4
  • B-Blockers RR 1.5
  • ACEIs RR 1.3
  • Nonlosartan ARBs RR 1.3
Acute Management of Gout

**INITIATE PROPHYLAXIS**
- NSAIDS (with PPI) (A)
- Low-dose colchicine (0.6mg qd or BID) (A)
- Low dose corticosteroid (if colchicine or NSAIDS not tolerated) (C)

**EVALUATE SYMPTOMS**
while on ULT

**NO symptoms**

**DETERMINE DURATION**
- At least 6 months (A)

**TOPHI?**
- 6 months after achieving target UA if tophi detected on PE (C)
- 3 months after achieving target UA level if no tophi (B)

**CONTINUE RX**
- CONTINUE anti-inflammatory prophylaxis

**YES symptoms**

**CONTINUE anti-inflammatory prophylaxis**
Gout

Indications for UA lowering agent (UALA)

- Tophus or tophi (A)
- Frequent attacks (>2 attacks/yr) (A)
- CKD stage 2 or worse (C)
- Gout with urolithiasis (C)
- UA overproduction and urinary overexcretion (>1000 mg daily) (C)
American College of Rheumatology 2012 Recommendations for Acute Flare

• Monotherapy with NSAIDs, steroids, or colchicine for mild-to-moderate attack.
• Colchicine should be the first-line therapy for “attack prophylaxis”
• Prophylaxis should continue for the greater of: 6 months, 3 months after achieving target UA levels without tophi, or 6 months after achieving target levels with resolution of tophi.
Bibliography

Bibliography

Answers

1. A
2. C
3. D
4. A
5. B
6. E
7. B
Supplementary Slides
AFP Review Articles

• Overview
• 12/15/2014 Diagnosis, Treatment, and Prevention of Gout
• 01/01/2012 Osteoarthritis: Diagnosis and Treatment
• 12/01/2011 Diagnosis and Management of RA
• 09/01/2008 Shoulder Osteoarthritis: Dg and Management
AFP Review Articles

• 11/01/2015 Exercise for Osteoarthritis of the Knee
• 06/01/2015 Colchicine for Acute Gout
• 01/01/2015 Methotrexate Therapy for RA
• 07/15/2014 Corticosteroid Injections for OA of the Knee
• 06/01/2014 Tx of Knee OA: A Clinical Practice Guideline
• 04/01/2013 ACR Recommendations on Therapies for OA
• 03/01/2013 Analgesics for Osteoarthritis
• 09/01/2011 Exercise for the Tx of Knee Osteoarthritis
Non-Rheumatic Diseases with Positive RF

<table>
<thead>
<tr>
<th>Disease</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis C</td>
<td>&lt; 70%</td>
</tr>
<tr>
<td>Mixed cryoglobulinemia</td>
<td>90%</td>
</tr>
<tr>
<td>Sarcoidosis</td>
<td>5-30%</td>
</tr>
<tr>
<td>Pulmonary fibrosis</td>
<td>20%</td>
</tr>
<tr>
<td>Infections</td>
<td>Varies</td>
</tr>
<tr>
<td>Aging</td>
<td>5%</td>
</tr>
</tbody>
</table>
ANA

• Reported as titers: > 1:320 more likely to be true dz
• Titers of ≤ 1:40 unlikely to have a rheumatologic dz
• ANA pattern is more specific for dz
• Best for SLE, drug-induced lupus, Sjögren, scleroderma & MCTD
# Disease-Specific ANAs

<table>
<thead>
<tr>
<th>Disease</th>
<th>ANA Biomarker</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLE</td>
<td>Anti-Smith</td>
</tr>
<tr>
<td>RA</td>
<td>RF</td>
</tr>
<tr>
<td>Scleroderma</td>
<td>Anti-centromere</td>
</tr>
<tr>
<td>MCTD</td>
<td>Anti-U1RNP</td>
</tr>
<tr>
<td>Polymyositis</td>
<td>Anti-Jo-1</td>
</tr>
<tr>
<td>Sjögren</td>
<td>Anti-SSA &amp; anti-SSB</td>
</tr>
<tr>
<td>Wegener</td>
<td>c-ANCA &amp; p-ANCA</td>
</tr>
</tbody>
</table>
Chromatin Antibodies

- Anti-dsDNA: Rule in SLE
- Anti-histone: Rule out drug-induced lupus
- Anti-Smith: Rule in SLE
- Anti-Ro: Sjögren
- Anti-centromere: Scleroderma
- c-ANCA: Wegener’s
Pseudogout

- Monoarthritis; clinically indistinguishable from gout.
- Often precipitated by illness or surgery.
- Pseudogout is most common in the knee (50%) and wrist.
- Reported in any joint (including MTP).
- CPPD disease may be Asx (deposition of CPP in cartilage).
UALA: Allopurinol

- MOA: Reduces the production of UA (inhibits xanthine oxidase).
- Starting dose: 100 mg/d (50 mg/d if CrCl 30-60).
- Increase dose in 100 mg increments until the UA is <6.0 or max dose of 800 mg.
- Typical dose is 300 mg/d.
- Maintenance UA q 3 mo for 6 mo then once yearly.
Allopurinol Hypersensitivity

• 1% of patients can develop severe allopurinol hypersensitivity syndrome, which carries a mortality of 20-30%.
• Severe allopurinol hypersensitivity syndrome is more likely to occur in patients with renal insufficiency, those who are taking a thiazide diuretic, and those started on allopurinol at a dosage of 300 mg/day.
Lyme Arthritis

• Erythema migrans 7-10 days after *Borrelia burgdorferi* tick bite

• Early dissemination
  – Migratory arthralgias, fever, systemic complaints

• Late dissemination/chronic disease
  – Migratory oligoarthritis
  – Carditis
  – Neurological
Urologic Problems

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Disclosure Statement

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All individuals in a position to control content for this session have indicated they have no relevant financial relationships to disclose.
Learning Objectives

After attending this lecture, the learner will be able to

1. Identify the signs, symptoms, diagnosis and treatment/management of acute prostatitis, erectile dysfunction, hypogonadism and BPH
2. Discuss the (updated) USPSTF recommendation for screening for prostate cancer
3. Describe the typical work-up & diagnosis of urolithiasis

NOTE:
- Urinary Incontinence → Geriatrics session; UTI → STIs
- Supplemental Slides: Hematuria, Chronic prostatitis, testicular issues
1. A 52 yo M presents with evolving symptoms of frequent urination at night. He notes increase in dribbling following urination and less force of stream. Which of the following is the most appropriate first line agent of treatment?

a) Ciprofloxacin  
b) Terazosin  
c) Dutasteride  
d) Saw Palmetto
Benign Prostatic Hyperplasia

- Lifetime risk of surgery = 29%

<table>
<thead>
<tr>
<th>AGE</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>31-40 years</td>
<td>8%</td>
</tr>
<tr>
<td>51-60 years</td>
<td>45%</td>
</tr>
<tr>
<td>60-80 years</td>
<td>&gt;80%</td>
</tr>
</tbody>
</table>
Benign Prostatic Hyperplasia

**SYMPTOMS**
- ↓ force of stream
- Hesitancy
- Terminal dribbling
- Incomplete emptying
- Urgency
- Nocturia
- Frequency

**COMPLICATIONS**
- Acute urinary retention
- Recurrent UTIs
- Hydronephrosis
- Renal failure

**American Urological Association Symptom Scoring Index** (Level C)

- **MILD (Score <7)**: Watchful Waiting
- **MOD (8-19)**: Medical Management
- **SEVERE (>20)**: Surgery
BPH Meds

**Alpha-1 antagonists**
- 5 approved
- Similar efficacy
- Different side effect profiles
  - tamsulosin, terazosin, doxazosin with ↑SE
- **Dynamic component**
- Level A Rec; Cochrane, 2008

**5-Alpha reductase inhibitors**
- 3 approved
- Similar efficacy
- Similar side effect profiles
- 6-12 months Rx for full effect
- **Reduce size**
- Level A Rec; Cochrane, 2008
  - NNT for hematuria = 2
  - NNT to prevent a TURP = 6

NNT for hematuria = 2
NNT to prevent a TURP = 6
BPH Meds cont.

• Combination treatment MAY help especially when >30 cc volume
  Level B Rec, Cochrane

• Saw palmetto is controversial & is no better than placebo
Other BPH Treatments

- Tadalafil (Cialis)
  - Reason for improvement is unknown
  - Level B
  - Do not use with alpha-blockers

- Transurethral resection of the prostate (TURP)

- Transurethral microwave thermotherapy (TUMT)
  - Is effective when there is
    - No urinary retention
    - No previous prostate procedure
    - Prostate volumes between 30-100 mL
  - Not as effective as TURP (Cochrane, 2007)
Key Recommendations for Practice

• Alpha blockers are effective first-line treatments for patients with bothersome, moderate-severe symptoms (SOR A)

• The addition of 5-alpha reductase inhibitor is effective in men with bothersome, moderate to severe BPH symptoms and a documented enlarged prostate when alpha blocker monotherapy is not effective. (SOR A)
2. A 70 yo M presents with dysuria, urinary frequency, urinary urgency, incomplete voiding, and suprapubic pain for several days. He denies fever, chills, nausea, emesis, and malaise. His physical exam was significant for a tender, enlarged, boggy prostate. You diagnose him with acute bacterial prostatitis (ABP). All of the following risk factors increases the risk of a poor prognosis with ABP in his age group EXCEPT?

a) History of BPH
b) BMI >25
c) Temperature greater than 100.4°F
d) Urinary retention
e) Transurethral catherization
Acute Bacterial Prostatitis

- Incidence peaks: 20-40y & >70 y
- Dx with history & physical
  - PE: Tender, warm, swollen/boggy, firm & irregular
- Diagnostics: UA, C&S

- Symptoms include:
  - Voiding symptoms: irritative (e.g., dysuria, urinary frequency, urinary urgency) or obstructive (e.g., hesitancy, incomplete voiding, straining to urinate, weak stream)
  - May have suprapubic, rectal, or perineal pain
  - Painful ejaculation, hematospermia, and painful defecation possible
  - Systemic symptoms (fever, chills, nausea, emesis, and malaise) \(\rightarrow\) assess for sepsis
## Differential Diagnosis of Acute Bacterial Prostatitis

<table>
<thead>
<tr>
<th>Condition</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign prostatic hypertrophy</td>
<td><strong>Obstructive</strong> voiding symptoms, enlarged nontender prostate, negative urine culture</td>
</tr>
<tr>
<td>Chronic bacterial prostatitis</td>
<td>Recurring prostatitis symptoms for at least 3 months, positive urine culture with each episode</td>
</tr>
<tr>
<td>Chronic pelvic pain syndrome</td>
<td>Pain attributed to the prostate with no demonstrable evidence of <strong>infection</strong></td>
</tr>
<tr>
<td>Cystitis</td>
<td>Irritative voiding symptoms, normal prostate exam</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverticulitis</td>
<td><strong>LLQ pain</strong>, acute change in bowel habits, hx of diverticuli, TTP in LLQ</td>
</tr>
<tr>
<td>Epididymitis</td>
<td>Irritative voiding symptoms, tenderness to palpation on affected epididymis</td>
</tr>
<tr>
<td>Orchitis</td>
<td>Swelling, pain and/or TTP in 1 or both testicles</td>
</tr>
<tr>
<td>Proctitis</td>
<td>Tenesmus, rectal bleeding, feeling of rectal fullness, passage of mucus through the rectum</td>
</tr>
<tr>
<td>Prostate Cancer</td>
<td>Presence of constitutional symptoms, nodules on prostate exam</td>
</tr>
</tbody>
</table>

Acute Bacterial Prostatitis Rx

- Base empiric antibiotic on the suspected mode of infection & presumed infecting organism
  - Gram-negative enteric bacteria; Cover GC/CT if sexually active
- Antibiotic choice (Level C)
  - Ceftriaxone/Doxycycline, Quinolones*, Bactrim
    - Ciprofloxacin 500 mg bid x 2-4 weeks
    - *Increasing gram negative enteric bacteria with quinolone resistance
- Broad spectrum IV antibiotics if ↑risk for antibiotic resistance
- Rx Duration: mild infections is typically 10 to 14 days; four weeks for severe infections
Key Recommendations for Practice

Not Recommended

− Prostatic massage (SOR C)
− PSA (SOR C)
− Ignore fever lasting over 36 hours (SOR C)

http://www.aafp.org/afp/2016/0115/p114.html
3. A 62 yo M presents with inability achieve a satisfactory erection & increased fatigue for 6 months. Past medical history reveals obstructive sleep apnea, and BPH. Physical examination reveals decreased muscle mass and thinning hair. What is the most appropriate next diagnostic step?

a) Confirm empiric use and efficacy of phosphodiesterase-5 inhibitors
b) Obtain an LH level
c) Obtain a prolactin level
d) Obtain an early morning testosterone level
e) Order a scrotal ultrasound
4. Which labs are most accurate in predicting primary hypogonadism?
A. AM labs: Low testosterone, high FSH, high LH
B. AM labs: Low testosterone, low FSH, low LH
C. PM labs: Low testosterone, high FSH, high LH
D. PM labs: Low testosterone, low FSH, low LH
Symptoms of Male Hypogonadism

- Decreased libido
- Decreased energy
- Decreased sexual hair
- Infertility
- Erectile dysfunction
- Loss of muscle mass
- Decreased bone density
Diagnosing Male Hypogonadism

- Total testosterone level (AM draw)
  - Normal Testosterone
  - Low Testosterone
    - Repeat testosterone (consider free), FSH, LH
      - Low T, Low FSH, LH
        - Secondary hypogonadism
          - Prolactin, MRI, T4, TSH
      - Low T, High FSH, LH
        - Primary Hypogonadism
# Lab Testing for Hypogonadism

<table>
<thead>
<tr>
<th>Testosterone</th>
<th>Semen analysis</th>
<th>Gonadotropins (LH/FSH)</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low sperm ct</td>
<td>Elevated</td>
<td>Primary hypogonadism</td>
</tr>
<tr>
<td>Low</td>
<td>Low sperm ct</td>
<td>Low/low nl</td>
<td>Secondary hypogonadism</td>
</tr>
</tbody>
</table>
Causes of Male Hypogonadism

Primary
- Chromosomal abnormalities (Klinefelter syndrome XXY)
- Infections
- Trauma
- Cryptorchidism
- Drugs
- Chemotherapy

Secondary
- Pituitary tumors
- Infiltrative disease
- Inflammatory diseases
- Idiopathic hypogonadotrophic hypogonadism
- Kallmann Syndrome
- HIV/AIDS
- Obesity

Androgen Resistance
- 5-alpha reductase deficiency

Testosterone

Dihydrotestosterone (DHT)

Androgen receptor abnormalities
Goals of Treating Hypogonadism

- Restore sexual function, libido, well-being, and behavior
- Produce and maintain virilization
- Optimize bone density and prevent osteoporosis
- In elderly men, possibly normalize growth hormone levels
- Potentially affect the risk of cardiovascular disease
- In cases of hypogonadotrophic hypogonadism, restore fertility

Bhasin S, J Clin Endocrinol Metab. 2006;91:1995–2010
Treating Male Hypogonadism

**ANDROGEN REPLACEMENT**
- Testosterone enanthate or cypionate
- Transdermal delivery
  - Androgen 5 mg patch daily
  - AndroGel 1% 5 mg daily

**IMPROVING FERTILITY**
- Stimulating spermatogenesis
  - hCG, and hMG
  - GnRH
Side Effects of Testosterone Rx

- Worsening of the prostatic hypertrophy
- Increased risk of prostate cancer
- Lower sperm count with large doses
- Swelling of ankles, feet, or body, with or without heart failure
- Gynecomastia
- Sleep apnea
- Blood clots
Contraindications to Testosterone Therapy

- Prostate cancer
- Breast cancer

### Risk of adverse outcomes

- Undiagnosed prostate nodule
- Unexplained PSA elevation
- BPH with severe urinary retention
- Erythrocytosis
- NYHA Class III or IV heart failure
5. A 46 yo M presents complaining of worsening erectile dysfunction. He denies history of depression, anxiety, CAD or peripheral vascular disease. His BMI is 32. He exercises 3 times weekly. A recent AM testosterone level was 310 ng/dL (normal range: 280 to 1,100 ng/dL). Which of the following is the most appropriate therapy?

a) Testosterone IM
b) Testosterone Gel
c) Trazodone
d) A phosphodiesterase inhibitor
e) Yohimbine
Erectile Dysfunction = Small Vessel Dz

- ED is a robust predictor of all-cause mortality & CV events in men
  Hazard ratio for mortality = 2.04
  Hazard ratio for CV event = 1.62
- “Dose-response” increase with ED severity
  - Bohm, Circulation, March 15, 2010
ED Rx begins with PDE5-Inhibitors

• Oral phosphodiesterase-5 (PDE5) inhibitors are 1st line. NNT = 2.1: Level A Rec, Cochrane, 2007
• Most effective for men with: DM, spinal cord dysfunction, & antidepressants side effects Level A Rec, Cochrane, 2007
• Helpful in nerve-sparing prostatectomy Level B Rec, Bandolier, 2005
• Efficacy & side effects similar among the 4. Drop-out rates ↓ for sildenafil Level A Rec, Bandolier, 2005
Adverse Effects of PDE-5 Inhibitors

- Vision disturbances
- Priapism
- Angina
- Sudden, permanent sensorineural hearing loss (May 2010)
Other ED Treatments

- **Testosterone**
  Helpful if low T (<12 nmol/L)
  NNT = 2.1: Level A Rec

- **Yohimbine**
  NNT = 6.4: Level A Rec

- **Vacuum devices**
  Level B Rec

- **Alprostadil**
  NNT = 3.5; Not a 1st-line agent 2/2 side effects:
  Level A Rec
Other ED Treatments cont.

• Trazodone: NOT USEFUL
  • Level A Rec

• Fibrates & statins may contribute to ED
  • Level B Rec

• Managing obesity (level B)
  • BMI >30 ↑ ED risk
  • Losing weight improves ED
Key Recommendations for Practice

• First line therapy for ED is oral phosphodiesterase type 5 inhibitors (SOR A)
• PDE type 5 inhibitors are most effective in the treatment of ED associated with DM, spinal cord injury and antidepressant side effects. (SOR A)
• Psychosocial therapy and testosterone supplementation in men with hypogonadism are additional ED therapies (SOR B)

http://www.aafp.org/afp/2010/0201/p305.html
Prostate Cancer

Source: National Cancer Institute
The decision about whether to be screened for prostate cancer should be an individual one. The USPSTF recommends that clinicians inform men ages 55 to 69 years about the potential benefits and harms of prostate-specific antigen (PSA)-based screening for prostate cancer. Screening offers a small potential benefit of reducing the chance of dying of prostate cancer. However, many men will experience potential harms of screening, including false-positive results that require additional workup, overdiagnosis and overtreatment, and treatment complications such as incontinence and impotence. The USPSTF recommends individualized decisionmaking about screening for prostate cancer after discussion with a clinician, so that each man has an opportunity to understand the potential benefits and harms of screening and to incorporate his values and preferences into his decision.

C Recommendation
AAFP (2018)

PSA-Based Prostate Cancer Screening in Men Aged 55-69 (C)

• The AAFP does not recommend routine prostate-specific antigen (PSA)-based screening for prostate cancer. For men ages 55-69 who are considering periodic prostate cancer screening, clinicians should discuss the risks and benefits and engage in shared decision-making that enables an informed choice.


➢ DON’T GET PSA.

The USPSTF recommends against PSA-based screening for prostate cancer in men age 70 years and older.

D Recommendation

Men age 70 and older

https://screeningforprostatecancer.org/
6. A 49 yo F presents for evaluation of recurrent episodes of hematuria and flank pain. Spiral CT scan of the abdomen and pelvis reveals urolithiasis. She eventually passes the stone into a urine strainer. Analysis of the stone reveals calcium oxalate. Dietary recommendations would include:

a) Decrease in calcium  
b) Normal calcium diet  
c) Decrease in fiber intake  
d) Decrease in natural forms of citrate
Key Recommendations for Practice

• Patients with kidney stones should increase fluid intake to at least 2L per 24 hours. (SOR B)

## Kidney Stones – Risk Factors

<table>
<thead>
<tr>
<th>RISK FACTORS</th>
<th>SYMPTOMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Male Gender</td>
<td>• Abdominal Pain</td>
</tr>
<tr>
<td>• <em>Age (to 65)</em></td>
<td>• Renal colic</td>
</tr>
<tr>
<td>• Low urine volume</td>
<td>• Sudden; not relieved</td>
</tr>
<tr>
<td>• Situational; Geography</td>
<td>• Radiating pain to back or groin</td>
</tr>
<tr>
<td>• Heredity</td>
<td>• Hematuria</td>
</tr>
<tr>
<td>• Diet (high Na)</td>
<td></td>
</tr>
<tr>
<td>• Medications</td>
<td></td>
</tr>
</tbody>
</table>
Meds Associated w/ Stone Formation

- Triamterene and the sulfonamides (poor solubility)
- Calcium and vitamin D supplements (hypercalciuria)
- Carbonic anhydrase inhibitors (increases urinary pH, thereby increasing calcium phosphate precipitation)
- Indinavir, a protease inhibitor, (urinary crystallization)
- NOT HCTZ (Increase Calcium reabsorption)
Imaging Options

*Renal Colic Suspected (based on hx/pe)*

- Pregnant, Gallbladder dz or Gyn cause suspected
- Hx of radio-opaque renal calculi
- Everyone else

**Ultrasound**

**X-ray**

- IV Pyelogram (only if no CT available)
- Non-contrast helical CT

Could consider bedside US if not obese

If Xray normal, but you still have concerns for stone.

*A strategy beginning with ultrasonography (including point-of-care ultrasonography performed by an emergency physician) can help many patients avoid CT and its associated radiation. (Level of Evidence = 1b–)*

http://www.aafp.org/afp/2015/0115/p132a.html
Imaging modality

Non-contrast CT

<table>
<thead>
<tr>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>95 to 100</td>
<td>94 to 96</td>
</tr>
</tbody>
</table>

Advantages

Most sensitive & specific radiologic test (i.e., facilitates fast, definitive diagnosis)
Indirect signs of the degree of obstruction
Provides information on non-genitourinary conditions

Limitations

Less accessible and relatively expensive
No direct measure of renal function.
Management Options

~98% pass on their own in 1-2 wks

Analgesia

Alpha-blockers (tamsulosin or nifedipine) unlikely to have any benefit

Strain urine

F/U KUB q 1-2 wks

Urology if not passed in 2-4 wks

RTC signs of sepsis

~53% pass on their own

Indication: for intervention:
- evidence of persistent obstruction
- failure of stone progression
- persisting colic

ESWL or ureteroscopy

UROLOGY Consult (SOR C)

<4 mm

5-10 mm

>10 mm
<table>
<thead>
<tr>
<th>Management (3 Principles)</th>
<th>Prevention (of Recurrences)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Recognize emergencies (hydronephrosis)</td>
<td>• Need to analyze calculi</td>
</tr>
<tr>
<td>• Adequate analgesia</td>
<td>• Labs</td>
</tr>
<tr>
<td>• Impact of size and location on Hx &amp; Rx</td>
<td></td>
</tr>
</tbody>
</table>
7. A 55 yo M is noted to have incidental urolithiasis on plain films of the abdomen. He denies abdominal pain, nausea, vomiting and bowel changes. Abdominal examination is unremarkable. The most appropriate next step is?

a) Dissolution therapy with ursodiol  
b) Endoscopic retrograde cholangiopancreatography  
c) Watchful waiting  
d) Extracorporeal shockwave lithotripsy
Hemataspermia

Post Procedural
- Prostate Biopsy (80%)
- Radiation (25%)

Sporadic
- Prostatitis
- STI’s
- Cancer (Men over 40)
- Frequent daily ejaculation (over weeks)
- Schistosomiasis
Hematospermia

Evaluation
• Persistent, unexplained sx should be evaluated by a transrectal ultrasonography.
• MRI is second line.
• Exclude infection - get a UA.
• Rule-out prostatitis
• Routine PSA is not recommended

Treatment
• Reassurance for most patients
• Treat identifiable structural abnormalities
• Emerging therapy: Finasteride in patients with refractory sx
Thank you!
Answers

1. B
2. B
3. D
4. A
5. D
6. B
7. C
Bibliography


Bibliography

5. JFP. June 2012; vol 61:S1-S10.
Supplementary Slides
The Take-Home Points for Hematuria

- Positive dipsticks for blood should get microscopic confirmation
  - R/O myoglobinuria and decide glomerular vs. non-glomerular.
- Top 3 suspects are infection, stones, and malignancy.
- Look for illness patterns:
  - Unilateral flank pain, afebrile, N/V (stones)
  - Obstructive Sxs, fever, prostate tenderness (prostatitis)
  - CVAT, fever, dysuria (pyelo)
- If no easy answer, ask: Glomerular or not?
  - Glomerular - protein or renal dz? If so, refer to nephrology.
  - Not - 1. CT-U; 2. Cytology; 3. Cystoscopy
# Age and Hematuria

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Common</th>
<th>Uncommon</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15</td>
<td>Glomerulopathy (IgA, Alport syndrome, thin BM disease, APSGN)</td>
<td>Factitious</td>
</tr>
<tr>
<td></td>
<td>Hypercalciuria with stones</td>
<td>Fever</td>
</tr>
<tr>
<td></td>
<td>Congenital obstructive anomalies</td>
<td>HUS</td>
</tr>
<tr>
<td></td>
<td>UTIs</td>
<td>Hemophilia</td>
</tr>
<tr>
<td></td>
<td>Sickle cell disease</td>
<td>HSP</td>
</tr>
<tr>
<td></td>
<td>Viral infection</td>
<td>Schistosomiasis</td>
</tr>
<tr>
<td>15-50</td>
<td>Calculi</td>
<td>AVMs or fistulae</td>
</tr>
<tr>
<td></td>
<td>Menstrual contamination</td>
<td>DIC</td>
</tr>
<tr>
<td></td>
<td>Exercise</td>
<td>Goodpasture’s syndrome</td>
</tr>
<tr>
<td></td>
<td>UTIs</td>
<td>Loin pain-hematuria syndrome</td>
</tr>
<tr>
<td></td>
<td>PKD</td>
<td>Renal infarction</td>
</tr>
<tr>
<td></td>
<td>Sickle cell disease</td>
<td>Renal vein thrombosis</td>
</tr>
<tr>
<td></td>
<td>Intercourse</td>
<td>Schistosomiasis</td>
</tr>
<tr>
<td></td>
<td>Papillary necrosis</td>
<td>Medullary sponge kidney</td>
</tr>
<tr>
<td>&gt;50</td>
<td>BPH</td>
<td>AVMs or fistulae</td>
</tr>
<tr>
<td></td>
<td>Cancer (renal, ureteral, bladder, prostate)</td>
<td>Cyclic hematuria in women</td>
</tr>
<tr>
<td></td>
<td>Overanticoagulation</td>
<td>Endometriosis</td>
</tr>
<tr>
<td></td>
<td>PKD</td>
<td>TTP</td>
</tr>
<tr>
<td></td>
<td>Prostatitis</td>
<td>Renal vein thrombosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toxins (cantharidin, djenkol bean)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LP-HS</td>
</tr>
</tbody>
</table>
American Urological Association Symptom Index

<table>
<thead>
<tr>
<th>Over the past month or so:</th>
<th>Not at all</th>
<th>Less than 1 in 5 times</th>
<th>Less than one-half of the time</th>
<th>About one-half of the time</th>
<th>More than one-half of the time</th>
<th>Almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often have you had the sensation of not completely emptying your bladder after you finished urinating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How often have you had to urinate again less than 2 hours after you finished urinating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How often have you found that you stopped and started again when urinating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How often have you found it difficult to postpone urination?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How often have you had a weak urinary stream?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How often have you had to push or strain to begin urination?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>How many times do you typically get up to urinate from the time you go to bed at night until the time you get up in the morning?</td>
<td>None</td>
<td>1 time</td>
<td>2 times</td>
<td>3 times</td>
<td>4 times</td>
<td>5 times</td>
</tr>
</tbody>
</table>

Total score: _______
Chronic Bacterial Prostatitis

Updated AFP article: http://www.aafp.org/afp/2016/0215/p290.html

- Source of recurrent UTIs
- Similar Sx as Acute with ASx intervals
- WBCs + on pre- & post-massage UAs
- C&S neg on pre- & + on post-massage
Chronic Bacterial Prostatitis

- Most (65-80%) due to E. coli
- Treatment is 6-12 weeks
- Alpha blockers may help in RX
- If man does not improve, consider a prostatic calculus
Chronic Bacterial Prostatitis Rx

- TMP-SMX as 1st line: Level C Rec
- Quinolone for Rx failures: Level C Rec
- Rarely: TUP of infected tissue for very Sx complete failures on Abx
Acute Infectious Epididymitis

- Treat men with presumptive Dx of acute infectious epididymitis for chlamydia and gonorrhea if < 35 y.o., and Rx for enteric UTI pathogen if > 35 y.o. (SOR A)
- Epididymotis/orchitis should be suspected in patients with testicular pain and a C-reactive protein > 24 mg/dl (SOR C)
Kidney Stone Labs
All Patients

- CBC
- UA
- BMP
- Ca
- PO4

- Urate
- Urine C & S
- Stone Analysis
- Vitamin D
Kidney Stone Labs
Circumstantial

- Hypercalcemia: PTH
- Abnormal Albumin: Ionized Calcium
- Hyperoxaluria: Oxalate level
- Sarcoidosis: ACE level & calcitriol
More Extensive Testing

- Children
- Solitary kidney
- CRI/CKD
- Residual stone burden
- Infected stones
- Gout
- Intestinal disease
Prevention

- All patients: 2-3 L water q day, 8-12 oz QHS (urine volume = 2 L/day)
- “B rec”
- □ NaCL (2g)
- □ Animal protein (8 oz)
- □ Oxalate
- □ Calcium in diet ‘B’ rec (to 1200 mg/day)
Causes of Scrotal Pain and Swelling

Updated Scrotal Mass article: http://www.aafp.org/afp/2014/0501/p723.html

- Pain
  - Testicular torsion
  - Torsion of appendix testis
  - Epididymitis
  - Trauma
  - Orchitis and others

- Swelling
  - Hydrocele
  - Varicocele
  - Spermatocele
  - Tumor
<table>
<thead>
<tr>
<th>CLINICAL RECOMMENDATION</th>
<th>EVIDENCE RATING</th>
<th>REFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epididymitis/orchitis should be suspected in patients with testicular pain and a C-reactive protein level of more than 24 mg per L (228.6 nmol per L).</td>
<td>C</td>
<td>7</td>
</tr>
<tr>
<td>Any patient presenting with acute scrotal pain and a mass or swelling should be evaluated for testicular torsion by scrotal ultrasonography or surgical exploration within six hours of symptom onset.</td>
<td>C</td>
<td>1, 12</td>
</tr>
<tr>
<td>Testicular torsion should be suspected in patients with rapid onset of acute unilateral scrotal pain and swelling, nausea or vomiting, high position of the testicle, and an abnormal cremasteric reflex.</td>
<td>C</td>
<td>1, 12</td>
</tr>
</tbody>
</table>

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to http://www.aafp.org/afpsort.
Epidemiology

• Accounts for 30% of all acute scrotal swelling
• Bimodal ages – neonatal (in utero) and pubertal ages
  65% occur in ages 12-18yo
• Incidence 1 in 4000 in males < 25 yo
• Increased incidence in puberty due to inc weight of testes
Predisposing Anatomy

• Bell-clapper deformity
  • Testicle lacks normal attachment at vaginalis
  • Increased mobility
  • Transverse lie of testes
  • Typically bilateral
  • Prevalence 1/125
Torsion: Clinical Presentation

- Abrupt onset of pain – usually testicular, can be lower abdominal, inguinal
- Often < 12 hrs duration
- May follow exercise or minor trauma
- May awaken from sleep
- Cremasteric contraction with nocturnal stimulation in REM
- Up to 8% report testicular pain in past
- May have N&V
Torsion: Examination

- Edematous, tender, swollen
- Elevated from shortened spermatic cord
  - Horizontal lie common (PPV 80%)
  - Reactive hydrocele may be present
- Cremasteric reflex absent in nearly all (unreliable in < 30 mo old) (PPV 95%)
- Prehn’s sign (elevation relieves pain in epididymitis and not torsion) is NOT reliable
Intermittent Torsion

- Intermittent pain/swelling with rapid resolution (seconds to minutes)
- Long intervals between symptoms
- PE: testes with horizontal lie, mobile testes, bulkiness of spermatic cord (resolving edema)
- Often evaluation is normal – if suspicious need GU follow-up
Diagnosis – “Time is Testicle”

• Ideally -- prompt clinical diagnosis
• Imaging: secondary to clinical exam
  Color doppler – decreased intratesticular flow
    • False + in large hydrocele, hematoma
    • Sens 69-100% and Spec 77-100%
    • Lower sensitivity in low-flow pre-pubertal testes
• Nuclear technetium-99 radioisotope scan
  Show testicular perfusion
  30-min procedure time
  Sens and spec 97-100%
Management

• Detorsion within 6hr = 100% viability
  Within 12-24 hrs = 20 – 50 % viability
  After 24 hrs = 0 - 10% viability

• Surgical detorsion and orchiopexy if viable
  Contralateral exploration and fixation if bell-clapper deformity

• Orchiectomy if non-viable testicle

• Never delay surgery on assumption of nonviability, as prolonged symptoms can represent periods of intermittent torsion
Manual Detorsion

- If presents before swelling
- Appropriate sedation
- In 2/3rds of cases testis torses medially, 1/3rd laterally
- Success if pain relief, testes lower in scrotum
- Still need surgical fixation
Torsion of Appendix Testis

- Peak age 3-13 yo (prepubertal)
- Sudden onset, pain less severe
- Classically, pain more often in abd or groin
- Non-tender testicle

Tender mass at superior or inferior pole

- May be gangrenous, “blue-dot” (21% of cases)
- Normal cremasteric reflex, may have hydrocele
- Inc or normal flow by doppler U/S
Torsion of Appendix Testis

- Management supportive
  - Analgesics, scrotal support to relieve swelling
- Surgery for persistent pain
  - No need for contralateral expl.
Epididymitis

- Inflammation of epididymis
- Subacute onset pain, swelling localized to epididymis, duration of days
  - With time, swelling and pain less localized
- Testis has normal vertical lie
- Systemic signs of infection
  - Inc WBC and CRP, fever + in 95%
- Cremasteric reflex preserved
- Urinary complaints: discharge/dysuria PPV 80%
Epididymitis

- Sexually active males
  Chlamydia > N. gonorrhea > E. coli
- Less commonly pseudomonas (elderly) and tuberculosis (renal TB)
- Young boys, adolescents often post-infectious (adenovirus) or anatomic
  Reflux of sterile urine through vas into epididymis
  50-75% of prepubertal boys have anatomic cause by imaging
Epididymitis Diagnosis

- Leukocytosis on UA in ~40% of patients
- PCR Chlamydia + in 50%, GC + in 20% of sexually active
- 95% febrile at presentation
- Doppler and nuclear imaging show increased flow
- If Hx consistent with STD, CDC recommends:
  - Cx of urethral discharge, PCR for C and G
  - Urine culture and UA
  - Syphilis and HIV testing
Epididymitis Treatment

- Sexually active treat with ceftriaxone/doxycycline or ofloxacin
- Pre-pubertal boys
  Treat for co-existing UTI if present
  Symptomatic Tx with NSAIDs, rest
  Referral all to GU for studies to rule out VUR, post urethral valves, duplications
  - Negative culture has 100% NPV for anomaly
Diabetes

Belinda Vail, MD, FAAFP
Chair, Department of Family Medicine
University of Kansas
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All individuals in a position to control content for this session have indicated they have no relevant financial relationships to disclose.
Learning Objectives

Upon completion of this lecture, participants should be able to:

1. State the criteria for the diagnosis of diabetes mellitus.
2. Summarize a disease management plan that includes appropriate performance improvement measures, lipid management, blood pressure management, hemoglobin A1c management, urine protein screening, dilated eye exam, foot exam, and aspirin use.
3. Recommend appropriate pharmacologic methods of controlling blood sugar, including oral agents and selection of type and regimen of insulin.
1. A 62 yo obese male with diabetes and anemia presents to your office. Which of the following anemias could falsely elevate his A1c?

A. Hemolytic anemia  
B. Sickle cell anemia  
C. Iron deficiency anemia  
D. Acute blood loss
Diagnosis of Diabetes

• Hgb A1c ≥ 6.5% (point of care value not recommended for dx)
  – Falsely elevate: hypertriglyceridemia, hyperbilirubinemia, splenectomy, renal failure, iron deficiency anemia, aplastic anemia* (decrease erythrocytosis and increase lifespan of erythrocytes)
  – Falsely lower: HIV meds, liver disease, blood loss, hemolytic anemia, hemoglobin variants (decrease lifespan of erythrocytes – use fructosamine levels*)

• Fasting plasma glucose ≥126 mg/dL (still the standard)
• 2-hr plasma glucose ≥200 mg/dL (75 g glucose load)
• Random plasma glucose ≥200 mg/dL with classic symptoms of hyperglycemia (polyuria, polydipsia)

Prevalence of diabetes is 9.4% – 500 million people worldwide
<table>
<thead>
<tr>
<th>Type 1</th>
<th>vs</th>
<th>Type 2</th>
<th>vs</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid onset</td>
<td></td>
<td>&gt;90% of diabetics</td>
<td></td>
<td>Latent autoimmune diabetes of adulthood</td>
</tr>
<tr>
<td>Autoimmune loss of beta cells in the pancreas = insulin deficiency</td>
<td></td>
<td>Usually adults, but often in adolescents</td>
<td></td>
<td>Presents like type 2</td>
</tr>
<tr>
<td>Weight loss is prevalent</td>
<td></td>
<td>Insulin resistance = high insulin levels</td>
<td></td>
<td>Thin individuals</td>
</tr>
<tr>
<td>25% present with ketoacidosis</td>
<td></td>
<td>Obesity is prevalent</td>
<td></td>
<td>Move quickly to insulin</td>
</tr>
<tr>
<td>Screen for complications 5 years after diagnosis</td>
<td></td>
<td>Insidious onset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low C-peptide levels with + anti-GAD antibodies</td>
<td></td>
<td>Screen for complications at diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incidence in children up 30%</td>
<td></td>
<td>Maturity onset diabetes of the young</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elevated C-peptide</td>
<td></td>
<td>Hereditary</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Usually not requiring insulin</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td>Type 3c</td>
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<td></td>
<td></td>
<td>Post pancreatitis with destruction of beta cells</td>
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<td></td>
<td>Requires insulin</td>
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<td></td>
<td></td>
<td>Often with malnutrition</td>
</tr>
</tbody>
</table>
Management Goals (ADA)

• A1C <7%**
  <6.5% for new diagnosis, long life expectancy
  <7.5% for children (more commonly type 1)
  <8% for longstanding disease, advanced complications
  <8.5% for limited life expectancy, extremely complex older patients

  Monitor every 3 months (every 6 months if well-controlled)

• Limit hypoglycemia
  – History of hypoglycemia is predictive of future episodes and increases morbidity and mortality*
  – Recommend range – not specific numbers

• Blood sugar: pre-meal 80-130
• Blood pressure: <140/90 mm Hg (<130/80 mm Hg preferred)
• Lipids: lifestyle modification; statin management  (statin recommendations after references)
Self-Management

• Self-management that works
  – Motivational interviewing/collaborative problem solving/negotiating individualized goals
  – Cognitive behavioral therapy
  – Nurse- and dietitian-led training and education

• Self-monitoring indicated
  • If using multiple insulin injections or a pump
  • When using sulfonylureas
  • During illness or corticosteroid use
  • When oral medications are adjusted
  • When postprandial hyperglycemia is a concern

• Benefit in type 2 disappears by 1 year**
Pharmacological Therapy

- Biguanide: (metformin)
- Thiazolidinedione (TZD): (pioglitazone, rosiglitazone)
- Sulfonylureas: (glyburide, glipizide, glimepiride)
- Meglitinides: (repaglinide, nateglinide)
- Alpha-glucosidase inhibitors: (acarbose, miglitol)
- Insulin (short- and long-acting; human and synthetic)
- GLP-1 receptor agonists: (exenatide, liraglutide, albiglutide, dulaglutide)
- DPP-4 inhibitors: (sitagliptin, saxagliptin, linagliptin, alogliptin)
- SGLT2 inhibitors: (canagliflozin, dapagliflozin, empagliflozin)

STOP SMOKING: Increases risk for developing diabetes
2. Which of the following medications affects B12 levels, necessitating monitoring?

A. Metformin  
B. Acarbose  
C. Glyburide  
D. Repaglinide  
E. Sitagliptin
Biguanide – Metformin

• Should be the #1 choice unless there are contraindications*
• Continue if adding other medications*
• Decreases glucose production in the liver
• Also Insulin sensitizer** and lowers insulin and lipid levels
• No hypoglycemia or weight gain*
• Improves cardiovascular outcomes in overweight and newly diagnosed type 2 diabetics** decreases mortality** decreases MACE**
• Only oral medication for use in children and adolescents*
• Category B in pregnancy
• Used for polycystic ovary disease*

May reduce A1c and insulin requirement in overweight adolescents with type 1 diabetes
Metformin Precautions

• CAUTION in the elderly (>65), renal dysfunction**, cardiopulmonary disorders (OK with stable CHF), and hepatic disease
  BUT: decreased mortality in heart failure, kidney and liver disease
• Check creatinine prior to use*
• Stop if GFR <30 mL/min; do not start if GFR <45 mL/min (theoretical risk of lactic acidosis)
• Stop prior to IV contrast** and 48 hours after** (angiography/pyelography)
• Increased all-cause mortality if used in Stage 5 kidney disease
• Check for B12 deficiency** (no defined interval)

? Increase in Alzheimer’s and Parkinsons: dose and length of treatment related?
Thiazolidinediones

**Pioglitazone** (Actos)
- Insulin sensitizer** (decrease insulin resistance)*
- ↓ gluconeogenesis (increase hypoglycemia)
- Improves cerebrovascular outcomes & nonfatal acute MI*
- Increases ovulation
- Reduction in risk of dementia (type 2)
- **Rosiglitazone** (Avandia) [no real indication]

**Precautions**
- Cardiopulmonary disorders (fluid retention – volume overload)* Black Box warning for class III or IV heart failure
- Elderly due to declining ventricular function
- Monitor LFTs, avoid in hepatic dysfunction (but can be useful in nonalcoholic steatohepatitis)
- Decrease bone density and increase fractures (don’t use in osteoporosis)
- Category C in pregnancy (growth retardation in animals) *

47% increased risk of pancreatic, bladder, prostate cancers. Heneka, Ann Neurol 2015;78:284
3. 55 yo with newly diagnosed DM and HTN with chronic renal failure and a creatinine of 2.4. Which medication would be the safest with regard to renal function?

A. Acarbose (Precose)
B. Glyburide (Diabeta, Glynase)
C. Sitagliptin (Januvia)
D. Glipizide (Glucotrol)
Sulfonylureas

- **Glipizide** (Glucotrol), **Glyburide**, **Glimepiride** (Amaryl)
- Stimulate pancreatic beta cells to release insulin
- Weight gain and hypoglycemia
- Can be used in low doses in the elderly (avoid glyburide)
- OK in mild renal dysfunction (except glyburide has an active metabolite eliminated by the kidneys)*
- OK in cardiopulmonary comorbidities (sleep apnea, CHF)
- Glyburide in and out of favor in gestational diabetes
- May increase fractures (especially hip) in women
- OK to add to metformin but don’t stop metformin*

Old sulfonylureas: tolazamide, tolbutamide, chlorpropamide
Meglitinides

- **Repaglinide** (Prandin), **Nateglinide** (Starlix)
  - Rapid-acting (half-life <1 hr) insulin secretagogues
  - Moderate cost and moderate decrease in glucose
  - May be used in elderly, renal failure, and cardiopulmonary disorders
  - Helpful for erratic eating schedules
  - Hypoglycemia*

*Hypoglycemia*
Alpha-glucosidase Inhibitors

• **Acarbose** (Precose) and **Miglitol** (Glyset)
  - Delay carbohydrate absorption in gut – decrease peak glucose levels, no hypoglycemia as monotherapy*
  - Reduces risk of cardiovascular events* (STOP NIDDM)
  - Monitor LFTs; avoid in cirrhosis, GI disease
  - Not for use in renal dysfunction (creatinine >2)*
  - Must keep glucose available – in case of hypoglycemia
  - Weight neutral
  - Category B in pregnancy
  - Helpful for erratic eating schedules
4. A 43 yo Hispanic male with type 2 diabetes and a BMI of 45 is on metformin 1000 mg bid. His fasting sugars average 150 and his postprandial 220. A1c is 9%. Which of the following would improve his postprandial sugar and help with weight loss?

A. Exenatide (Byetta)
B. Pioglitazone (Actos)
C. Sitagliptin (Januvia)
D. Nateglinide (Starlix)
GLP-1 Receptor Agonists

• Subcutaneous injections
• Mechanism of action
  − Potentiate insulin secretion
  − Suppress postprandial glucagon secretion
  − Slow gastric emptying
  − Promote satiety (no weight gain)
• Exenatide (Byetta): doses bid or weekly
  − OK to give with insulin (not in same syringe)
• Liraglutide (Victoza): doses daily
  − Not renally excreted
  − Fewer cardiovascular events and less renal disease***
  − Licensed for weight loss (Saxenda) – 1/4 have 10% loss @ 1 yr
  − Decreases visceral adipose tissue, improves β cell function
• Albiglutide (Tanzeum): doses weekly
• Dulaglutide (Trulicity): doses weekly – positive cardiovascular effects
• Lixisenatide (Adlyxin): doses daily
• Semaglutide (Ozempic): doses weekly [now has an oral form – not yet available]
GLP-1 Receptor Agonists

- Side effects
  - Nausea, vomiting, diarrhea, weight loss**
  - Pancreatitis*
  - Hypoglycemia (with sulfonylurea)
  - Thyroid C-cell tumor risk
- Decrease dose in renal failure (except liraglutide). Avoid if creatinine clearance <30 mL/min
- Category C in pregnancy

Lowers A1c more than DPP-4 inhibitors
May stabilize and lower blood sugar better than insulin, but more GI side effects and greater cost

May cause extended hypoglycemia when used with insulin, but liraglutide decreases insulin dose and A1c
DPP-4 Inhibitors

- Currently available
  - Sitagliptin (Januvia)
  - Saxagliptin (Onglyza) – ↑ heart failure
  - Alogliptin (Nesina)
  - Linagliptin (Tradjenta) – does not need to be renally dosed

- Block dipeptidyl peptidase 4 (enzyme that breaks down natural incretins)
- Better insulin release and blood sugar control, particularly postprandial
- Don’t add to sulfonylurea in the elderly*
- Linagliptin not renally excreted and good choice in elderly
- Side effects minimal: URI, sore throat, diarrhea, pancreatitis
- Weight neutral
- Joint pain – can be debilitating
- No good outcomes data; modest A1c lowering
- No hypoglycemia

7 others used in Europe or Japan
SGLT2 Inhibitors

• Currently available
  Canagliflozin (Invokana)
    • Can use to GFR <45
  Dapagliflozin (Farxiga)
    • Can use to GFR <60
    • Has been used in type 1 diabetes
  Empagliflozin (Jardiance)
    • Can use to GFR <45
  Ertugliflozin (Steglatro)

• Mechanism of action
  Block reabsorption of glucose in the kidney*
  Increase urinary excretion of glucose*
  Less effective as renal function decreases

• Desirable side effects
  Decrease weight
  Decrease blood pressure
  Increase HDL cholesterol
  Decrease risk of MI, stroke, cardiovascular death*
  Improve renal function*

• Undesirable side effects
  B12 deficiency
  May predispose to DKA
  Increase fractures
  Risk of foot amputation*
  Increased UTIs and genital infections*
Combination Therapy

• Best if different mechanisms of action are combined
• Available combinations
  – Metformin with all other classes
  – Thiazolidinediones and sulfonylureas or DPP-4 inhibitor
  – Empagliflozin-linaglaptin (Glyxambi)
• Cost savings if both medications are expensive
• As beta cell function declines or inability to gain control, add insulin (all can be used with insulin)*

Please see full list after the references
Insulin

- Average dose 0.6-0.8 units/kg body weight/day
  - ~40-50 units for a 70 kg man
  - Half for basal needs and half with meals
- Bioavailability changes with site of injection*
  - Faster in abdomen, slower in thigh
  - Exercise accelerates absorption in thigh*
  - Arm reduces exercise-induced hypoglycemia by 60%
  - Abdomen reduces exercise-induced hypoglycemia by 90%
- Best combination: long-acting basal and rapid-acting synthetic – most closely mimics normal*
- Use in geriatrics when other medications are contraindicated*
Intensive Insulin Therapy

• Early use of insulin to reach blood sugar goal
• Consistent increase in insulin dose until blood sugar is at goal
• Results
  – Decreased progression to renal disease in type 1 diabetes*
  – In type 2 diabetes, no difference in eventual progression to dialysis
  – Does not prevent cardiovascular events
  – More hypoglycemia*
  – Better outcomes when used early in disease process
  – Actual increase in all-cause mortality
Long-Acting Insulins

- **NPH** duration 16-24 hours (2/3 in AM, 1/3 in PM)
- **Glargine** (Lantus, Toujeo, Basaglar) 24 hours
  - Cannot mix with other insulins and Solution must remain clear
  - Initiate dose at 80% of prior total insulin dose
  - Split dose when >60 units
  - Best approach for geriatric patients in long-term care facilities (predictable control)*
- **Detemir** (Levemir) similar to glargine ~ 24 hours
  - Less weight gain*
  - Length of activity increases as dose increases
- **Degludec** (Tresiba)
  - Fewer hypoglycemic events (type 1)*
  - Lower fasting glucose levels
Rapid-Acting Analogues

- **Lispro** (Humalog), **aspart**, **glulisine** (Apidra)
- Analogs of human insulin; all similar
- With meals if 2-hour postprandial sugar is high*
- Onset 15 min, peak 1-3 hr, duration 2-5 hr
- May need to adjust long-acting regimen
- Particularly well-liked by type 1 diabetics (~1/3 of daily insulin requirement)
- Available in 75/25 mix with longer-acting protamine form
Inhaled Insulin

• Rapid-acting (Afrezza)
• Indicated for types 1 and 2
• Not indicated in chronic lung disease or smokers
• Side effects: cough, throat pain
Insulin Pump/Transplant

• High patient satisfaction
• Improved glucose control – now used in type 2 diabetes
• Uses only short-acting insulin
• Associated with weight gain
• Requires motivated patient to do frequent glucose checks
• Newer continuous glucose monitors
• Pancreatic transplant still primarily experimental
• Early diagnosis of type 1 – immunosuppression and hematopoietic stem cell transplant increases beta cell function and prolongs insulin independence

The boards have ignored this topic
5. Which of the following medications would be outside the recommendations for a 15-year-old with type 2 diabetes, hypertension, and hyperlipidemia?

A. Metformin
B. Sitagliptin (Januvia)
C. Liraglutide (Victoza)
D. Lisinopril
E. Pravastatin
Treatment in Children

- 3 choices: metformin (type 2); liraglutide (type 2 to age 10); insulin* (type 1 or 2)
- Screening for complications in Type 1
  - Microalbumin yearly beginning age 10 or 5 years after onset
  - Retinopathy beginning at age 15 or 5 years after onset
  - Screen for hypothyroidism
  - Screen for hypertension
  - Screen for celiac disease (tissue transglutaminase IgA, endomysial antibody IgA)
- Hypertension
  - ACE inhibitor for HTN or elevated albumin/creatinine
- Lipids
  - Check if positive family history
  - Use statins if > age 10
- Type 2: glucose >250 or A1c >9 start insulin
  - If glucose <250, A1c <9 start lifestyle change and metformin (exercise >60 min/d)
Immunizations

• **Influenza** yearly
• **Pneumococcal** once, repeat at age 65 (must be 5 years later)
• **PCV13** age 65 or (<65 for chronic renal failure patients only)
• **Hepatitis B** recommended for all ≤ age 60 (OK after age 60)
  – 3 dose series – if previously given, booster not indicated
• **Tdap** (replaces Td one time only)
• **Zoster** vaccine at 60
Complications

• Macrovascular
  − Heart disease
  − Stroke

• Microvascular
  − Retinopathy
  − Neuropathy
  − Nephropathy

• Diabetic foot problems
  − Ulcers
  − Osteomyelitis
  − Charcot foot

• Ketoacidosis and hyperosmolar hyperglycemia

• Hypoglycemia

Treatment of multi-vessel coronary artery disease: Better survival with CABG than angioplasty
6. In which group is the rate of diabetes the highest?

A. Hispanic Americans
B. Asian Americans
C. Native Americans
D. African Americans
Cultural Competence

• Asian-Americans
  – Develop diabetes at a lower body mass and younger age
    • (BMI = 24, compared to African American = 26, Caucasian = 30)
  – More end-stage renal failure

• African-Americans
  – Develop retinopathy at a lower A1c level
  – Higher rates of renal failure and peripheral artery disease
  – Risk of death from heart disease higher in presence of renal disease

• Latino-Americans
  – 51% higher death rates
  – Rate in Latinos will double in the next 10 years

• Native Americans
  – Highest rates at 15.9% (24.1% in southern Arizona)
Screening for Comorbid Conditions

• Blood pressure at every visit
• Lipids yearly (every other year if well-controlled)
• Screen for hypothyroidism because it can contribute to dyslipidemia*
• Screen for tobacco use
• Screen for depression (more prevalent in patients with chronic disease)
• In type 1, screen for hypothyroidism and celiac disease
Screening for Complications

• Yearly dilated eye exam
• Yearly urine microalbumin/creatinine ratio (not required if patient is on ACE/ARB)
• Foot screening to prevent amputation
  – Yearly monofilament, pulses, vibratory
  – Visual inspection of feet at every visit
• Ask about autonomic neuropathies: erectile dysfunction, postural hypotension, gastroparesis (best test is gastric emptying time and first-line treatment is metoclopramide {Reglan}*)
• Screening for cardiac disease with stress echo/thallium
  – If patient is symptomatic or high index of suspicion
  – Consider when patient develops microalbuminuria
Prevention of Complications

• **Glycemic control**
  − 1% reduction in HbA1c = 21% decrease in risk of developing a complication
  − Better outcomes with tight control early in the disease process
  − No evidence for tight control as the disease progresses

• **Blood pressure control** (<120/80 increasingly recommended)

• **Correction of dyslipidemia** (statins)

• **Smoking cessation**

• **Healthy diet and active lifestyle**

• **Aspirin to prevent cardiovascular complications**
  − 65-70% of adults with type 2 DM die from macrovascular complications
Aspirin Recommendations

• Diabetics: 2-4 X the risk for cardiovascular complications and stroke
• Bleeding risk increases in patients with diabetes on aspirin
• Low-dose aspirin (75-162 mg/day) reasonable in adults with diabetes and no history of vascular disease whose 10-year risk of CHD events is >10% and no increased risk of bleeding
  • Males >50 and females >60 with 1 additional risk factor (Smoking, hypertension, dyslipidemia, albuminuria, FH of premature death)
• Secondary prevention with known cardiovascular disease or symptomatic peripheral vascular disease
  • Aspirin or clopidogrel (Plavix) 75 mg/d
  • For symptoms of claudication
    • Cilostazol or second-line pentoxifylline
7. 19 yo male admitted with ketoacidosis. Glucose 670, pH 7.12, K+ 6.8, Na+ 130. Treatment with fluids and IV insulin is initiated and 3 hours later glucose is 220, pH 7.25, K+ 5.1. What is now most appropriate?

A. Start glucose
B. Stop insulin
C. Change IV fluid to ½ normal saline with dextrose and K+
D. Add sodium bicarbonate
Ketoacidosis

• Insufficient insulin; increased gluconeogenesis and fatty acid oxidation resulting in metabolic acidosis
• Uncommon in type 2 unless African-American or Hispanic
• Criteria
  − Anion gap >10
  − Glucose ≥250
  − pH <7.3,
  − Bicarbonate ≤18*
  − Serum and urine ketones
Ketoacidosis Treatment

• Volume replacement
  − 1 L NS/hr until dehydration resolved
  − Then ½ NS at 150-500 mL/hr* (usually 5-8 L deficit)
• Insulin drip (1-2 units/hr—0.1 U/kg/h)
  − If K+ is < 3.3 mEq/L, must replace K+ before starting insulin*
• Continue insulin drip until acidosis is resolved*
  − Reduce but do not stop drip if hypoglycemic
• Hourly monitoring of electrolytes, glucose, and pH
• Replace K+ as soon as it approaches 5 mg/dL*
• Add D5 when glucose is ~250 mg/dL*
• Bicarb only for pH < 7 or HCO₂ < 10 mEq/L*
Hyperosmolar, Hyperglycemic State*

• Hospitalization (may need ICU)
  – Mortality greater than DKA
• **Insulin infusion** (oral and SQ are inadequate)*
• IV fluids (normal saline)
• Replace K+ as it falls near normal range
• Oral medications and/or subcutaneous insulin is restarted after blood sugars return to the 200 range
• Delirium or altered mental status usually clears with correction of metabolic abnormalities*
Microvascular Complications

- Nephropathy, retinopathy, neuropathy
- All treated with
  - Glycemic control
  - BP control
  - Lipid control
  - Smoking cessation
- No evidence that ASA is helpful*
- Appearance of microvascular complications associated with increased risk of amputation
Retinopathy

• Strongest predictor is duration of disease
• Refer to ophthalmologist for any retinopathy
• Panretinal photocoagulation reduces severe visual loss in proliferative retinopathy
• Antivascular endothelial growth factor (antiVEGF) medications reduce macular edema and vessel proliferation (injected into the eye)
  • Ranibizumab (Lucentis)
  • Bevacizumab (Avastin)
• Recombinant fusion protein: aflibercept (Eylea)
• RNA aptamer: pegaptanib (Macugen)
• Patients with nonproliferative diabetic retinopathy should avoid strenuous exercise like powerlifting
• Most common cause of sudden monocular vision loss is vitreous hemorrhage
Neuropathy Treatment

• Symptomatic treatment
  • *1<sup>st</sup>: amitriptyline or nortriptyline, pregabalin (FDA-approved), duloxetine (FDA-approved)
  • 2<sup>nd</sup>: venlafaxine, gabapentin, 5% lidocaine patch, topiramate, lamotrigine, carbamazepine, capsaicin cream, botulinum toxin, tapentadol
  • 3<sup>rd</sup>: opioids, tramadol
  • Also try: L carnitine, acupuncture
Nephropathy Treatment

- Avoid NSAIDs: they acutely reduce renal blood flow and may cause interstitial nephritis*
- Aggressive management of blood sugar and BP
- Initiate ACE inhibitor or ARB for microalbuminuria >30 mg/g or hypertension
- Treat with increased doses of ACE inhibitors or switch to ARB if creatinine is increasing despite ACE therapy
- Do not use ACE inhibitor and ARB together*
- Microalbumin yearly until on ACE or ARB, then questionable
  - If abnormal, repeat to confirm*
- When hypoglycemia occurs in previously well-controlled diabetes, most likely cause is progressing renal failure**
- Refer for rapid decline, difficulty managing, advanced disease
- Increasing systolic blood pressure may be an indication of microalbuminuria
8. 57 yo CM with diabetic foot ulcer. What is the best indicator of its ability to heal?

A. Size of ulcer
B. Patient’s pulse
C. Signs of infection
D. Patient’s blood sugar
E. Patient’s blood pressure
Diabetic Foot

• Leading cause of nontraumatic foot amputation
• Neuropathy, altered foot structure, vasculopathy
• Best treatment is aggressive prevention
• Diabetic foot ulcer: remove pressure; good wound care and debridement;
• Best test for sensation is a monofilament*, and best predictor of future ulcers
• Osteomyelitis usually occurs in the foot*: best test is MRI**
• Best indicator for successful healing: intact vascular supply (pulses)*
  • Assess decreased pulse with noninvasive vascular studies (ankle-brachial index)*
• Infectious etiology
  − Untreated: aerobic Gm+ staph and β-hemolytic strep
  − Treated: polymicrobial
  − Cover MRSA (10-32%) and Strep (dicloxacillin, cephalexin, Augmentin, doxycycline, trimethoprim/sulfa). Severe: piperacillin/tazobactam & vancomycin*
Charcot Foot

• Inflammatory condition in obese individuals with peripheral neuropathy
• Recurrent erythema and edema (like cellulitis) without fever, chills, elevated white count or other signs of infection
• MRI for definitive diagnosis: bone marrow and soft tissue edema, joint effusion, and microtrabecular or stress fractures
• Treatment: immobilization with total contact casting 3-12 months
  – Distributes pressure away from the foot
  – Surgery may be indicated for severe dislocation or instability
Nonalcoholic Fatty Liver (NAFLD)

• Initial evaluation: rule out uncommon (not rare) causes
  – Viral hepatitis studies
  – Iron studies for hemochromatosis
  – Serum albumin levels and CBC

• NAFLD fibrosis score
  – Age, hyperglycemia, body mass index, platelet count, albumin, and AST/ALT ratio
  – 25% progress to cirrhosis
  – http://www.nafldscore.com/
  – Advanced fibrosis reliably excluded with a cut-off score of <-1.455

• Metformin can improve metabolic problems
Increased Risks

• Cancers: liver, pancreas, colorectal, endometrium, breast, bladder
• Hearing impairment
• Sleep apnea
• Periodontal disease (see dentist at least yearly)
• Depression (screen)
• Cognitive impairment (patients > age 60 with type 1 are 83% more likely to have dementia)
• Fractures
• Associated endocrinopathies
  – Cushing’s, Acromegaly, Pheochromocytoma, Glucagonoma
Other Complications

• Dupuytren’s disease prevalence up to 33%*
• “Trigger finger”
• Carpal tunnel
• Adhesive capsulitis (Frozen shoulder): 10-20% lifetime risk; progressive limited abduction and passive external rotation
• Rotator cuff tendinopathy
• Necrobiosis lipoidica diabeticorum*: sharply demarcated reddish-brown plaques with central yellow deposits in the pretibial area, may precede diagnosis, 0.3% of patients, may treat with corticosteroids
• Acrochordons* (skin tags) common finding
• Retinal vein occlusion: sudden, painless loss of vision with tortuous and dilated retinal veins on funduscopic exam
Other Complications

• Diabetes is a risk factor for developing necrotizing soft-tissue infections*

• Perinephric abscess*
  – Fever (>4 days on antibiotics) and persistent flank pain
  – *CT for perirenal fluid or enlargement of psoas muscle
  – Perirenal gas on CT is diagnostic
  – Treatment: drainage and antibiotics

• Trigger finger: 10% lifetime risk; corticosteroid injection is 1st treatment
References


References


References

References


Answers

1. C
2. A
3. D
4. A
5. B
6. C
7. C
8. B
Statin Recommendations

• Patients with overt cardiovascular disease = high-dose statin
• Ages 40-75 with ≥ 7.5% 10-year risk of ASCVD and LDL 70-189 = high-dose statin
• Ages 40-75 and no ASCVD and LDL 70-189 = moderate-dose statin
• Treat fasting triglycerides > 500

Moderate dose statins: atorvastatin 10-20mg, rosuvastatin 5-10 mg, pravastatin 40-80 mg, simvastatin 20-40 mg
High dose statins: atorvastatin 40-80 mg or rosuvastatin 20-40 mg

ASCVD = atherosclerotic cardiovascular disease
Other Medications

• **Colesevelam** *(WelChol)— bile acid sequestrant*
  - Lowers LDL cholesterol
  - Lowers A1c ~ ½%
  - Used as an adjunct to metformin
  - May increase incretins

• **Bromocriptine** *(Cycloset)— anti-Parkinson medication*
  - Boosts the activity of dopamine and “resets” the body’s biological clock to control metabolism

• **Mifepristone**
  - Indicated for blood sugar control in Cushing’s
## Combination Medications

### Metformin combinations

- **metformin-pioglitazone** (ActoplusMet)
- **metformin-rosiglitazone** (Avandamet)
- **metformin-glipizide** (Metaglip)
- **metformin-glyburide** (Glucovance)
- **metformin-glyburide** (Glucovance)
- **metformin-repaglinide** (PrandiMet)
- **metformin-sitagliptin** (Janumet)
- **metformin-saxagliptin** (Kombiglyze XR)
- **metformin-alogliptin** (Kazano)
- **metformin-linagliptin** (Jentadueto)
- **metformin-dapagliflozin** (Xigduo XR)

### Other combinations

- **metformin-canagliflozin** (Invokamet)
- Metformin-empagliflozin (Synjardy XR)
- Metformin-ertugliflozin (Segluromet)

- alogliptin and **pioglitazone** (Oseni)
- glimepiride and pioglitazone (Duetact)
- glimepiride and rosiglitazone (Avandaryl)
- empagliflozin and linagliptin (Glyxambi)
- ertugliflozin and linagliptin (Qtern)
- ertugliflozin and sitagliptin (Steglujan)
- lantus and lixisenatide (Soliqua)
- degludec and liraglutide (Xultophy)
Endocrinologists’ Algorithm for Initiation of Therapy, Based on A1c Levels

- **6.5-7.5%**: monotherapy (usually metformin)
- **7.6-9.0%**: dual therapy: metformin plus
  - Sulfonylurea or
  - TZD: Pioglitazone or
  - Glinide: Repaglinide/nateglinide or
  - DPP4: Sitagliptin/saxagliptin/linagliptin or
  - GLP-1 agonist: Exenatide/pramlintide/liraglutide
- **> 9.0%**: Insulin or triple therapy:
  - Metformin plus
  - DPP4 or GLP-1 plus/or
  - Sulfonylurea or glinide plus/or TZD

- Metformin + exenatide + pioglitazone at onset ↓ treatment failure by 84% at 2 years
Other Medications for Complications

• Post MI
  Ticagrelor or prasugrel with aspirin are preferred
  If neither of these is an option, the new antiplatelet agent, vorapaxar with aspirin is recommended

• Diabetic macular edema
  Ranibizumab (Lucentis – first approved), Bevacizumab (Avast – cheapest), and aflibercept (Eylea – most expensive but probably the best)
  Cost is an important factor
Integrative Options for Diabetes

• Chromium and fiber: beneficial effect on glycemic control (SOR: C)
  Maybe magnesium
• Lower vitamin D levels increase risk of DM but no evidence that supplementation works
• Alpha lipoic acid shows promise for diabetic neuropathy
• Evidence on cinnamon is inconclusive
• Acupuncture can be helpful for peripheral neuropathy and bladder dysfunction (SOR: B)
• Biofeedback and meditation best for stress reduction to improve glycemic control (SOR: C)
• Yoga and Tai Chi questionable, but Tai Chi improves balance
Evidence

• Intensive treatment early in diabetes with tight control of blood sugar and blood pressure can decrease complications (neuropathy, retinopathy, nephropathy, and foot infections) and improve long-term outcomes*. (Ebell in AFP)
• Tight control in type 1 improves cardiovascular outcomes. In type 2 and elderly, tight control may be detrimental.* (Nathan, Diab Care, 2009;32:193)
• Lowering blood pressure below conventional standards reduces the incidence of cardiovascular events and mortality. (AHRQ)
• Lifestyle interventions for overweight individuals with impaired glucose tolerance reduces the incidence of progression to diabetes. (Bandolier)
Evidence

• Both vigorous exercise and moderate exercise reduce the risk of type 2 diabetes in women. The more exercise taken, the greater the risk reduction. Bandolier: RCT

• There is fair evidence to recommend acarbose treatment for overweight individuals with impaired glucose tolerance to prevent cardiovascular events or hypertension (level B).

• Metformin should be considered as the first-line oral hypoglycemic agent in overweight patients with diabetes***. National Guideline Clearinghouse: (SOR:A)

• Metformin corrects fatty liver by activating AMP-activated protein kinase, decreasing acetyl CoA carboxylase, and reducing fatty acid oxidation.

• There is no specific creatinine level beyond which ACE inhibitors or ARBs cannot be used.* National Guideline Clearinghouse: (SOR:A)
Endocrine Diseases

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Disclosure Statement

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Learning Objectives

1. Identify the diagnosis and management of the common types of hypothyroidism, hyperthyroidism & thyroid nodules.
2. Discuss the work-up of pituitary masses.
3. Review the diagnosis & work-up of parathyroid disorders, Addison’s disease and Cushing’s syndrome
17 yo with neck “swelling” for 2-3 wks, 5 lb weight gain and feeling increasingly tired. Otherwise has no symptoms. Exam significant for a diffusely enlarged, smooth and non-tender thyroid.

What initial test would you order for this patient?
1. What initial test would you order for this patient?

A. T4 level  
B. T3 resin uptake (T3 uptake or T3RU)  
C. TSH  
D. Thyroid ultrasound
Thyroid Dysfunction

HYPOTHYROIDISM

TSH = HIGH

T4 LOW

OVERT

SUBCLINICAL

SUBCLINICAL

EUTHYROID

TSH = LOW

T3/ T4 NORMAL

T4 HIGH

OVERT

HYPERTHYROIDISM

NOTE: You don’t need symptoms to be classified as overt.
Screening for Thyroid Dysfunction & Cancer

• The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for thyroid dysfunction in nonpregnant, asymptomatic adults.

• The USPSTF recommends against screening for thyroid cancer in asymptomatic adults.


Hypothyroidism

Is common

- Females > Males (6:1)
- 1:300 U.S. adults

Variety of causes

- Primary
  - Chronic autoimmune (Hashimoto) thyroiditis
  - Ablation
- Secondary
  - Lithium
  - Interferon
  - Amiodarone
- Transient
  - Silent, subacute, or postnatal thyroiditis
- Central
Risk Factors for Hypothyroidism

• Female sex
• Advancing age
• White race
• Type 1 diabetes
• Down syndrome
• Family hx of thyroid disease

• Goiter
• Previous hyperthyroidism
  • Possibly due in part to ablation therapy leading to iatrogenic thyroid dysfunction
• External-beam radiation in the head and neck area
Hypothyroidism Signs & Symptoms

- Fatigue
- Dry skin
- Hair loss
- Hoarseness
- Slow DTRs
- Depression
- Myalgia
- Macroglossia
- Lateral eyebrow thinning
- Weight gain
- Cold intolerance**
- Coarse hair
- Goiter
- Constipation
- Concentration loss
- Hyperlipidemia*
- Bradycardia
Diagnosing Hypothyroidism

- History
- Physical Exam
- Lab testing

- TSH
- T4
- Thyroid antibodies
- Surrogate markers
- High CPK, LDL, triglycerides, proteinuria, normocytic anemia
2. 6 weeks after initiating therapy with levothyroxine, you check a steady-state TSH level. The TSH decreased from 9.3 to 7.21. All of the following factors are barriers to reaching a therapeutic TSH level EXCEPT?

A. Treating with desiccated thyroid supplementation
B. Treating with levothyroxine (T4) rather than liothyronine (T3)
C. Patient is also taking lithium
D. Patient taking ferrous sulfate for iron deficiency
Initiating Hypothyroidism Treatment

• Use levothyroxine (T4)
  • Start at 1.6 mcg/kg/day
  • Start lower in the elderly (1.0-1.25)
• Take on fasting stomach & wait 30 mins before eating
• Re-evaluate @ steady state (5-6 weeks after dosage change)
• Different products can have different bioavailability (e.g.,
genetic brands; Armour)
• Combining T3/T4 generally not superior to T4 alone
Hypothyroidism Treatment Principles

- Avoid desiccated thyroid – poorer quality control
- Avoid triiodothyronine/ liothyronine (T3)
- If supratherapeutic can develop osteoporosis; A Fib
- Interactions: Iron, sucralfate, cholestyramine, antacids, anticonvulsants, grapefruit, amiodarone, lithium, SSRIs, retinoids
Hypothyroidism Treatment Principles

• If TSH WNL but patient not feeling well, consider
  - Pushing TSH to <2.5.
  - Problems with conversion of T4 to T3 (see next slide)

• Exposures & nutrient deficiencies
  - Heavy metals: selenium, chromium, zinc, iron, copper, mercury, lead
  - Iodine
  - Vitamins: A, B2, B6, B12, D, E
Decreased T4 → T3 Conversion
Medications

- OCPs
- Steroids
- Chemotherapy
- Lithium

- SSRIs
- Phenytoin
- Iodinated contrast agents
- Theophylline

- Beta blockers
- Fluoride
- Opiates
- Estrogen
Decreased T4 $\rightarrow$ T3 Conversion

Other Factors

- Stress
- Aging
- Alcohol use
- Fasting
- Radiation
- Excess cruciferous vegetables

- Receptor antibodies
- Low ferritin
- Pesticides
- Soy (excess)
- Hemochromatosis
- Smoking
- Kidney disease
3. 42 yo c/o fatigue, weight loss, voracious appetite, hand tremor, HAs, and worsening anxiety symptoms for 4 weeks. Exam significant for a diffusely enlarged non-tender thyroid & fine hand tremor. TSH is 0.12 and T4 is elevated. What is the next diagnostic step?

A. CBC  
B. Radioiodine uptake study  
C. Thyroid antibodies  
D. Thyroid ultrasound
HypERThyroidism

<table>
<thead>
<tr>
<th>Is common</th>
<th>Variety of causes</th>
</tr>
</thead>
</table>
| ![Female to Male Ratio](image) | - **Graves disease**  
  - TSH receptor-stimulating antibodies  
- **Functional thyroid nodules**  
  - Multinodular goiter; Adenoma  
- **Thyroiditis**  
  - Hashimoto*; postpartum  
- **Ingestion**  
  - Amiodarone; Iodine  
- **Metastatic thyroid cancer**  
- **Hyperemesis gravidarum** |

- Females > Males (8:1)
- U.S. Prevalence: ~0.2 %
Risk Factors for Hyperthyroidism

- Female sex
- Advancing age
- Black race
- Low iodine intake
- Personal or family history of thyroid disease
- Ingestion of iodine-containing drugs, such as amiodarone
HypERThyroidism Signs & Symptoms

- Nervousness
- Irritability
- Palpitations
- Weight loss
- Heat intolerance
- Increased appetite
- Tremor
- Hyperdefecation
- Fatigue
- Mental changes
- Insomnia
- Dyspnea on exertion
- Headache
Diagnosing HypERThyroidism

• History & Physical Exam
• Labs & studies
  • TSH (A)
  • Free T4 & T3 (A)
  • Radioactive uptake scan (A)
  • CBC (B)
  • Consider: ESR, ultrasound, thyroid abs (C)
Diagnosing HypERThyroidism

TSH = LOW
T4 = HIGH

Radioactive thyroid uptake & scan

Order Scan

Diffuse Uptake
- GRAVES DISEASE

Nodule
- ADENOMA

Multiple Nodules
- MULTINODULAR GOITER
Graves Disease: Treatment

• Radioactive iodine is the TOC: A Rec
  - Except perhaps in cases with ophthalmopathy: B Rec

• Surgery is uncommon today

• Medications
  - PTU or methimazole & beta blockers
  - Chinese herbal meds (I Rec, Cochrane 2007)
Graves Disease: Treatment

- Methimazole safer than PTU
- With PTU, risk of serious liver injury is
  - Adults: 1:10,000
  - Peds: 1:2,000
- PTU now considered a 2nd-line agent
  - EXCEPT during pregnancy (1st tri) & lactation
4. 46 yo c/o painless neck mass for 6 wks. On exam you palpate a 2-cm firm mass in right lobe of thyroid. What is the initial diagnostic test?

A. TSH  
B. Fine-needle aspiration  
C. Free T4  
D. Thyroid ultrasound
Thyroid Nodules

• Work up all nodules
  - 5% are malignant
  - 95% of solitary thyroid nodules are benign hyperplastic lesions

• Start with TSH (SOR A)
  - TSH results determine further workup
Thyroid Nodules

- **Benign**
  - Adenomas
  - Cysts
  - Hashimoto’s
  - Subacute thyroiditis
  - Riedel’s struma

- **Malignant**
  - Papillary carcinoma (60%)
  - Follicular carcinoma (12%)
Thyroid Nodule Workup

START WITH TSH
GET ULTRASOUND & either

LOW TSH
I-123 SCAN
HOT
ENDOCRINE OR SURGERY
COLD

NORMAL or HIGH TSH
FNA
Other Causes of Hyperthyroidism

**Hashimoto’s Thyroiditis**
- Chronic lymphocytic thyroiditis
- Prevalence = 0.3-1.2%
- Typically painless, nontender, diffuse goiter
  - Can have pain, pressure and dysphagia, low grade fever, high ESR or CRP

**Subacute Thyroiditis**
- Acute inflammatory disease (viral)
- Fever and thyroid tenderness
- Initial hyperthyroidism → transient hypothyroidism
- Clinical dx with thyroid function tests
The Thyroid in Pregnancy

• Thyroid size can increase by 10% (more in iodine deplete countries)
• 50% increase in thyroid hormone production & 50% in iodine needed
• 10% of gravid women in 1st trimester will be + for thyroid peroxidase or thyroglobulin antibodies
  - 16% have hypothyroidism
  - 33-50% develop post partum thyroiditis

The Thyroid in Pregnancy

• TSH goal in pregnancy <3.0
• Treatment not needed for isolated low T4
• Women already on levothyroxine should increase dose by 25-50% during pregnancy.
• Antithyroid meds are NOT indicated for women with gestational hyperthyroidism
• For Graves, use PTU in 1st trimester, then methimazole.
The Thyroid in Pregnancy

- Post partum thyroiditis
  - No anti-thyroid medication during toxic phase
  - Check TSH q 2 months after toxic phase for hypothyroidism
  - Can try to wean off levothyroxine @ 6-12 months after starting treatment

- No radioactive iodine scanning during pregnancy
5. 58 yo with hypertension has an elevated calcium level on routine lab work. He denies any complaints & his exam is unremarkable. Additional labs are significant for an elevated calcium, elevated parathyroid level and low phosphate levels.

You suspect he has hyperparathyroidism. All of the following are common symptoms of hyperparathyroidism EXCEPT:

A. Bone pain
B. Increased appetite
C. Depression
D. Renal Stones
Causes of Hypercalcemia

• Parathyroid hormone-related
  - Primary hyperparathyroidism*
    • Sporadic, familial, associated with multiple endocrine neoplasia I or II
  - Tertiary hyperparathyroidism
  - Associated with chronic renal failure or vitamin D deficiency

• Vitamin D-related
  - Vitamin D intoxication
  - Usually 25-hydroxyvitamin D2 in over-the-counter supplements

• Granulomatous disease
  - Sarcoidosis, berylliosis, tuberculosis

• Hodgkin's lymphoma

• Malignancy
  - Humoral hypercalcemia of malignancy* (mediated by PTHrP)
  - Solid tumors, especially lung, head, and neck squamous cancers, renal cell tumors
  - Local osteolysis* (mediated by cytokines) multiple myeloma, breast cancer
Causes of Hypercalcemia

**Medications**
- Thiazide diuretics (usually mild)*
- Lithium
- Milk-alkali syndrome (from calcium antacids)
- Vitamin A intoxication (including analogs used to treat acne)

**Other endocrine disorders**
- Hyperthyroidism
- Adrenal insufficiency
- Acromegaly
- Pheochromocytoma

**Genetic disorders**
- Familial hypocalciuric hypercalcemia: mutated calcium-sensing receptor

**Other**
- Immobilization, with high bone turnover (e.g., Paget's disease, bedridden child)
- Recovery phase of rhabdomyolysis
Hyperparathyroid

• **Presentation**
  - Bone pain
  - Depression
  - Frequent urination
  - Kidney Stones
  - Nausea
  - Loss of appetite

• **Treatment**
  - Locate & remove tumor surgically

_Bones, stones and psych groans!_
Parathyroid

- Hypoparathyroid
  - Only 900 cases per year in U.S.
  - I would not expect any questions on such an uncommon disease
  - Treatment is to restore calcium & mineral balance thru Ca++ & Vit D supplements

- Hyperparathyroid
  - ~2 per thousand people affected
  - May be primary (most common) or secondary
Hyperparathyroidism

Primary
• Typically from single benign adenoma (80%)
  - Multiple benign tumors, rarely parathyroid cancer
• Most people with primary disease have no symptoms at the time of diagnosis
• Remove the adenoma or overactive parathyroid glands

Secondary
• Typically due to vitamin D deficiency, chronic kidney disease, or other causes of low blood calcium
• Manage underlying cause
6. A 33 yo presents with irregular menses and galactorrhea for 3 months. The remainder of her PMH and PE are unremarkable. Lab studies are within normal limits, except for a prolactin level of 310 mg/mL. The most appropriate next step in her work-up is:

A. Dexamethasone suppression test
B. PET scan of the brain
C. MRI of the brain
D. CT head with and without contrast
Prolactinoma – Diagnosis

- Prolactin correlates with tumor size
- Rule of 200’s
  - Prolactin level >200 is almost always a prolactinoma
  - <25 is normal
- Pregnancy test
- Thyroid function studies (TSH and Free T4)
- MRI with contrast or CT scan with coronal cuts
- Formal visual field examination if >10 mm in size
- Evaluation of remainder of pituitary function, if indicated
Pituitary Abnormalities

• Sx depend on hormone secreted
  • **Prolactin** – Amenorrhea, galactorrhea, impotence
  • **Growth hormone** – Gigantism and acromegaly
  • **Corticotropin** – Cushing’s disease
  • **TSH** – Hyperthyroidism
Evaluation of a Sellar Mass

- MRI with and without gadolinium
  - Gadolinium contrast
    - Normal pituitary takes up gadolinium more than does CNS tissue
    - Microadenomas often take up gadolinium less than normal pituitary
- CT
  - Calcification in a craniopharyngioma or a meningioma is seen better by a CT than by MRI
- PET Scan
  - Uptake by adenoma was 2-3X greater than by craniopharyngiomas or meningiomas
Differential Diagnosis for a Sellar Mass

- **Benign Tumors**
  - Pituitary adenoma (most common mass)
  - Craniopharyngioma
  - Meningiomas

- **Malignant Tumors**
  - Primary
    - Germ cell tumor
    - Sarcoma
    - Chordoma
    - Pituitary carcinoma
  - Metastatic
    - Lung
    - Breast
Cushing’s Syndrome
(Think ↑ Cortisol)

Primary features
- Central obesity
- Ecchymoses
- Plethora
- Proximal weakness
- Osteopenia/osteoporosis
- Hypertension
- WBC >11.0
- Purple striae >1cm wide

Other features:
- Myopathy, hirsutism, opportunistic infections, loss of libido (male)

Diagnostic steps
- Confirm the elevated cortisol level, then identify the source
- Dexamethasone Suppression Test

Treatment
- Reducing steroid use, surgery, radiation, and medications
Cushing’s Syndrome

- 10-15 per million in general population
- Higher prevalence in patients with
  - Diabetes
  - Obesity
  - Hypertension
  - Osteoporosis
- Peak Incidence in 25-40 yo
Cushing’s Syndrome
Clinical Characteristics of Cushing’s Syndrome

• Psychological symptoms  40%
• Bruising  36%
• Congestive heart failure  22%
• Edema  18%
• Renal Calculi  16%
• Headache  14%
• Polyuria/Polydipsia  10%
• Hyperpigmentation  6%

• Diagnosis is usually delayed because Sx are nonspecific
Laboratory Diagnosis of Cushing’s Syndrome

- 1\textsuperscript{st} confirm the hypercortisolemia; 2\textsuperscript{nd} determine the source
  - **Cortisol levels (circadian cycling)**
    - AM cortisol may be normal
    - Raised midnight cortisol
  - **24-hr urinary free cortisol**
    - Not affected by obesity, drugs, medical conditions
    - Need to measure creatinine (ratio unreliable)
    - 4x normal unequivocal, lower uncertain
  - **Midnight salivary cortisol**
    - Raised in medical/psychiatric illness
  - **Dexamethasone Suppression test**
Dexamethasone Suppression Test
Dexamethasone acts like cortisol, lowers the amount of ACTH released by the pituitary gland.

**Normal**
- Pituitary makes less ACTH
- Adrenals make less cortisol

**Cushing’s Syndrome**
- Pituitary makes less ACTH
- Adrenals still making cortisol

Give Dexamethasone
Addison’s Disease
(Think \( \downarrow \) cortisol & \( \downarrow \) aldosterone)

- **Primary**
  - Atrophy or destruction of adrenal glands
- **Secondary**
  - Inadequate secretion of ACTH from pituitary gland

- **Clinical presentation**
  - Hyperpigmentation
  - Low blood pressure
  - Weight loss
  - N&V
  - Muscle cramps
  - Irregular menses
  - Salt craving
  - Malaise, fatigue
Addison’s Disease
(Think ↓ cortisol & ↓ aldosterone)

• Diagnostic Testing
  - Serum electrolytes
  - Blood glucose
  - CBC
  - ACTH stimulation test
  - CT scan adrenals
  - MRI adrenals

• Treatment
  - Replace cortisol
  - Replace aldosterone
Summary Pearls

• **Thyroid**
  - TSH to start diagnosis
  - Be vigilant for thyroid disease in pregnancy

• **Parathyroid**
  - Focus on hyperparathyroidism (high Ca, high PTH)
  - Usually primary, remove the tumor

• **Pituitary Masses**
  - Sx dependent on specific hormone

• **Addison’s Disease**
  - Think low cortisol and aldosterone (*Must Add some*); electrolyte abnormalities

• **Cushing’s Syndrome**
  - Think high cortisol; dexamethasone suppression testing

• **Supplementary slides** – pituitary masses, thyroid ca
1. C
2. B
3. B
4. A
5. B
6. C
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Bibliography


Supplementary Slides
Adenomas

• There is a separate webinar available covering adenomas
Pituitary Masses

- 10-15% of all primary brain tumors
- 20-25% of pituitary glands at autopsy found to have adenomas
- 70% of adenomas are endocrinologically secreting
- 25% of those with MEN-I develop pituitary adenomas
- Etiology is unknown
- Not associated with environmental factors
Sonographic Evidence of Thyroid Cancer in a Nodule

<table>
<thead>
<tr>
<th>Feature</th>
<th>PPV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taller than wide</td>
<td>59.8</td>
</tr>
<tr>
<td>Solid appearance</td>
<td>49.4</td>
</tr>
<tr>
<td>Microcalcifications</td>
<td>38.6</td>
</tr>
<tr>
<td>Irregular margins</td>
<td>28.2</td>
</tr>
<tr>
<td>Purely cystic nodule</td>
<td>(&lt; 2%)</td>
</tr>
</tbody>
</table>
Workup of Multinodular Thyroid for Cancer

- Dynamic Contrast Medium-Enhanced MRI (DCE-MRI) is more accurate than FNA in detecting cancer in a multinodular gland: B Rec, Tezelman. Archives of Surgery, 2007
- Negative Predictive Value = 100%
  For FNA, it’s 58%
PPV: DCE-MRI = 78.5%; FNA = 100%
Diagnostic accuracy: DCE = 90%; FNA = 71%
Subclinical Hypothyroidism

- Prevalence: 5%-17%
- Risk for progression to overt dz: 8%-18%
- Look for Sx
- Treat if TSH > 10, attempting conception, or + thyroid peroxidase Ab
- Be observant for overtreatment: Osteoporosis, A Fib
- Treatment does NOT result in improved survival or morbidity, nor QOL nor Sx: A Rec, Cochrane, 2007
Subclinical Hyperthyroidism

• Subclinical hyperthyroidism: Any antithyroid drug is effective (A Rec)
  • Nygaard. AFP’s Clinical Evidence Concise. 2007;76:1014-7.
• Prevalence: 0.1%-6%
• Risk higher in women, age > 60, + antibodies
• Higher osteoporosis, death from CV causes, A Fib
• Joint decision-making for treatment or not
AMERICAN ACADEMY OF FAMILY PHYSICIANS

STRONG MEDICINE FOR AMERICA
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Learning Objectives

1. Identify key concepts in systems of care for the elderly.
2. Identify common gait disorders in the elderly including Parkinson’s disease.
3. Manage common geriatric syndromes.
Case Discussion

A 72 yo woman seeks your advice. Her daughter has encouraged her to transfer the title for her home to her children to protect it for her family if she were to need nursing home care. She wonders “if this is really necessary” because she has “Medigap” insurance. She also says that if she ever needed to live permanently in a nursing home, she would not want to be kept alive and she understands that Medicare would cover her hospice care.
What Medicare Covers

- Medicare will only pay for skilled, rehabilitative care in nursing homes (20 days after at least a three-day hospital stay; patient pays a copayment of $168 per day for day 21-100 of skilled care)
- Medicare hospice benefit is for home hospice and does not include cost of inpatient custodial care.
- Custodial nursing home care is paid for primarily out of patient’s “pocket.” Medicaid only pays after “spending down.”
Medicaid

• Surviving spouse is often allowed to keep the couple’s home, one car, and a very limited amount of other assets (as little as $3,000).

• Any asset transfer to family members other than a spouse must occur at least three years prior to the need for nursing home care (five years if in a trust).
1. The largest portion of the Medicare budget is spent on:

A. Surgical procedures and postop care  
B. Hospital costs in the last month of life  
C. Overhead for intermediaries  
D. The 20% of Medicare recipients with five or more chronic diseases
Impact of Multiple Chronic Diseases

- Nearly half of Medicare enrollees have at least 3 chronic conditions; >20% have 5 or more.
- Enrollees with at least 3 chronic conditions account for nearly 90% of Medicare’s annual budget.
- Two-thirds of Medicare budget spent on 20% with 5 or more chronic diseases.
Case Discussion

• Three months ago, 71 yo complained of increased falls and weak right knee. Chronic severe low back pain. Minimal neck discomfort. Referred to orthopedics.

• Mental status normal. Cranial nerves normal. Stiff-legged gait. Lower extremity increased tone and hyperreflexia; bilateral lower ext weakness. Position sense impaired.
2. Your next step is:

A. Order CT of head.
B. Order TSH, B12, blood sugar.
C. Order MRI of cervical spine.
D. Order MRI of lumbosacral spine.
Neurological Gait Disorders

- Peripheral neuropathy: Distal sensory and motor signs only
- Lumbosacral: Lesion below end of spinal cord (T12) = no upper motor neuron signs
- Cervical: Upper motor signs; no cranial nerve or gray matter signs (e.g., dementia)
- Brain: cranial nerve and gray matter signs, extrapyramidal signs
Upper Motor Neuron Signs

- Weakness (not complete paralysis) of a group of muscles (not a single muscle); minimal muscle atrophy
- Increased muscle tone (spasticity, rigidity)
- Hyperreflexia (+/- clonus)
- Babinski response
Cervical Myelopathy

• Cervical myelopathy usually due to degenerative spine changes; may have little neck pain and no radicular symptoms.

• Upper motor neuron signs often present.

• Paresthesias and loss of position sensation may be caused by spinal cord compression (posterior column) but may also have peripheral neuropathy.
Surgery for Cervical Myelopathy

- Better response to surgery if shorter duration, milder symptoms (better if not walker-dependent preop)
Management

• Image neck (MRI) if candidate for surgery.
• Check B12, TSH, glucose (since he has signs of posterior column sensory loss).
Case Discussion

• 74 yo man complains of exertional pain in back of thighs that limits walking; pain is worse walking downhill than uphill; some relief with rest and leaning forward.

• On exam, normal cranial nerves, DTRs, and upper extremity strength; mild weakness of quadriceps bilaterally; labs including alk phos and PSA are normal.
3. The next step is:

A. Order MRI of lumbosacral spine.
B. Order CT of lumbosacral spine.
C. Prescribe analgesic, order physical therapy.
D. Order EMG of lower extremities.
Surgical vs. Nonsurgical Therapy for Lumbar Spinal Stenosis

- One of three randomized to surgery didn’t get surgery; two of five “nonsurgical” group had surgery.
- Benefit of surgery waned over time (2 years).
- “Often patients fear they will get worse without surgery, but the majority of patients in the nonsurgical group showed small improvements in all outcomes.”
Case Discussion

An 80 yo man is referred for evaluation of possible depression. He’s accompanied by his wife who describes how much more difficulty ambulating he’s had since esophagectomy for cancer 18 months ago. His medications include hydrochlorothiazide, lisinopril, risperidone, metoclopramide and valproate.
Case Discussion

On exam, the patient has a flat affect and blinks little. He slowly rocks back and forth in his chair when asked to stand but is unable to propel himself to a standing position. When helped up to a standing position, he has trouble initiating his gait, then takes a few small steps and freezes.
4. Your next step is:

A. Begin carbidopa/levodopa 25 mg/100 mg tid
B. Stop the risperidone, metoclopramide and valproate
C. Begin amantadine 100 mg bid
D. Stop HCTZ and lisinopril
Pearls

• Drug-induced parkinsonism can occur with medications overlooked as considered culprits (metoclopramide, prochlorperazine, sodium valproate).
• Atypical antipsychotics may cause parkinsonism: risperidone, olanzapine, et al.
• Quetiapine and clozapine have little extrapyramidal toxicity
Pearls

- Resting tremor, asymmetric rigidity/tremor, and response to levodopa best predict correct diagnosis of Parkinson’s disease
- May take up to one to two months to determine if medication is working
When to Start Drug Rx in the Elderly?

- Functional decline: dominant side more affected, interference with ADLs and gait.
- Why delay drug treatment?
- Medications often associated with side effects in elderly and don’t prevent progression.
- Cost of medication is high.
Medications for PD

• Carbidopa/L-dopa (Sinemet)
• Dopamine agonists (e.g., pramipexole, ropinirole)
• COMT inhibitors
  - (e.g., entacapone)

• Anticholinergics (e.g., trihexyphenidyl)
• Amantadine
• MAO Inhibitor (selegiline, rasagiline)
Carbidopa/Levodopa (Sinemet)

- Most effective med for gait (bradykinesia, rigidity); tremor response variable.
- Carbidopa prevents peripheral breakdown of levodopa; >75 mg daily for max effect.
- Begin 25/100 bid or tid; may use 25/250 as dose increased; avg patient needs about 500 to 1,000 mg L-dopa/day.
Treating PD in the Elderly

- Carbidopa/levodopa is the most effective medication for PD; optimize dose before adding other drugs.
- Anticholinergics and amantadine have little role in treating elderly PD patients.
- COMT inhibitors and MAO inhibitors are very expensive for modest gain.
- Dopamine agonist more likely to cause delusions/hallucinations.
Case Discussion

An 87 yo nursing home resident returns from the hospital after treatment for wrist fracture. She completed a course of antibiotics and takes prn oxycodone for pain. She has frequent incontinence of small volumes of liquid stool. She is afebrile. Next step?
Diarrhea in the Nursing Home

• At any point in time, 1% of nursing home residents are suffering from diarrhea
• Fecal impaction may mimic “diarrhea”; distension of rectum stimulates large bowel contraction; only small amounts of liquid stool pass the fecalith in the rectum and may be misinterpreted as “diarrhea”
• Popular board question!
Case Discussion

• Two days later, the patient develops severe diarrhea and has a temperature of 38.5°C (101°F). White count is 16,000. *Clostridium difficile* toxin titre is positive.
5. Your next step is:

A. Begin vancomycin 125 mg po qid.
B. Begin metronidazole 250 mg po tid.
C. Begin vancomycin 500 mg po qid
D. Begin metronidazole 500 mg po tid.
What is the most common cause of severe, irreversible loss of visual acuity >70 years?
Age-Related Macular Degeneration (AMD)

- Leading cause of new blindness >55 yo; “dry” more common, “wet” more severe
- Macula has highest concentration of photoreceptors in retina.
- Provides visual acuity and color vision; degeneration leads to loss of central vision (impairs reading, face recognition, driving).
Case Discussion
What causes this type of visual loss?

https://commons.wikimedia.org/wiki/File:Eye_disease_simulation,_glaucoma.jpg
6. What causes this type of visual loss?

A. Age-related macular degeneration
B. Cataracts
C. Glaucoma
D. Diabetic retinopathy
Open Angle Glaucoma: Definition

• Characteristic optic neuropathy and visual field changes often, but not always, associated with increased intraocular pressure.
7. Presbycusis is typically associated with the reduction in what type of hearing loss?

A. Hearing threshold at all frequencies
B. Hearing threshold at higher frequencies
C. Hearing threshold at lower frequencies
D. Hearing threshold at midrange frequencies
Typical Presbycusis: Blue Line
Case Discussion

A 78 yo woman with history of osteoarthritis comes to your office for 4-week history of early morning shoulder and hip discomfort. Labs are normal except for erythrocyte sedimentation rate of 52 mm/h.
Polymyalgia Rheumatica

• Rare <50 yo, avg age 70
• Bilateral aching/morning stiffness (>30 minutes) for at least one month, and involving at least two of the following three areas: neck or torso, shoulders or proximal regions of the arms, and hips or proximal aspects of the thighs
• Sed rate >40 or elevated C-reactive protein
Treatment of PMR

• “Low-dose” oral prednisone, e.g., 15 mg daily, is often effective within 24-48 hours.
• “High-dose” oral prednisone, e.g., 60 mg daily, is only indicated when PMR accompanies temporal arteritis
• Empiric treatment with high-dose prednisone in suspected temporal arteritis before biopsy may be appropriate if urgent need (e.g., threatened vision)
• Biopsy still positive within 1 week of starting steroids
Case Discussion

An 84 yo woman has repeated falls due to near syncope in the nursing home, most often when she is returning to her room after lunch or dinner. Her medications include HCTZ 25 mg daily and lisinopril 10 mg daily for hypertension. Supine blood pressure is consistently 150/85.
Postprandial Orthostatic Hypotension

• Syndrome of orthostatic hypotension occurring 30-45 minutes after a meal

• Prevent by having patient remain seated for 45 minutes after meals and avoiding hypotensive medications at mealtime

• Should be considered in the differential diagnosis of near syncope or syncope.
Answers

1. D
2. C
3. C
4. B
5. A
6. C
7. B
Preoperative Examination and Surgical Management

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Disclosure Statement

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Learning Objectives

1. Screen patients for risk factors before they undergo surgical procedures, and report subsequent risks to the patient’s surgical care team.
2. Evaluate patients for preoperative cardiac risk based on the risk and complexity of the surgery and the functional status of the patient.
3. Understand the perioperative management of diabetes.
Preoperative Evaluation

- Required for all patients undergoing a diagnostic or therapeutic procedure except for healthy individuals having
  - Peripheral nerve blocks
  - Local or topical anesthesia
  - No more than 50% nitrous oxide/oxygen (dental procedures, excision of skin lesions)

- Thorough medical history and physical exam
  - PE focuses on BMI, BP, O2 sat, cardiac and pulmonary examination, dental examination

- Assessment of perioperative risk factors
- Ancillary tests
- Interventions recommended to mitigate risks
- Social support
  - Care giver, home health, rehab?
Preoperative Evaluation Goals

• Assess risk of a major adverse cardiovascular event (MACE)
• Assess risk of health conditions that may impact perioperative morbidity and mortality
• Assess overall health status and improve health status relative to surgery
• Accurate communication to the patient and the surgical team
• Medical optimization (rather than “clearance”)
Operative Risk

Patient:
Health status
Functional status

Operation:
Urgency
Type
Stress

=RISK
Medical History

- Age
- Functional capacity
- Obesity (cardiac, PE)
- Sleep apnea

- Medications
- Alcohol and drug use
- Smoking

- Anesthetic history
- Current medical problems

- Cardiac status
- Pulmonary status
- History of abnormal bleeding
- Risks for symptomatic anemia
- Possibility of pregnancy
Cardiac Evaluation
Cardiac Risk Assessment

• Risk assessment for MACE (major adverse cardiac event)
• Risk increases with age (>62 independent risk factor for perioperative stroke)
  – Assess the risk/complexity of the surgery
  – Assess the risks and functional status of the patient
  – Assess other risks
    • Risk of bleeding
    • Pregnancy
    • Anesthesia risk
    • Smoking
1. Your 72-year-old patient with diabetes and hypertension, whom you last saw 6 months ago, is having cataract surgery, and she comes to you for a preop evaluation. What will you order?

A. ECG
B. CBC
C. BUN/creatinine and electrolytes
D. Thallium stress test
E. None of the above
Risk of Procedure

High Risk
(>5% risk of MI)
Aortic and Vascular*
Peripheral vasc.
Cardiothoracic
Emergent

Moderate Risk
(1-5% risk)
Head and neck
Abdominal
Orthopedic
Prostate

Low Risk
(< 1% risk*)
Endoscopic
Cataract***
Plastic
Breast
Known Cardiac Risk

• **Coronary artery disease**
  − Recent MI: >60 days should elapse before non-cardiac surgery
  − MI within 6 months increases mortality from stroke by 8-fold
  − Postoperative mortality rate (30 day) = 2.9%

• **Heart failure**
  − 3rd heart sound and jugular venous distention – strongest association with MACE*
  − Risk is greatest with diastolic dysfunction
  − Increases risk by 50-100% – Postoperative mortality rate >9%
Known Cardiac Risk

• Moderate or severe valvular stenosis or regurgitation: should have an **echocardiogram** prior to surgery if
  – No echocardiogram in the last year
  – Clinical changes
  – Dyspnea of unknown cause

• **Arrhythmias**
  – Investigate underlying cardiopulmonary disorders
  – Atrial fibrillation: if clinically stable only requires anticoagulation monitoring/adjustment
Risk of MACE

• All patients should be assessed for cardiac risk factors
• RCRI (Revised Cardiac Risk Index – Goldman)
  − 1 point each for
    • History of CVA/TIA
    • Heart failure
    • Ischemic cardiac disease
    • Renal insufficiency (Cr >2.0 mg/dL)
    • Diabetes requiring insulin
    • Orthopedic, supra-inguinal vascular, intra-thoracic, intra-abdominal surgical site
• American College of Surgeons NSQIP MICA (2011)
  − FACS web-based calculator:  http://www.riskcalculator.facs.org/
  − Risks include increasing age

0-1 = low risk
≥2  = elevated risk
2. You have an active 87-year-old patient who plays golf weekly but uses a cart. He is able to climb 2 flights of stairs without getting too winded. His METS are:

A. >10
B. 7-10
C. 4-6
D. <4
Metabolic Equivalent (MET)

1 MET = resting or basal O2 consumption of 40-year-old, 70 kg man

>10 METS = excellent functional capacity (vigorous exercise)

7-10 METS = good functional capacity (mod-vigorous exercise)

4-6 METS = moderate functional capacity
  
  (Climbing a flight of stairs, walking up a hill, heavy housework)

<4 METS = poor functional capacity
  
  (Slow ballroom dancing, golfing with a cart, playing a musical instrument)
ACC/AHA Perioperative Guideline

• Step 1: If emergency, proceed to surgery with appropriate monitoring
• Step 2: If urgent or elective and patient has known acute coronary syndrome, refer to cardiology
• Step 3: If stable coronary artery disease: determine the perioperative risk of MACE
  - Low-risk surgery = low risk of MACE and no further testing
  - Moderate-risk surgery and METS ≥4 = low risk of MACE and no further testing is required
  - Moderate-risk surgery and METS ≤4 = increased risk of MACE and further testing is indicated
  - High-risk surgery = proceed to further testing
Cardiac Evaluation: ECG

• Not indicated for low-risk procedure (SOR: strong)
• Moderate- or high-risk procedure for patients with increased risk:
  – Known coronary heart disease
  – Significant arrhythmia
  – Peripheral arterial disease
  – Cerebrovascular disease
  – Structural heart disease
• Indicated for patient without known coronary disease if undergoing a high-risk procedure (or for moderate-risk procedure if low functional capacity)
• ICSI: All patients >65 years within 1 year of surgery (SOR: weak)
  (ICSI – Institute for Clinical Systems Improvement)
Evaluate for: Q waves, ST-segment elevation/depression, left ventricular hypertrophy, QTc prolongations, bundle branch block, arrhythmia
Cardiac Evaluation: Stress Testing

- For high-risk procedures or for patients with elevated risk and poor or unknown functional capacity (if it will change management), it is reasonable to perform
  - Exercise stress testing
  - Noninvasive pharmacological stress testing
  - If Left Bundle Branch Block: myocardial perfusion scan or pharmacologic echocardiogram
- For patient *without* significant risk, METS >4, moderate-risk procedure it is reasonable to forgo further testing (on ITE this patient did NOT have an ECG)
- Non-cardiac surgery should be delayed
  - 14 days after balloon angioplasty
  - 30 days after bare metal stents
  - 6 months after drug-eluting stents (Levine GN, et al., *Circulation* 2016, Sept 6;134:e123)
Pulmonary Evaluation
3. Which of the following procedures is an indication for a preoperative chest x-ray in a 55 yo patient?

A. Hernia repair
B. AAA repair
C. Knee replacement
D. Hysterectomy
Chest X-Ray

• No outcomes evidence for routine CXR
• Indications for CXR
  – New or unstable cardiopulmonary signs or symptoms
  – Risk factors for pulmonary complications:
    • COPD
    • Age >60 years (some say 50)
    • Functional dependence
    • Hypoalbuminemia
    • CHF
    • Emergency or prolonged procedure
    • Certain surgical sites (thorax, upper abdomen, AAA)
Pulmonary Risks

• Procedure-related risk factors are more predictive of pulmonary complications than patient-related factors
  – Greatest risk is how close surgery is to the diaphragm
  – Surgery >3 hours significantly increases risk
  – Patient: Preop O2 sat ≤91%

• Need to quit smoking 8 weeks prior to surgery
Obstructive Sleep Apnea

• All patients should be screened for OSA (SOR C) (STOP-BANG)
  – Snore
  – Tired during the day
  – Observed to stop breathing
  – Pressure (elevated blood pressure)
  – BMI >35
  – Age >50
  – Neck circumference >16 inches (40 cm)
  – Gender male

• Patients with OSA who have an oral appliance or CPAP equipment should bring these with them on the day of the surgery (SOR A)
  – Should be in preop recommendations
Other Testing
Routine Laboratory Tests

• CBC
  − Risk for anemia (chronic kidney or liver disease, inflammatory diseases)
  − Age >65
  − Major surgery**
  − Surgery with expected excessive blood loss
• Electrolyte and creatinine testing
  − PMH of HTN*, CHF, CKD, complicated DM, liver disease
  − Medications diuretics, ACE-I/ARB, NSAIDs, digoxin
  − Nephrotoxic medication in surgery, ? >60 and high-risk surgery
• A1c: indicated only for patients at very high-risk or signs and symptoms of undiagnosed diabetes
  − Should be up to date, but manage based on current blood sugars
Routine Laboratory Testing

• Urinalysis
  – Only for urologic procedures

• Coagulation tests
  – Potential bleeding problem by history
  – Taking anticoagulants
  – ASA class II or VI

• Pregnancy testing in patients of child-bearing age
  – Sexually active and delayed menses
  – Concerned about pregnancy
  – Possibility of pregnancy is uncertain

Non-elective surgery should not be delayed in pregnancy
NOT Routinely Recommended

- Electrolytes
- Blood glucose
- Liver function tests
- PT/PTT
- Urinalysis
- Pulmonary function tests
- ECG for asymptomatic/low-risk patients and low-risk procedures

Preoperative Exams
COST: >$30 billion annually
60% are unnecessary
30-95% of unexpected lab abnormalities not addressed
4. Your 57 yo patient has rheumatoid arthritis and is having hip replacement surgery. Which should you order?

A. X-ray of the contralateral hip  
B. Chest x-ray  
C. Cervical spine film  
D. Bone density
Rheumatoid Arthritis

- Patients with rheumatoid arthritis may require C-spine imaging for atlanto-axial subluxation prior to intubations*
  - Prevent spinal cord injury during intubation
  - May require cervical fusion prior to surgery
  - Despite evidence, many anesthesiologists do no change method of intubation, so this recommendation remains controversial
  - MRI will provide even higher quality imaging

  - (Just a note: Odontoid [or open mouth] view is for odontoid fracture not atlanto-axial subluxation)
Renal Status

• Patients with CRF are at increased risk
  − Surgery well tolerated if GFR >25 mL/min
  − GFR 10-15 mL/min – complications rise 55-60%

• Postoperative acute kidney injury (AKI) has a high mortality rate (develops in 1% of surgical patients)

• Optimizing for surgery
  − Consider preoperative dialysis if GFR <15 mL/min
  − Ensure preoperative euvolemia and normal osmolar status
  − Minimize exposure to nephrotoxins
  − Avoid perioperative hypotension (anesthesia)
Assess Skin for Risks of Delayed Healing and Infection

- Risks for surgical site infection
  - Smoking
  - Diabetes
  - Obesity
  - Malnutrition
  - Chronic skin disease
Diabetes

• Insulin management
  - Poor preoperative control leads to poor outcomes, so control should be addressed prior to surgery
  - Continue usual diabetes regimen* and minimize fasting
  - Doses of long-acting insulins should be continued at 50-100% of usual dose
  - Continue insulin pump basal dose
  - Hold short-acting insulins, oral diabetic agents, and GLP-1 agonists
  - Utilize short-acting, sliding scale insulin to maintain blood glucose at 140-180 mg/dL (high quality evidence, strong recommendation)

Increased risk of infection and postop CV morbidity and mortality
In a pediatric patient with a URI, consider delaying surgery requiring general anesthesia if any of the following are present:

- History of prematurity
- Asthma
- Copious secretions
- A parent who smokes
- Planned use of an endotracheal tube
- Procedure involving the airway
STOP SMOKING

- It’s so important it gets its own slide
- Some surgeons will not do elective surgery if the patient smokes
  - Preferably $\geq 8$ weeks prior to surgery
  - But ever is good
Medication Management Prior to Surgery
Statins (just do it)

• Statin benefits
  − Lipid-lowering
  − Reduce vascular inflammation
  − Improve endothelial function
  − Stabilize atherosclerotic plaques (reduce 30-d MI & death)

• Statin therapy (lovastatin and fluvastatin longer acting)
  − Try to start at least 4 weeks prior to procedure**
  − Perioperative initiation is reasonable in patient undergoing vascular surgery and may be considered in patients with other indications for statin therapy* (Patients having PCI and CABG have decreased mortality if they take statin on day of surgery – equivalent of 20 mg atorvastatin)
  − Should be continued in patients already taking them because risk of CV events sharply increases if stopped
Beta Blockers

• Beta blockers (preferably cardio-selective) indicated for history of HF, MI in the past 3 years, or atrial fibrillation.
• Continue beta blockers before, during, and after surgery (they reduce cardiac oxygen demand)
  − If they have been used for at least 4 weeks prior to surgery (SOR: A)
  − Used for known ischemic HD undergoing vascular surgery
• If beta blockers have not been used for at least 1 week, initiation may be harmful (SOR: B)
  − New evaluation of 17 studies (in 16, beta blockers were initiated within 1 day of surgery: decreased MI, but increased stroke, hypotension, bradycardia, and death)
• Still appropriate prior to and after CABG
Aspirin

• POISE-2 Trial – Stop aspirin 5-7 days prior to surgery
  – Neither aspirin nor low-dose clonidine reduced death or nonfatal MI in non-cardiac surgery
  – Results the same, whether patients were on aspirin already or started prior to surgery
  – Bleeding more common with aspirin (hazard ratio = 1.23)
• Except: Safety of aspirin withdrawal in patients with prior coronary artery stenting is still questionable, so may continue in these patients
• Start after PCI (percutaneous coronary intervention)
Dual Antiplatelet Therapy

• DAPT should be continued (if possible) when*
  – <4-6 weeks after bare metal stent
  – <1 year after drug-eluting stent
• If DAPT must be stopped, then continue aspirin

DAPT choices for use with aspirin: Clopidogrel, prasugrel, ticagrelor
5. Which of the following is true regarding coagulant management prior to a right colectomy of a 65 yo with hypertension, hyperlipidemia, and stable atrial fibrillation?

A. Stop warfarin 5 days prior to surgery and bridge with low-molecular-weight heparin. Restart warfarin the day following surgery.
B. Stop warfarin 5 days prior to surgery and restart it the day following surgery.
C. Stop warfarin 2 days prior to surgery and restart it on the evening after surgery.
D. Stop warfarin 2 days prior to surgery and restart it the evening after surgery. Bridge with low-molecular-weight heparin.
Warfarin Management

• Lower thromboembolic risk (use HAS-BLED – see at end of slides)
  − A-fib with no CVA or embolism in past 12 months
  − Biological heart valves >3 months out
  − Vascular grafts
  − DVT >3 months out – not hypercoagulable
  − No current systemic arterial embolism

• Management
  − Stop 5 days preop (or if INR is 1.5-1.9 can stop 3-4 days prior)
  − Restart postop when taking PO
Warfarin Management

• High thromboembolic risk
  – Mechanical heart valve
  – Stroke or TIA <3 months ago
  – DVT/PE with hypercoagulable state or <3 months ago
  – Coronary stenting <12 months ago
  – Atrial fibrillation with a CHA$_2$DS$_2$-VASc ≥6

• Management
  – Stop 4-5 days preop and start LMWH (low-molecular-weight heparin)
  – Stop LMWH 12-18 hours preop
  – Restart LMWH 6 hours postop
  – Restart warfarin when taking PO
  – Stop LMWH when INR = 2.0

BRIDGE study
Medication to Stop Prior to Surgery

- ACE inhibitors and ARBs (day of surgery)
- Clopidogrel/prasugrel/ticagrelor: 5-7 days
- Apixaban (Eliquis): 48 hours
- Dabigatran (Pradaxa): 2-5 days
- Rivaroxaban (Xarelto): at least 24-72 hours
- Edoxaban (Savaysa): at least 24-72 hours
- NSAIDs: 1-3 days
- COX-2 agents: 2-3 days
- Most diabetes medications except insulin
- Osteoporosis agents and hormone therapy
- Biologic agents (Humira, Enbrel, infliximab) – hip or knee surgery – one dosing interval

- Anything unnecessary (herbals, OTCs)
Medications to Give/Continue Prior to Surgery

- Parenteral antibiotics: 30 min prior
- Long-acting insulins (at usual time)
- Steroids (usual daily dose)
- Anti-arrhythmic agents
- Most antihypertensives
- Statins
- Neuro/psych meds
- Anti-Parkinson’s
- Antiseizure drugs
- Benzodiazepines (to prevent withdrawal)
- Non-biologic DMARDs (methotrexate) – hip or knee surgery
- HIV medications
Steroids

• Not usually needed for
  – Inhaled steroids
  – Topical steroids
  – Prednisone <5 mg/d or <10 mg every other day

• If unsure, do AM cortisol
  – If >10 mcg/dL then not suppressed
  – If <5 mcg/dL then suppressed and will need stress dose
  – If 5-10 mcg/dL may give steroids or to ACTH suppression test

• In adrenal insufficiency (stress dose) – this is seldom done now
  – Moderate-risk procedures: 50 mg hydrocortisone IV q 8 hours
  – High-risk procedures: 100 mg hydrocortisone IV q 8 hours
Antibiotic Management

• Assess for drug allergies
• Prophylactic antibiotics are given within one hour of procedure (except 2 hours for vancomycin/fluoroquinolones)
• Discontinue within 24 hours after procedure
• Discontinue within 48 hours after procedure for cardiac procedures
Opioid Management

• Length of time for use of opioids after surgery
  - General surgery: 4-9 days
  - Mastectomy or hysterectomy: 4-13 days
  - Musculoskeletal: 6-15 days
Herbal Medications

• 70% of patients fail to disclose use of herbal medicines
• 8 most commonly used
  – Echinacea, ephedra, garlic, ginkgo, ginseng, kava, St. John’s wort, valerian
• Alteration of the actions of absorption, distribution, metabolism and elimination of conventional drugs
6. Which of the following is the most important risk factor for postoperative pulmonary complications?

A. Age >80 years  
B. General anesthesia  
C. Diabetes  
D. Obesity
Postoperative Pulmonary Complications

• Risks
  - Advanced age
  - Functional dependence
  - COPD
  - Heart failure
  - Serum albumin <30 g/L (poor nutrition)
  - High risk surgery (vascular, emergent, AAA, prolonged, neurosurgery, abdominal)

• Common complications
  - Atelectasis
  - Pneumonia (most common remote)
  - Respiratory failure
  - Bronchospasm
  - Exacerbation of underlying disease

• Prevention
  - Incentive spirometry
  - Ambulation
  - Preoperative corticosteroids
Preventing Infection

- Surgical site infections = 37% of postop infections
  - More common in diabetics: Prevent with tight glucose control
  - Treat pre-existing infections
  - Provide nutritional supplementation 7-14 days preoperatively
  - Smoking cessation
- MRSA
  - 8% of nosocomial infections
  - Identify patients with known carrier status (nasal swab)
  - Universal frequent hand washing and room cleaning
  - Use of good isolation techniques
- Dental infection
  - Undetected dental disease may predispose to increased postoperative infection
  - Oral exam and patient education on oral health
  - Treatment of dental abscesses should occur prior to surgery
Thromboembolism Prophylaxis

• Low risk: early mobilization
• Medium risk
  − Intermittent pneumatic device or graduated compression stockings, LMWH – or fondaparinux [Arixtra] or warfarin
• High risk
  − LMWH (or as above), graduated compression stockings and intermittent pneumatic device
• Prophylaxis for major orthopedic surgery should continue for 35 days
7. Your remove a 5 mm basal cell cancer from the arm of a 60-year-old and close the wound with 4 sutures. What should you apply to the wound?
A. Silver sulfadiazine
B. Triple antibiotic ointment
C. Povidone-iodine
D. Petrolatum
E. Mupirocin (Bactroban) cream
Office Surgery Tips

• White petrolatum ointment is effective for post-procedure care*
  − Topical antibiotics aggravate wounds, cause contact dermatitis, and promote antibiotic resistance

• Decrease pain from infiltration of local anesthetics*
  − Warm solution to room temperature
  − Buffer with sodium bicarbonate*
  − Small needles and insert rapidly
  − Slow infiltration
  − Inject through edge of wound into subcutaneous tissue
  − Pretreat with topical anesthetics
Hyperbaric Oxygen*

• Long list of reimbursable uses
• Short list of conditions that benefit from hyperbaric O2
  – Decompression sickness
  – Wounds caused by crush injuries
  – Short-term for diabetic foot ulcers
Dental Prophylaxis

• Indicated for*
  – Prosthetic heart valve
  – Previous infective endocarditis
  – Congenital heart disease
    • Unrepaired cyanotic congenital heart disease
    • Repaired heart defect with prosthetic device < 6 months
    • Repaired heart defect with leak/shunt at prosthetic site
  – Transplant with valve regurgitation from abnormal valve
• Amoxicillin 2g is the antibiotic of choice

• Not indicated for
  – Mitral valve prolapse or acquired valvular disease
  – Previous orthopedic procedures or joint replacements

2007 American Heart Association Guidelines and endorsed 2014 by American Dental Association

[Source: American Academy of Family Physicians]
Co-management

• Consider agreement with surgeon to order standard tests depending on the surgery to be performed
  – (i.e., ultrasound for cholecystectomy)
Key Recommendations

• Beta blockers and statins should be continued perioperatively in patients who are already taking these medications (A recommendation)
• Perioperative statin therapy is recommended for patients undergoing vascular surgery, regardless of the presence of cardiac risk factors (A rec)
• Initiation of fixed-dose beta blockers immediately before surgery may be harmful and is not advised. If a decision is made to initiate beta-blocker therapy, it should begin several weeks before surgery (B recommendation)
• The decision to perform preoperative testing should be based on the H&P findings, perioperative risk assessment, and clinical judgment (A rec)
• Patients in usual state of health do not require preoperative testing for cataract surgery (A recommendation)
References

Answers

1. E
2. C
3. B
4. C
5. B
6. A
7. D
### CHA$_2$DS$_2$-VASc

<table>
<thead>
<tr>
<th>Condition</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive heart failure</td>
<td>1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Age $\geq$ 75</td>
<td>2</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1</td>
</tr>
<tr>
<td>Stroke or TIA</td>
<td>2</td>
</tr>
<tr>
<td>Vascular Disease</td>
<td>1</td>
</tr>
<tr>
<td>Age 65-74</td>
<td>1</td>
</tr>
<tr>
<td>Sex female</td>
<td>1</td>
</tr>
</tbody>
</table>
HAS-BLED

- Hypertension: Uncontrolled, >160 mmHg systolic
- Renal disease Dialysis, transplant, Cr >2.26 mg/dL or >200 µmol/L
- Liver disease Cirrhosis or bilirubin >2x normal with AST/ALT/AP >3x normal
- Stroke history
- Prior major bleeding or predisposition to bleeding
- Labile/Unstable/high INRs, time in therapeutic range < 60%
- Age >65
- Medication usage predisposing to bleeding Antiplatelet agents, NSAIDs
- Alcohol or drug use ≥8 drinks/week
Instructions: Fasting

• 2-4-6-8 hour rule
  − 2 hours for “clear liquids” (water, pulp-free fruit juice, carbonated beverages, clear tea and coffee)
  − 4 hours of breastmilk
  − 6 hours for nonhuman milk and light meals such as toast
  − 8 hours for regular meals; fried, fatty foods; meat
Common Issues in the Elderly, Part 2

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Learning Objectives

1. Discuss diagnosis and management of osteoporosis.
2. Review essentials of decision-making capacity.
3. Identify key issues in geriatric prevention.
4. Manage urinary tract problems and male sexual dysfunction in the elderly.
## Osteoporosis: WHO Definition

<table>
<thead>
<tr>
<th>T Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;-1 SD</td>
<td>Normal</td>
</tr>
<tr>
<td>-1 to -2.5 SD</td>
<td>Low bone mass (osteopenia)</td>
</tr>
<tr>
<td>&lt;-2.5 SD</td>
<td>Osteoporosis</td>
</tr>
<tr>
<td>&lt;-2.5 SD plus one or more fractures</td>
<td>Severe or established osteoporosis</td>
</tr>
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</table>
Bone Mineral Density Test
DXA (Dual Energy X-ray Absorptiometry)

• The WHO criteria for osteoporosis are based on DXA.
• Hip DXA is the best predictor of hip fracture, which is the most clinically relevant site of fracture.
## Who Needs BMD Testing?

<table>
<thead>
<tr>
<th>Patient category</th>
<th>USPSTF</th>
<th>NOF/ISCD</th>
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<tbody>
<tr>
<td>Women age ≥65 yo</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Women age 50-64 yo based on risk factors</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Men age ≥70 yo</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Men age 50-69 yo based on risk factors</td>
<td>No</td>
<td>Yes</td>
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</tbody>
</table>
## Who Needs BMD Testing?

<table>
<thead>
<tr>
<th>Patient category</th>
<th>USPSTF</th>
<th>NOF/ISCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>All men and women with a fragility fracture</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Anyone considering Rx for osteoporosis</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Anyone receiving Rx for osteoporosis</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Vitamin D Metabolism

- D3 (cholecalciferol) and D2 (ergocalciferol) are both biologically active.
- D2 or D3 converted in liver by hydroxylation into 25 OH vit D and then converted in kidney to 1,25 di-OH vit D.
- 25 OH vit D has low biological activity but is the major form in circulation: best marker for nutritional status re: vit D.
1. A 72 yo obese, African American woman complains of sudden onset of mid-back pain. X-ray confirms T4 vertebral compression fracture and diffuse osteopenia. Your next step:

A. Recommend weight reduction and exercise, start vitamin D3 and calcium
B. Check vitamin D level and begin alendronate 70 mg weekly
C. Order DEXA scan
D. Work-up for secondary causes of osteoporosis
Primary (Idiopathic) Osteoporosis

• Short stature, slender, Caucasian women are at greater risk for osteoporosis.
• Risk of osteoporosis in men becomes similar to women in advanced age (>80).
• Alcohol and cigarette smoking accelerate this risk.
• Osteoporotic fractures usually begin in vertebrae under greatest anatomical load (T10-T12) and spread caudal and cephalad.
Screening for Secondary Causes of Osteoporosis

- CBC, albumin/total protein, alkaline phosphatase (myeloma, cancer)
- Serum creatinine (CKD)
- Calcium, phosphorus (hyperparathyroid)
- TSH (hyperthyroidism)
- Testosterone (men; hypogonadism)
Who Needs Treatment?

- Postmenopausal women and men >50 yo
  - Hip or vertebral fracture
  - Prior fractures and low bone mass
  - T score ≤-2.5 after appropriate evaluation for secondary causes
  - Low bone mass (T score -1 to -2.5) if high risk (e.g., glucocorticoid use)
2. Which of the following is the USPSTF’s recommendation regarding daily supplementation of vitamin D and calcium for postmenopausal women to prevent fracture?

A. Supplemental vitamin D3 and calcium are not recommended
B. 20 mcg 25-hydroxyvitamin D + 800 mg calcium
C. 400 IU/day of vitamin D3 + 1000 mg calcium
D. 800 IU/day of vitamin D3 + 1200 mg calcium
Vitamin D and Calcium: USPSTF

- Recommends against daily supplementation with D3 400 IU or less and calcium 1000 mg or less.
- Concludes that evidence is insufficient to assess benefits/harms of higher doses.
- Guideline does not address vit D and calcium supplements for women or men with established osteoporosis.
Vitamin D and Calcium

• National Osteoporosis Foundation still recommends calcium and vitamin D supplementation (1200 mg calcium, 800-1000 IU vitamin D3) for all postmenopausal women.
Vitamin D and Calcium: USPSTF

- USPSTF revoked its recommendation for Vit D supplementation to reduce risk of falls/fracture in older patients who are frequent fallers
- No clear benefit (or harm) of vitamin D supplementation in cancer or cardiac risk.
- Nearly all studies of osteoporosis Rx (e.g., bisphosphonates) presume adequate levels of vitamin D and calcium; supplement if not adequate
Treatment of Osteoporosis

- Prevent hip fractures and vertebral fractures: alendronate (Fosamax), risedronate (Actonel), zoledronic acid (Reclast), teriparatide (Forteo), denosumab (Prolia)
- Prevent vertebral fractures (i.e., studies have not confirmed prevention of hip fracture): ibandronate (Boniva), raloxifene (Evista)
Bisphosphonates

• Given on an empty stomach with full glass of water
• Contraindications
  - Esophageal stricture
  - Achalasia
  - Patient unable to stand or sit upright
  - Renal failure with creatinine clearance of <35 mL/minute
  - Hypocalcemia
Bisphosphonates & Osteonecrosis of Jaw

• Low incidence.
• Most often with IV bisphosphonates.
• Mostly in cancer patients.
• Maintain oral hygiene & regular dental care.
Bisphosphonate Rx: How Long?

- FLEX trial: 1100 women, alendronate therapy averaged 5 years; randomized to continue 5 more years or stop

- Clinical vertebral fracture risk lower for continued treatment, especially in two groups: those without pre-existing fracture & T score $<-2.5$ or pre-existing fracture & T score $<-2.0$ (NNT 21 & 17 respectively)

- Inadequate data for nonvertebral fracture
Calcitonin

- Calcitonin: Polypeptide hormone
- Intranasal formulation for vertebral fracture complicated by pain for *analgesic benefit*.
- Weak anti-fracture efficacy.
- Remember to prescribe calcium and vitamin D!
- Increased risk of cancer with long-term use? Limit to six months’ duration.
Raloxifene

- Selective estrogen receptor modulator (SERM)
- Estrogen agonist/antagonist
- Reduces risk of breast cancer
- Does not stimulate endometrium
- Hot flashes
- Has not been shown to reduce hip fracture risk; less potent than bisphosphonates
Teriparatide (PTH)  
Parathyroid Hormone (1-34)

- Daily SQ injections.
- Reserved for pts with high risk for fractures:
  - Multiple fractures
  - Extremely low BMD eg, <-3
  - Intolerant/unresponsive to other Rx
- FDA black box warning: osteosarcoma (animals); thus, safety and efficacy ? >2 yrs.
- Consider substituting bisphosphonate after 2 yrs.
Denosumab (Prolia)

- Monoclonal antibody against RANKL (receptor that stimulates osteoclastic activity).
- Reduces vertebral, hip and nonvertebral fractures.
- Effective up to 8 years; effects wear off quickly after stopping.
- 1-2% severe hypocalcemia.
- q6 month injection (expensive).
Osteoporosis and CKD

• Most studies excluded patient with GFR <30cc
• Bisphophonates may worsen renal function
• Increased risk of hypocalcemia with denusomab
• If BMD <-2.5 and no fracture, consider no treatment (encourage exercise, smoking cessation, limit alcohol)
• If BMD <-2.5, history of fragility fracture and no evidence of renal osteodystrophy, may treat with bisphosphonate or denusomab under care of metabolic bone specialist
3. A hospitalized, demented elderly woman is admitted to your service and deemed mentally incapacitated. There are no advance directives. In order to make immediate medical decisions:

A. Obtain a power of attorney
B. Create a living will
C. Have “interested parties” identify proxy decision-maker
D. Ask social worker to pursue guardianship
• Power of attorney can be assigned only by someone with the capacity to make decisions (that’s why they call them “advance” directives).
Principles of Decision-Making for Incompetent Patients

• Documented advance directives
• Substituted judgment: Someone who knows the patient “attempts to make decisions in the manner that the patient would.”
• Best interest standard: Decisions based on “predicted outcomes that would most likely promote the patient’s well-being” (beneficence).
4. A demented patient has gangrene involving of her right foot. The surgeons recommend a BKA. You and the surgeon explain the surgery to the patient and believe she understands the pros and cons. The daughter is the DPOA and objects.

A. Proceed with surgery  
B. Ask a psychiatrist to evaluate her  
C. Call off the surgery  
D. Call the patient’s son to get his permission
Decision-making Capacity

- Determining capacity: Capacity to make a given medical decision is an isolated measure. If a patient understands the benefits and risks of an intervention and is consistent in her response, then the DPOA has no authority to overrule the patient.

- Generally a good idea to have two or more physicians independently confirm that the patient understands her decision.
State to State

• Laws differ by state on requirements to determine capacity.
  Tools include the ACE (Aid to Capacity Exam)

• Competency is determined by courts
Tube Feeding

• No evidence that feeding tubes reduce the risk of aspiration pneumonia, heal pressure wounds, improve nutritional status, or decrease mortality.

• 2/3 placed during acute hospitalization with little discussion with family.

• Transfer to ER for tube-related complications common.

• Hand-feeding often acceptable alternative.

ABIM & AGS Choosing Wisely Campaign: Ten Things Physicians and Patients Should Question

• #1 Don’t recommend percutaneous feeding tubes in patients with advanced dementia; instead, offer oral-assisted feeding
#8 Avoid using prescription appetite stimulants or high-calorie supplements for treatment of anorexia or cachexia in older adults; instead, optimize social supports, discontinue medications that may interfere with eating, provide appealing food and feeding assistance, and clarify patient goals and expectations.
Case Discussion

A 75 yo woman has a one-month progressive decline in her baseline mental status. She has anorexia, constipation, intermittent nausea, and a 10-lb weight loss. More recently, she became nonverbal and was unable to ambulate at all and was using a wheelchair. She is disoriented and intermittently incontinent of urine.
Case Discussion

Her affect is flat. HEENT exam normal. Neck supple, no goiter. Mucous membranes are dry. Coarse breath sounds in all lung fields. T 38.2°C, pulse 84/min, respiratory rate 20/min, blood pressure 152/81 mm Hg, and oxygen saturation 98% on room air.
Apathetic Hyperthyroidism

- Up to one-third of elderly patients with hyperthyroidism do not have symptoms of sympathetic overactivity (tachycardia, tremor, nervousness, heat intolerance, increased appetite, more frequent stools, etc.).
- Elderly patients with Graves’ disease less likely to have goiter. Constipation common and 40% have pulse <100.
ABIM & AGS Choosing Wisely Campaign: Ten Things Physicians and Patients Should Question

• #7 Don’t recommend screening for breast, colorectal, prostate or lung cancer without considering life expectancy and the risks of testing, over-diagnosis and overtreatment.
USPSTF

• Aspirin to prevent CV Disease and Colorectal cancer
  – 70 yo and older: I

• Colorectal Screening
  – 76-85 yo: C

• Mammography
  – 75 and older: I
Screen or Not Screen

- Eprognosis

http://eprognosis.ucsf.edu/
Preoperative Assessment of the Elderly

- Cardiac stress testing or other noninvasive imaging is unnecessary before low-risk noncardiac surgery.
- If patient has no cardiac hx and good functional status, preoperative cardiac stress testing is unnecessary for any surgery.
- Don’t perform preoperative medical tests for eye surgery unless there are specific medical indications.
Elder Abuse and Neglect

• USPSTF position on elder abuse and neglect is insufficient evidence to recommend screening
• AMA recommended screening geriatric patients for abuse in all practice settings.
Identifying At-Risk Elders

• Elder abuse and neglect not well-studied; little data to identify best screening tool or effectiveness of screening.

• Despite lack of evidence for screening, most states have statutes protecting elders from abuse or neglect (including self-neglect).

• Adult protective services (APS) protects community-dwelling; long-term care ombudsman programs (LTCOP) for nursing homes, assisted living, personal care homes.
Identifying At-Risk Elders

- Cognitively impaired women age >80 at greatest risk.
- Sedation (overmedication), skin tears, dehydration (Na >147), malnutrition, fractures, pressure sores may be clues.
Screening Tools

• Interview elderly patients by themselves.
• Ask about family composition and living arrangements.
• Ask directly about abuse, neglect, or exploitation.
  1. Do you feel safe where you live?
  2. Who prepares your meals?
  3. Who handles your checkbook?
5. The most common cause of lack of sexual activity in older heterosexual couples is:

A. Female partner’s lack of interest
B. Female partner’s medical condition
C. Male partner’s lack of interest
D. Male partner’s medical condition
Reason for Cessation of Sexual Intercourse (2000 Interview Cohort)

N Beckman et al., BMJ, 2008; 337:a279.
6. An 82 yo woman admitted to your nursing home has a urine culture that grew >100,000 e. coli. You should prescribe antimicrobials if:

A. She has >50 WBCs per high-powered field on UA.
B. She has a poor appetite.
C. She has frequency, urgency, dysuria, or suprapubic pain.
D. She seems more confused.
ABIM & AGS Choosing Wisely Campaign: Ten Things Physicians and Patients Should Question

• #5 Don’t use antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present.
7. The most common cause of urinary incontinence in women >50 years old is:

A. Urge
B. Stress
C. Overflow
D. Functional
Urge Incontinence (Overactive Bladder)

• Most common type of urinary incontinence
• Signs and symptoms:
  – Abrupt urgency
  – Frequency
  – Nocturia
  – Volume of leakage may be large or small
Bladder Filling Physiology: Urge

![Graph showing bladder filling physiology with lines indicating overactive and normal states.](image)
Drug Treatment of Overactive Bladder

• Medications include antimuscarinics, such as oxybutynin, tolterodine, darifenacin (Enablex), trospium and others.

• Beta 3 agonists also effective without anticholinergic side effects, e.g., mirabegron (Myrbetriq)
Urge Incontinence

• Urge incontinence meds more effective when combined with behavioral therapy.

• Usually do not ablate detrusor over-activity. Efficacy similar; differ by side effects, cost.

• Lack of response to one agent does not preclude response to another.

• In men, check PVR before starting antimuscarinic medication to avoid making urinary retention worse.
An 80 yo complains of discomfort in his legs at night when trying to sleep, relieved by standing and walking. His only medication is prophylactic aspirin. His hemoglobin is 9.8 g and MCV 78. What is the test most likely to reveal a treatable cause of his symptoms?
Restless Legs Syndrome

• Marked disagreeable discomfort in the lower extremities that occurs only at rest and is immediately relieved by movement
• 20% of pts >80 yo; sleep disturbance freq.
• Check serum ferritin; if low, give 2-month trial of iron replacement.
• RX: pramipexole 0.125 mg, Sinemet CR 50/200, clonazepam 0.5-1.0 mg, or oxycodone 5-10 mg hs.
Common Issues in the Elderly: Final Thoughts

- Feedback from recent test takers: geriatrics questions are reasonable, not esoteric
- Review free updates/reviews on the AGS website http://www.americangeriatrics.org/health_care_professionals/clinical_practice/clinical_guidelines_recommendations/
- Obtain copy of Geriatrics Review Syllabus (purchase through AGS, eighth edition)
- “Geriatrics at your fingertips” if pressed for time, $$
Answers

1. D
2. A
3. C
4. A
5. D
6. C
7. A
Acute and Chronic Cognitive Impairment

Russell Blackwelder, MD, MDiv, CMD
Department of Family Medicine
Medical University of South Carolina
Disclosure Statement

It is the policy of the AAFP that all individuals in a position to control content disclose any relationships with commercial interests upon nomination/invitation of participation. Disclosure documents are reviewed for potential conflicts of interest. If conflicts are identified, they are resolved prior to confirmation of participation. Only participants who have no conflict of interest or who agree to an identified resolution process prior to their participation were involved in this CME activity.

All individuals in a position to control content for this session have indicated they have no relevant financial relationships to disclose.
Learning Objectives

1. Review delirium.
2. Describe differential diagnosis of dementia.
3. Discuss evaluation of cognitive impairment.
Case Discussion

A 79 yo woman with mild dementia is 2 days postop for an elective right total hip arthroplasty. The nurses note that she was trying to get out of bed and screamed at them when they put her back to bed. When you see her, she is somnolent but arousable. You ask her where she is, but she just picks at the sheets and speaks nonsensically.
1. The appropriate next step is:

A. Order a chest x-ray.
B. Order a CT head with contrast.
C. Begin low-dose haloperidol
D. Review her outpatient medications.
Diagnostic Criteria for Delirium

• Acute disturbance of cognition (inattention: can’t focus, shift, or sustain attention)
• KEY: Rapid onset (hours to days), fluctuation
• Tactile or visual delusions common (auditory hallucinations rare)
Causes of Delirium

D  Drugs (toxicity and withdrawal)
E  Electrolyte disturbance
L  Lack of drugs, liver disease
I  Infection
R  Reduced sensory input
I  Intracranial
U  Urinary retention/fecal impaction
M  Myocardial/metabolic/pulmonary
Risk Factors for Delirium

• Use of restraints
• Four or more medicines in 24 hours
• Use of indwelling urinary catheter
• History of dementia, stroke, or Parkinson’s disease
• EVERYTHING!!!!!
Is Neuroimaging Always Needed?

- Neuroimaging unnecessary if:
  - Clinical evaluation discloses an obvious treatable medical illness or problem
  - No evidence of trauma or new focal neurologic signs
  - Patient is arousable and able to follow simple commands
The Yale Delirium Prevention Program

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive impairment</td>
<td>Reality orientation</td>
</tr>
<tr>
<td></td>
<td>Therapeutic activities</td>
</tr>
<tr>
<td>Sleep deprivation</td>
<td>Non-pharmacologic sleep protocol</td>
</tr>
<tr>
<td>Immobilization</td>
<td>Early mobilization</td>
</tr>
<tr>
<td>Vision impairment</td>
<td>Vision aids</td>
</tr>
<tr>
<td>Hearing impairment</td>
<td>Amplifying devices</td>
</tr>
<tr>
<td>Dehydration</td>
<td>Early recognition and volume repletion</td>
</tr>
</tbody>
</table>
Impact of Delirium Prevention

• Reduced number of delirium episodes
• Reduced total days of delirium
• Did not reduce severity of delirium
• Did not reduce risk of recurrence
Reducing sedative use in hospitalized elderly

• Warm milk or herbal tea, brief neck massage and soft music reduced bedtime benzodiazepine use by 50%
ABIM & AGS Choosing Wisely campaign: Ten Things Physicians and Patients Should Question

- #2 Don’t use antipsychotics as the first choice to treat behavioral and psychological symptoms of dementia
- #4 Don’t use benzodiazepines or other sedative-hypnotics in older adults as first choice for insomnia, agitation or delirium
- #10 Don’t use physical restraints to manage behavioral symptoms of hospitalized older adults with delirium
Learning Objectives

1. Review delirium.
3. Discuss evaluation of cognitive impairment.
“Normal” Aging Changes in Cognition

• Slowing in rate at which information can be received and processed

• Reduction in “explicit memory” (eg., the ability to recall a specific name, number, or location on demand)
Case Discussion

76 yo woman is brought to see you by her daughter, who is concerned about her mother’s failing memory. Six months ago, the daughter took over management of her mother’s checkbook after she failed to pay bills. Her mother seems unable to knit, something she enjoyed for years. She has difficulty finding the right words to complete a thought.
2. What is your diagnosis?

A. This patient has dementia.
B. This patient is depressed.
C. This patient is delirious.
D. This patient has mild cognitive impairment.
DSM-IV vs DSM-5

• DSM-5 combines diagnoses of dementia and amnestic disorders until new name: major neurocognitive disorders
• Further divided into major and mild neurocognitive disorders
• “Dementia” is still used for subtypes where the term is standard (e.g., “Lewy Body Dementia”)
• Removes awkward terms like “drug-induced dementia”
DSM-5: Major neurocognitive disorder

- Evidence of significant cognitive decline from a previous level of performance in one or more cognitive domains:
  - Learning and memory
  - Language
  - Executive function
  - Complex attention
  - Perception-motor
  - Social cognition

(Note: memory impairment is no longer a prerequisite for diagnosis)
The Dementia Epidemic: Any Good News?

• Health and Retirement Study found prevalence of dementia in U.S. (>65 yo) declined from 11.6% to 8.8% between 2000 and 2012 (jamainternmed.2016.6807)

• “Cognitive function and ageing study” found dementia prevalence declined between early 1990s compared to 2008-2011 (8.3% vs 6.5%, age > 65).

• Linked to better education and reduction of ASCVD/CVA.
Cases of Alzheimer’s Disease by Age per 100,000
Diagnostic criteria for Alzheimer’s Disease

• Memory loss plus one or more of the following:
• Aphasia: can’t come up with words, substitutes words, new words
• Apraxia: has difficulty using utensils, tools
• Agnosia: doesn’t recognize familiar people; gets lost in familiar surroundings
• Executive dysfunction: managing checkbook, using computer
Features Inconsistent With Alzheimer’s Disease

• Sudden onset (i.e., delirium)
• Focal motor signs
• Early marked change in personality/behavior
• Gait disorder early in disease course
• Seizures
Case Discussion

76 yo ex-college professor complains that his memory just isn’t as good as it was. Daughter confirms that he has more difficulty remembering discussions that took place earlier in the day. He’s still paying bills and doing the crossword puzzles. His mental status screening test shows minimal impairment.
3. What is your diagnosis?

A. This patient has dementia.
B. This patient is depressed.
C. This patient has mild neurocognitive disorder,
D. This patient is normal for his age.
Mild Cognitive Impairment or Mild Neurocognitive Disorder

• Complaint of memory impairment
• Objective memory loss (adjusted for age and education)
• Preserved general cognitive function
• Intact activities of daily living
• High risk of developing dementia (5%-10% annually) but 40%-70% do not progress
Difficulty With Concentration: Depression vs Dementia

• Patient comes in alone complaining about memory = depression.

• Patient brought in by loved one who complains about patient’s memory = dementia.
Case Discussion

80 yo with 12 months of becoming more sedentary, slowed movement, unsteady gait, 2 falls, no injury. Stepwise progression of deficits. Uses walker. Speech diminished in volume, less distinct. Can’t manage finances. No change in mood or personality. Diabetic, smoker, hypertensive. Flat affect. Muscle tone increased, right grip weak, asymmetric reflexes, no tremor. 1/5 on Mini-Cog Test.
4. This patient most likely has which type of dementia?

A. Alzheimer’s
B. Lewy Body
C. Vascular
D. Frontotemporal
Vascular Dementia

• Subcortical or mixed dementia
• Stepwise progression, prior strokes, focal neuro symptoms/signs
• Preserved personality but “emotional incontinence” or apathy common
• Definitive diagnosis difficult (i.e. microvascular changes on brain imaging common)
Vascular contributions to cognitive impairment and dementia
(American Heart Association/American Stroke Association)

• For middle-aged or young-old (65-74 yo), BP lowering may prevent late-life dementia post CVA
• For oldest adults (>80 yo), usefulness of BP lowering for the prevention of dementia is not well-established
(Stroke. 2011;42(9):2672-2713)
Case Discussion

A 69 yo man has developed rigidity, a short-stepped gait, and masked facies. He also has become more forgetful (MMSE = 19). His family thinks he sees things that aren’t real.
Diffuse Lewy Body Dementia

- Dementia, parkinsonism, and visual hallucinations (may develop severe extrapyramidal symptoms if prescribed neuroleptics)
Case Discussion

A 64 yo man is brought in by his family after exposing himself in public. He has been urinating in the kitchen sink and refuses to bathe. His MMSE is 26/30. He has some word-finding difficulties.
Frontotemporal Dementia

- Pick’s disease and non-specific degeneration of frontal lobes; corticobasal dementia, progressive supranuclear palsy (“Parkinson plus” syndromes)
- Behavioral problems early (disinhibition and/or profound apathy) plus aphasia
- Memory and visuospatial problems later
Case Discussion

A 76 yo man has increasing difficulty walking. He complains that his feet seem stuck together. He has mild memory loss. He has urge urinary incontinence.
Normal Pressure Hydrocephalus

- Clinical triad of dementia, ataxia, urinary incontinence (wacky, wobbly, and wet)
- Frequency of NPH and response to shunt surgery controversial
- Ataxia most responsive; dementia probably least responsive
Case Discussion

An 84 yo woman has developed rapidly progressive dementia over 4 months. She has a low-grade fever, is very rigid, and has myoclonic jerks when startled. EEG shows triphasic sharp wave complexes.
Creutzfeldt-Jakob Disease

- Rapidly progressive dementia over several months with myoclonus
- Frequently have periodic synchronous bi- or triphasic sharp wave complexes on EEG
- Tend to be younger patients
- Transmissible (viral-like “prions”)
- Rare (1 per million in US)
- “Variant” CJD = mad cow disease
Learning Objectives

1. Review delirium.
2. Describe differential diagnosis of dementia.
3. *Discuss evaluation of cognitive impairment.*
Case Discussion

An 80 yo man has slowly progressive memory loss and word-finding difficulties. Family took over his finances 2 months ago. His physical exam is unremarkable. No focal findings on neurological exam.
5. What is the next step mostly likely to result in improvement in his function?

A. MRI of brain
B. CBC, metabolic panel, TSH, B12
C. PET scan
D. Medication review
Potentially Reversible Dementias

- Drugs 16
- Hypothyroid 7
- Hyperparathyroid 3
- B12 Deficiency 2
- Subdural Hematoma 2
- Other 3
- Total 31 (10%)

Quality Standards Subcommittee of the American Academy of Neurology

• “Structural neuroimaging with either a noncontrast CT or MR scan in the initial evaluation of patients with dementia is appropriate. (Guideline)” …
• “Screening for depression, B12 deficiency, and hypothyroidism should be performed. (Guideline)”
• Genetic testing, VDRL, PET scan not recommended

DS Knopman, MD, et al (http://www.neurology.org/content/56/9/1143.long)
Screening for Dementia

• > 50% of persons with dementia have not received a diagnosis of dementia.
• Practical screening tools improve detection (eg, Mini-Cog).
Mental Status Screening Tests

- Mini-Mental Status Exam (MMSE): 12-item, 30-point tool administered in 10-15 minutes
- St Louis Univ Mental Status (SLUMS) 30-point; includes cutoffs for education/MCI
  [http://medschool.slu.edu/agingsuccessfully/pdfsurveys/slums_exam_05.pdf](http://medschool.slu.edu/agingsuccessfully/pdfsurveys/slums_exam_05.pdf) ($1.99 iPhone app)
- Mini-cog: Draw clock face and 3-word recall
- MOCA: [www.mocatest.org](http://www.mocatest.org)
Potential Benefits of Screening

- Clarify advance directives
- Begin discussion about alternatives to driving, housing alternatives
- Prevent financial victimization or self-neglect; remove firearms
- Participate in research
- Find reversible dementia?
Alzheimer’s Association Clinical Practice Guideline (July 22, 2018): Highlights

• Twenty recommendations divided into three levels (Type A must be done, Type B should be done, Type C may be done)
• Recommends evaluation of patients (or loved ones) reporting cognitive-behavioral symptoms (but not screening asymptomatic patients)
• Basic laboratory testing on all patients (A)
• MRI (or CT if unavailable) on all patients (B)
• No mention of measurable impact on course of disease
Learning Objectives

1. Review delirium.
2. Describe differential diagnosis of dementia.
3. Discuss evaluation of cognitive impairment.
Prevention of Dementia

• Epidemiological evidence that estrogen, antioxidants, fish oil, NSAIAEs, statins may prevent AD or delay progression
• Randomized, placebo-controlled trials fail to confirm epidemiological observations
• Cannot currently recommend any herbal or pharmaceutical to prevent AD
Summary of Cholinesterase Inhibitor Trials in Alzheimer Disease

• Nearly 9000 patients in 22 RCT, range 3 to 12 months of donepezil (eg, Aricept), rivastigmine (eg, Exelon), or galantamine (eg, Razadyne)

• Modest positive benefit in cognitive, behavioral, ADL, and global scales; few side effects; modest side effects (GI)

• Rare evidence of dose response

• Clinical outcomes (caregiver burden, nursing home placement, etc) not measured
ABIM & AGS Choosing Wisely campaign: Ten Things Physicians and Patients Should Question

• #6 don’t prescribe cholinesterase inhibitors for dementia without periodic assessment for perceived cognitive benefits and adverse gastrointestinal effects.
Memantine

• Behavioral, ADL, and global scales modestly better in moderate/severe dementia.
• Clinical outcomes (eg, caregiver burden) not measured.
• ADR: Falls and agitation.
• Conclusion: Use in moderate dementia if intolerant of Cholinesterase Inhibitors or severe dementia.
“Use It or Lose It”


- No prospective trial of cognitive activities shown to prevent or delay development of dementia
Exercise and Dementia

• **LIFE trial**: randomized, structured, moderate intensity, 2-year physical activity program for sedentary 70-89 yo adults at risk for mobility disability; no improvement in global or domain-specific cognitive function compared to control group (Sink KM et al, JAMA.2015;314(8):781-790)

• **Whitehall II Cohort**: 28-year follow-up of 35-55 yo subjects; no association of physical activity and cognitive decline (Sabia et al, BMJ 2017;357:j2709)
Diagnosis and Treatment of Dementia: The Dismal Failure of Medical Science

• No direct evidence linking *screening* and improved decision-making. (USPSTF. Ann Intern Med. 2013;159:601-612)


• Treatment for dementia (cholinesterase inhibitors and NMDA receptor antagonist) is minimally effective. (Ann Intern Med. 2008;148:370-378)
From the Alzheimer’s Association:

• “None of the pharmacologic treatments (medications) available today for Alzheimer’s dementia slow or stop the damage and destruction of neurons that cause Alzheimer’s symptoms and make the disease fatal.”

Case Discussion

An 81 yo patient with advanced dementia is hoarding food at her assisted living facility and repeatedly leaving her room wearing only her underwear. She makes sexually inappropriate comments to visitors. The administrator asks you to “do something” to control these behaviors.
6. You should:

A. Begin donepezil 10 mg at bedtime.
B. Admit to inpatient geriatric psychiatry unit and begin haloperidol 0.5 mg bid.
C. Begin olanzapine (eg, Zyprexa) 2.5 mg hs.
D. Offer to help the staff find ways to manage the behaviors non-pharmacologically.
Which Behaviors “Responsive” to Medication?

- **RESPONSIVE**: Agitation, depression, delusions, hallucinations, aggression
- **REFRACTORY**: Wandering, hoarding/hiding objects, repetitive questioning, apathy, social inappropriateness
- Behavioral approach to refractory Sx
Do Cholinesterase Inhibitors Treat Neuropsychiatric Symptoms?


• 272 pts in 12-week trial of donepezil (Aricept) for treatment of agitation in Alzheimer’s disease (avg MMSE 8/30)
• Donepezil no more effective than placebo
“Popular Drugs for Dementia Tied to Deaths”
NY TIMES 4/12/05

- FDA reviewed all atypical antipsychotics in dementia.
- 17 placebo-controlled studies, 5106 elderly subjects with dementia, average duration of Rx 10 weeks.
- Deaths: 4.5% (Rx) vs 2.6% (placebo).
ABIM & AGS Choosing Wisely campaign: Ten Things Physicians and Patients Should Question

• #2 Do not use antipsychotics as a first choice to treat behavioral and psychological symptoms of dementia
New Meds for Dementia?

• 2002-2012
  − 244 drugs tested for Alzheimer's
  − 1 approved
  − Donepezil
  − Rivastigmine
  − Galantamine
  − Memantine
  − Memantine + Donepezil
  − Tacrine (discontinued in U.S.)

Answers

1. D
2. A
3. C
4. C
5. D
6. D
BP control in patients with cognitive decline: Why low is not always better

• 172 patients with cognitive impairment (2/3 had dementia, 1/3 had MCI)
• 72% receiving antihypertensive treatment; office BP and ambulatory BP measured
• Those taking antihypertensive medications and who had ambulatory BP systolic average <130 had more rapid cognitive decline (no correlation with office BP)
Caregiver/Practitioner Resources

• Alzheimer’s Association 1-800-272-3900 or www.alz.org
• Government funded clinical trials in AD can be found at http://clinicaltrials.gov
Additional Reading

• Le Couteur DG et al. Political drive to screen for pre-dementia; not evidence based and ignores the harms of diagnosis. BMJ. 2013;347:f5125.
Additional Reading

• http://www.nice.org.uk/nicemedia/live/13419/53619/53619.pdf (2011 review of CIs and memantine)
Abnormal Uterine Bleeding

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Disclosure Statement

It is the policy of the AAFP that all individuals in a position to control content disclose any relationships with commercial interests upon nomination/invitation of participation. Disclosure documents are reviewed for potential conflicts of interest. If conflicts are identified, they are resolved prior to confirmation of participation. Only participants who have no conflict of interest or who agree to an identified resolution process prior to their participation were involved in this CME activity.

All individuals in a position to control content for this session have indicated they have no relevant financial relationships to disclose.
Learning Objectives

1. Formulate evaluation and treatment plans related to various high-risk conditions and reproductive complications, including dysfunctional uterine bleeding and potential cancers.
2. Clarify the appropriate diagnostic strategies for evaluating abnormal bleeding.
3. Assess training needs for procedures used to evaluate and treat abnormal uterine bleeding.
4. Formulate a treatment plan for women with abnormal uterine bleeding including dysfunctional uterine bleeding, menorrhagia, and amenorrhea.
Definition

• Menstrual flow outside of normal volume, duration, regularity, or frequency
Etiology

• Disruption of normal physiology
Menstrual Physiology

Pituitary FSH induces ovarian follicles to produce estrogen

Estrogen stimulates proliferation of the endometrium

LH surge prompts ovulation

In the absence of pregnancy, E and P levels decline, and withdrawal bleeding occurs

Resultant corpus luteum produces progesterone, inducing a secretory endometrium

Normal Cycle

Ovarian Histology
- Recruit Follicle
- Maturing Follicle
- Ovulation
- Corpus Luteum
- Degenerate C. Luteum

Body Temperature
- 37°C
- 36°C

Hormones
- Estradiol
- Progesterone
- Follicle-Stimulating Hormone (FSH)
- Luteinizing Hormone (LH)

Endometrial Histology

Day of Menstrual Cycle
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28

Menstruation

Ovulation

Luteal Phase

Follicular Phase
Etiology

• Disruption of normal physiology
• Anatomic changes in the endometrium
• Postmenopausal bleeding
Nomenclature

2011 International Federation of Gynecology and Obstetrics

• New classification scheme
• Standardize terminology

Munro et al. *Int J Gynaecol Obstet.* 2011;113:3-13
Basic PALM-COEIN Classification System for the Causes of Uterine Bleeding in Nonpregnant Women of Reproductive Age


**Abnormal Uterine Bleeding (AUB)**

- Heavy menstrual bleeding
- Intermenstrual bleeding

**PALM: Structural Causes**
- Polyp (AUB-P)
- Adenomyosis (AUB-A)
- Leiomyoma (AUB-L)
- Malignancy and hyperplasia (AUB-M)

**COEIN: Nonstructural Causes**
- Coagulopathy (AUB-C)
- Ovulatory (AUB-O)
- Endometrial (AUB-E)
- Iatrogenic (AUB-I)
- Not yet classified (AUB-N)
1. A 39 yo G2P2 presents for follow-up. She was seen 2 weeks ago with a complaint of 13 months of infrequent periods (q 2-3 months). She is otherwise healthy. Non-smoker. She takes no medications, and she breastfed both of her children for >12 months. (Her eldest child is 10 years.) Her vitals are WNL and her BMI is 24.8. Her physical exam is WNL including pelvic exam. Her most recent Pap was 11 months ago and was negative for intraepithelial lesion and HPV was negative. A urine pregnancy test is negative. A serum TSH and Prolactin are WNL. **Which one of the following is the best initial approach in this patient?**

A. Prescribe a 35 ug ethinyl estradiol combination oral contraceptive pill daily.

B. Prescribe megestrol 40 mg po daily.

C. Order a transvaginal ultrasound.

D. Perform an endometrial biopsy.
1. A 39 yo G2P2 presents for follow-up. She was seen 2 weeks ago with a complaint of 7 months of infrequent periods (q 2-3 months). She is otherwise healthy. Non-smoker. She takes no medications, and she breastfed both of her children for >12 months. (Her eldest child is 10 years.) Her vitals are WNL and her BMI is 24.8. Her physical exam is WNL including pelvic exam. Her most recent Pap was 11 months ago and was negative for intraepithelial lesion and HPV was negative. A urine pregnancy test is negative. A serum TSH and Prolactin are WNL. Which of the following is the best initial approach in this patient?

DX: Anovulatory Bleeding
AUB Adolescence Through Perimenopause

• Anovulatory
  - Irregular or infrequent periods
  - Flow ranging from light to excessively heavy bleeding
  - Commonly associated terms
    • Amenorrhea (absence of periods for more than three cycles; no bleeding for 90 days)
    • Oligomenorrhea (menses occurring at intervals of more than 38 days)
    • Metrorrhagia (menses at irregular intervals with excessive bleeding or lasting more than 8 days)
    • Dysfunctional uterine bleeding (anovulatory bleeding in which underlying etiologies have been ruled out)

• Ovulatory
  - Regular intervals (24-38 days)
  - Excessive volume (need to change menstrual products q 1-2 hours; passage of clots > 1 inch, and/or “very heavy” periods as reported by the patient) OR
  - Duration (> 8 days)
Anovulatory

• Characteristics
  - Irregular, often infrequent periods
  - Progesterone deficient/estrogen dominant state
  - Flow ranges from absent or minimal to excessive
  - 14% of women with recurrent anovulatory cycles develop cancer or hyperplasia
Anovulatory

• Differential Diagnosis
  – Adolescence (immature hypothalamic-pituitary-ovarian axis may result in anovulatory cycles for two to three years)
  – Perimenopause
  – Any other time – considered “abnormal”
…any other time…

- DM (uncontrolled)
- Eating disorder
- Hyper- or hypothyroidism
- Hyperprolactinemia
- Medication effect
  - Antiepileptics
  - Antipsychotics
- PCOS
- Pregnancy
Anovulatory Bleeding Evaluation

• **Laboratory**
  - Pregnancy test, CBC (+/-TSH, Prolactin)

• **Endometrial Biopsy**
  - Women ≤ 45 with one of the following risk factors:
    - Chronic anovulation
    - DM
    - Family history of colon cancer (?Lynch Syndrome)
    - Infertility
    - Nulliparity
    - Obesity
    - Tamoxifen use
  - Women > 45 with suspected anovulatory bleeding

• **Imaging**
  - TVUS or saline infusion sonohysterography if bleeding DOES NOT respond to medical therapy
Obtain history and perform PE to rule out systemic disease, medication effects, PCOS, and cervical or vaginal pathology.

- Adolescent or ≤ 45 years with no risk factors for endometrial cancer
- ≤ 45 years with recurrent anovulation or other risks of endometrial cancer
- > 45 years with suspected anovulation

§ Long-term medical therapy options

If continued irregular or excessive bleeding, perform EMB.

If EMB results normal, perform TVUS or SISH to rule out structural abnormality.

If etiology still unclear, hysteroscopy.

Endometrial Biopsy

§ Long-term medical therapy options:
- Levonorgestrel IUS [52-mg; 20 mcg/day]
- Combined OCP [1 monophasic pill 35 mcg ethinyl estradiol PO/day]
- Oral progestins [Norethindrone 2.5-5 mg PO/day]
- Oral tranexamic acid [1000-1500 mg PO TID]
- NSAID [e.g. Naproxen 500 mg PO BID]
- Depot medroxyprogesterone [150 mg IM or 104 mg SQ q 13 weeks]

Taken ONLY when patient is bleeding.
Evaluation and Treatment of Anovulatory Uterine Bleeding

**Endometrial Biopsy**

- Normal endometrium: Go to § (Long-term medical therapy options on previous slide)
- Hyperplasia without atypia:
  - Treat with medroxyprogesterone acetate, 10mg/d for 14 days/month
  - Daily megestrol, 40 mg
  - Insert levonorgestrel-releasing intrauterine system
- Hyperplasia with atypia: Refer to gynecologist
- Adenocarcinoma: Refer to gynecologic oncologist

Repeat endometrial biopsy in three to six months. Refer to gynecologist if hyperplasia persists.
A 39 yo G2P2 presents for follow-up. She was seen 2 weeks ago with a complaint of 7 months of infrequent periods (q 2-3 months). She is otherwise healthy. Non smoker. She is on no medications and she breastfed both of her children for >12 months. (Her eldest child is 10 years.) Her vitals are WNL and her BMI is 24.8. Her physical exam is WNL including pelvic exam. Her most recent Pap was 11 months ago and was negative for intraepithelial lesion and HPV was negative. A urine pregnancy test is negative. A serum TSH and prolactin are WNL. Which of the following is the best initial approach in this patient?

Low risk for endometrial cancer – so proceed with treatment.
2. The onset of heavy menses at menarche is often the first sign of what disorder?

A. Hemophilia A
B. von Willebrand disease
C. Leukemia
D. Immune thrombocytopenia
Ovulatory

• Characteristics
  - Regular intervals (every 24 to 38 days) with excessive bleeding or duration greater than 8 days
  - Less than 1% of women develop cancer or hyperplasia if they have no more than one risk factor for endometrial cancer
Ovulatory

• Differential Diagnosis
  − Bleeding disorder
    • Factor deficiency
    • Leukemia
    • Platelet disorder
    • von Willebrand disease
  − Hypothyroidism
  − Liver disease, advanced
  − Structural lesions
    • Fibroids
    • Polyps
Ovulatory Bleeding Evaluation

• **Laboratory**
  - Pregnancy test, CBC (+/- TSH)
  - Tests for bleeding disorder *(CBC with plts, PT/PTT; fibrinogen and thrombin time are optional; bleeding time neither sensitive or specific – do not need)* in adolescents and in women with one or more of the following risk factors *[(+ screen)]:
    - Family history of bleeding disorder
    - Menses lasting ≥ 7 days with excessive bleeding or impairment of activities with most periods
    - History of treatment of anemia
    - History of excessive bleeding with tooth extraction, delivery or spontaneous abortion, or surgery

• **Imaging (typically only in adults) to rule out structural abnormality**
  - TVUS or saline infusion sonohysterography

• **Endometrial biopsy**
  - ≤ 45 with normal laboratory and imaging results and bleeding unresponsive to therapy
  - > 45 with multiple risk factors for cancer
Evaluation and Treatment of Ovulatory Abnormal Uterine Bleeding

Menstrual Cycle regular but excessively heavy or more than 8 days’ duration

Obtain H&P to rule out systemic disease or enlarged uterus.
Lab: HCG, TSH, CBC

Adolescent or adult with (+) screening for possible bleeding disorder

Evaluate for bleeding disorder in collaboration with hematologist

Treat as indicated if bleeding diathesis present

Perform imaging for structural abnormality: TVUS or SISH.
If high risk of endometrial cancer, consider EMB in addition to imaging.
Perform imaging for structural abnormality: TVUS or SISH.
If high risk of endometrial cancer, consider EMB in addition to imaging.

- **Submucosal fibroid**
  - Referral for possible fibroidectomy
  - or
  - Uterine artery embolization

- **Endometrial polyp**
  - Referral for polypectomy

- **Normal imaging results**
  - § “Long-term medical therapy options” as discussed earlier in *Evaluation and Treatment of Anovulatory Uterine Bleeding*
Diagnostic Evaluation of Abnormal Uterine Bleeding

Imaging Evaluation

- **Transvaginal ultrasonography (TVUS)**
  - Helpful for evaluating the myometrium itself
  - Sensitivity and specificity for evaluating intracavitary pathology are low

- **Saline infusion sonohysterography (SH)**
  - Superior (more sensitive and specific) to TVUS in the detection of intracavitary lesions (eg, polyps, submucosal leiomyomas) [SOR: C]
  - Can distinguish between focal versus uniform thickening of the endometrium and structural abnormalities

- **Diagnostic hysteroscopy (DH)**
  - Numerous recent studies have demonstrated that DH had a significantly better diagnostic performance than SH and TVUS and was significantly more precise in the diagnosis of intracavitary masses. Hysteroscopy not only has increased accuracy for identifying the etiology of AUB, compared with D&C, but also offers the possibility of in-office use.

- **MRI** - May be useful to guide the treatment of myomas
EMB

Results

• **Proliferative** – normal in the follicular phase
  – When associated with abnormal bleeding, confirms anovulation and the effect of unopposed estrogen
• **Secretory/menstrual** – confirms ovulation has occurred
• **Hyperplasia** – advanced effect of unopposed estrogen (atypia = premalignant)
• **Atrophic** – seen in postmenopause or effect of OCPs, Depo-Provera
Treatment of AUB

**Medical**
- Levonorgestrel IUS (most effective)
  - 71-95% decrease in blood loss
- OCPs
  - 35-69% decrease
- Progestins (continuous dosing)
  - 87% decrease
- NSAIDs – ↓ prostacyclin (platelet anti-aggregating vasodilator)
  - 10-52% decrease
- Tranexamic acid (Lysteda)
  - 26-54% decrease

**Surgical**
- Myomectomy
- Hysterectomy
  - Definitive and most effective treatment for AUB, AND it yields a high level of patient satisfaction
- Ablation
  - 1st generation: Resection (laser, rollerball)
  - 2nd generation:
    - Cryoablation* 
    - Laser Intrauterine thermotherapy
    - Radiofrequency ablation* 
    - Thermal balloon ablation 
    - Microwave ablation*
Endometrial Ablation Methods

• Rule out preinvasive and invasive endometrial lesions before procedures.
• Must have completed childbearing and tolerate some menstrual bleeding.
Society of Gynecologic Surgeons

• Systematic Review Group (SRG) of the Society of Gynecologic Surgeons
  – Tradeoffs between treatment effectiveness and the risk of serious adverse events between hysterectomy, ablation, and the LNG-IUS.
  – SRG was able to conclude ONLY that there was moderate strength of evidence supporting the statement that bleeding is better controlled following hysterectomy than following ablation.
  – Three studies found statistically significant differences in validated dimensions of the SF-36 questionnaire favoring hysterectomy for pain, general health, vitality, and social function over ablation.

Surgery Versus Medical Therapy for Heavy Menstrual Bleeding *(Cochrane 2016)*

- Surgery, especially hysterectomy, reduces menstrual bleeding more than medical treatment at one year.
- There is no conclusive evidence of a difference in satisfaction rates between surgery and LNG-IUS, though adverse effects such as bleeding and spotting are more likely to occur with LNG-IUS.
- Oral medication suits a minority of women in the long term, and the LNG-IUS device provides a better alternative to surgery in most cases.
- Although hysterectomy is a definitive treatment for heavy menstrual bleeding, it can cause serious complications for a minority of women. Most women may be well advised to try a less radical treatment as first-line therapy.
- Both LNG-IUS and conservative surgery appear to be safe, acceptable and effective.

Abnormal Uterine Bleeding

Uterine evaluation

Enhanced risk of hyperplasia or neoplasia or both

Yes

Office endometrial biopsy

Adequate specimen?

Yes

Atypical hyperplasia/CA

Management of AUB-M

No

No

Enhanced risk of a structural abnormality

Yes

Enhanced risk of hyperplasia or neoplasia or both

No

Transvaginal U/S

Normal cavity?

Yes

Hysteroscopy +/- biopsy

Target lesion?

No

SIS

Can’t assess

Yes

Consider MRI

No

AUB-E or O (presumptive)

AUB-L, AUB-P, AUB-A

Adequate specimen?

No

Adequate specimen?
# AUB
## Acute Bleeding

<table>
<thead>
<tr>
<th>Agent</th>
<th>Suggested Dosage</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Conjugated equine estrogen**| Hemodynamically *unstable*: 25 mg intravenously every 4 to 6 hours for up to 24 hours  
Hemodynamically *stable*: 2.5 mg orally every 6 hours for 21 days | Follow treatment with a progestin to provoke withdrawal bleeding; do not use in patients at increased risk of thrombosis |
| Estrogen-progestin oral contraceptives | 1 monophasic pill containing 35 mcg of ethinyl estradiol orally 3 times daily for 7 days | Other regimens also effective; do not use in patients at increased risk of thrombosis              |
| Progestins                    | Norethindrone, 5 mg orally 3 times daily for 7 days                               | Other high-dose oral progestins are also effective                                                |
| Tranexamic acid               | 10 mg per kg intravenously every 8 hours or 20 to 25 mg per kg orally every 8 hours | Faster onset if given intravenously; do not use in patients at increased risk of thrombosis       |

A 36 yo G3P2A1 presents with a 14-month history of amenorrhea, hot flashes, and vaginal dryness. She previously had normal menses and takes no medications. Her past medical and surgical histories are negative. The patient is 66 inches tall and her BMI is 23.5 kg/m2. Her vital signs are normal. A physical examination is normal except for vaginal dryness and atrophy. Laboratory studies reveal a negative urine pregnancy test, normal TSH and prolactin levels, and elevated LH and FSH levels. The most likely diagnosis is:

A. Functional hypothalamic amenorrhea
B. Intrauterine synechiae (Asherman syndrome)
C. Primary ovarian insufficiency
D. Turner’s syndrome
(Secondary) Amenorrhea

**Systematic Approach**

- Focus on the signs and symptoms that suggest an underlying cause.
  - PCOS
  - Intrauterine synechiae (Asherman syndrome)
  - Functional hypothalamic amenorrhea
  - Hypothyroidism
  - Hyperprolactinemia
  - Primary ovarian insufficiency (Premature ovarian failure)

In practice, the most common cause: Progesterone-only contraceptive
Steps in Evaluation

• **Step 1** – Rule out pregnancy
• **Step 2** – TSH to evaluate for hypo- or hyperthyroidism prolactin to evaluate for pituitary tumor (fasting, no breast stimulation)
• **Step 3** – Determine the *relative estrogen status*
Relative Estrogen Status

Progestin Challenge Test

• 5-10 mg medroxyprogesterone acetate po q day x 10 days
• Any bleeding within 2-7 days is “positive”
Amenorrhea

(-) Pregnancy test
TSH
Prolactin

Elevated TSH or prolactin

Hypothyroidism
Pituitary disease

Normal TSH and Prolactin

Progestin challenge

(+) Withdrawal bleed

Anovulation
Anovulatory Amenorrhea

- Amenorrheic women with adequate estrogen ([+] progestin challenge test)
- Anovulatory, frequently obese, +/- PCOS
  - Progesterone is NOT being adequately produced in luteal phase
  - Unopposed estrogen stimulation
    - Risk of endometrial cancer is increased
    - Treatment
      - Progestin 10 mg q day 7-10 days every month or OCPs
Amenorrhea

TSH (nl), prolactin (nl), and progestin challenge

Outflow tract obstruction
(Asherman’s, Mullerian agenesis)

Estrogen and progestin challenge test
(e.g., one cycle of combined OCP)

No withdrawal bleed

(−) withdrawal bleed
Amenorrhea

(+) Withdrawal bleed following estrogen and progestin challenge

Measure FSH and LH

Low

Normal MRI

Normal

Primary Ovarian Insufficiency (aka premature ovarian failure)

High

Hypothalamic amenorrhea
Hypothalamic Amenorrhea

_Hypogonadotrophic Hypogonadism_

- Low or normal FSH/LH, normal prolactin, low levels of endogenous estrogen, normal MRI of sella
- (+) _Withdrawal bleed_ following estrogen-progestin challenge test
- Usually diagnosed by exclusion of pituitary lesions
- Anorexia/bulimia, stress, high-intensity exercise, chronic illness
Hypothalamic Amenorrhea

**Amenorrheic Women With Inadequate Estrogen**

- Risk of decreased bone density (10%-20%)
  - Cannot be completely overcome with supplemental calcium or *weight-bearing exercise*
  - ? Rate of fractures
- Although OCPs improve lumbar and total bone mineral, effect on fractures unknown
- Decrease intensive exercising
- *Increase BMI > 20* to restore menses
Ovarian Failure

*High FSH/LH*

- Primary ovarian insufficiency
  - < 40 not always reversible
    - Autoimmune, genetic, chemotherapy, mumps
- Postmenopausal
- Absence of secondary sex characteristics
  - Gonadal dysgenesis
    - Turner syndrome (most common form)
4. A 22-year-old female presents with the complaints of irregular menses, increased facial hair, and acne. Your evaluation leads to the diagnosis of polycystic ovary syndrome. *Which one of the following is the first-line treatment for her constellation of symptoms?*

A. Clomiphene  
B. Metformin  
C. Hormonal contraceptives  
D. Spironolactone
What Is Polycystic Ovary Syndrome?

• Complex condition that is most often diagnosed by the presence of two of the three following criteria: hyperandrogenism, ovulatory dysfunction, and polycystic ovaries

• Pathogenesis has been linked to altered luteinizing hormone (LH) action, insulin resistance, and a possible predisposition to hyperandrogenism

• Exact etiology – Unclear
  – Currently thought to emerge from a complex interaction of genetic and environmental traits
Common Comorbidities

• Metabolic Syndrome
  – 2X increased risk compared to general population
• Obesity
• Type 2 DM
  – 4X increased risk
  – 45% of PCOS patients will have impaired glucose tolerance or type 2 diabetes
• Nonalcoholic fatty liver disease
• Sleep apnea
• Increased risk of CV disease
• Increased risk of mood disorders
Criteria for Diagnosis of PCOS

• **Rotterdam Criteria** – presence of **two** of the following three findings
  
  − **Hyperandrogenism**
    • Clinically - presence of excessive acne, androgenic alopecia, or hirsutism (terminal hair in a male-pattern distribution)
    • Chemically - elevated serum levels of total, bioavailable, or free testosterone or dehydroepiandrosterone sulfate
    • Measurement of **androgen levels** is helpful in the rare occasion that an **androgen-secreting tumor** is suspected (e.g., when a patient has marked virilization [deepening voice or clitoromegaly] or rapid onset of symptoms associated with PCOS)
  
  − **Ovulatory dysfunction**
    • Oligomenorrhea (cycles more than 35 days apart but less than six months apart) or amenorrhea (absence of menstruation for six to 12 months after a cyclic pattern has been established)
  
  − **Polycystic ovaries**
    • Ovary containing 12 or more follicles (or 25 or more follicles using new ultrasound technology) measuring 2 to 9 mm in diameter or an ovary that has a volume of greater than 10 mL on ultrasonography
    • Single ovary meeting either or both of these definitions is sufficient for diagnosis of polycystic ovaries
Suspect PCOS?

**History and Physical**
- Menstrual history
- Fluctuations in weight and impact on PCOS symptoms
- Cutaneous findings
  - Terminal hair
  - Acne
  - Alopecia
  - Acanthosis nigricans
  - Skin tags
- Ask about factors related to common comorbidities
Suggested Evaluation

• Exclude pregnancy
• Exclude other causes of hyperandrogenism
  - TSH (Thyroid dysfunction)
  - Prolactin (hyperprolactinemia)
  - 17-hydroxyprogesterone (non-classical congenital adrenal hyperplasia due to 21 hydroxylase deficiency)
    • Random normal level < 4 ng/mL or
    • Morning fasting level < 2 ng/mL
  - Consider screening for Cushing syndrome and other rare disorders such as acromegaly in patients with physical findings that suggest either condition
  - Depending on presentation – exclude hypothalamic amenorrhea and primary ovarian insufficiency
• If documenting biochemical hyperandrogenemia
  - Total, bioavailable, or free testosterone OR dehydroepiandrosterone sulfate (DHEA-S)
Suggested Evaluation

• Other tests that may be helpful but are not necessary for diagnosis
  − Measurement of LH and FSH levels to determine a serum ratio of LH/FSH
    • A ratio greater than 2 generally indicates PCOS, but there are no exact cutoff values because many different assays are used
    − FSH level is more helpful in ruling out ovarian failure

• Transvaginal pelvic ultrasound
  − Ultrasonography of the ovaries is unnecessary unless imaging is needed to rule out a tumor or the patient has met only one of the other Rotterdam criteria for PCOS
    • Polycystic ovaries meeting the above parameters can be found in as many as 62% of patients with normal ovulation, with prevalence declining as patients increase in age
At Time of Diagnosis…

• BP at every visit
• Lipid level
• Screen for Type 2 DM (Insulin resistance)
  – Preferred 2-hour glucose tolerance test (Real world - HgbA1c)
  – Regardless of patient’s BMI
  – Repeat every 3-5 years
• Endocrine Society recommends screening for
  – Depression
  – Symptoms of OSA in overweight and obese patients
Hyperinsulinemia/Insulin Resistance

- Insulin sensitivity DECREASES (Insulin resistance)
- Insulin release and circulating insulin INCREASE; normal glucose tolerance unless there is metabolic syndrome present
Insulin Resistance

- Insulin resistance stimulates ovarian androgen production leading to anovulation
  - Prolonged anovulation can lead to development of enlarged ovaries with multiple cysts that were first seen on US, thus the name of the syndrome
- Hyperinsulinemia and hyperandrogenemia interfere with the secretion of gonadotropins from the pituitary gland, resulting in changes to the mid-cycle LH surge and its diurnal variation
Management of PCOS

Oligomenorrhea and amenorrhea
• OCPs# (combination pill, low dose)
• Monthly progesterone

Hirsutism
• OCPs
• Spironolactone*
• Finasteride

Insulin resistance
• Metformin

Infertility
• Clomiphene
• Letrozole^ – In a double-blind randomized trial, letrozole was associated with greater live-birth and ovulation rates compared to clomiphene (SOR A)

CASE:
• Irregular menses
• Facial hair
• Acne

A 2012 Cochrane review concluded that metformin does not improve fertility in patients with polycystic ovary syndrome

# Cochrane 2007.
^ Legro, et. al., 2014
PCOS Treatment

• Recommends hormonal contraception as the first-line medication for women diagnosed with PCOS who are experiencing irregular menses, acne, and hirsutism and do not desire pregnancy (SOR A).
• Metformin may help regulate menses but has not been shown to be as effective as oral hormone therapy.
• 2015 Cochrane review, oral contraceptives were recommended as the most effective treatment for hirsutism.
• Either letrozole or clomiphene is appropriate for women diagnosed with PCOS who want to become pregnant.

### Key Recommendations for Practice

<table>
<thead>
<tr>
<th>Clinical Recommendation</th>
<th>SOR</th>
</tr>
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<tbody>
<tr>
<td>All women diagnosed with PCOS should be screened for metabolic abnormalities (e.g., type 2 diabetes mellitus, dyslipidemia, hypertension), regardless of body mass index.</td>
<td>C</td>
</tr>
<tr>
<td>All women with suspected PCOS should be screened for thyroid disease, hyperprolactinemia, and nonclassical congenital adrenal hyperplasia.</td>
<td>C</td>
</tr>
<tr>
<td>A calorie-restricted diet is recommended for all patients with PCOS who are overweight. <strong>Weight loss has been shown to have a positive effect on fertility and metabolic profile.</strong></td>
<td>A</td>
</tr>
<tr>
<td>Hormonal contraception (e.g., oral contraceptives) should be used as the initial treatment for menstrual cycle irregularity, hirsutism, and acne in patients with PCOS <strong>who are not actively trying to get pregnant.</strong></td>
<td>A</td>
</tr>
</tbody>
</table>

Perimenopausal Bleeding

*(Endometrial Biopsy first based on risk)*

- **Progestins** – Provera 5-10 mg for 12 days/month
  - Prevents endometrial hyperplasia
- **OCPs** (agent of choice if nonsmoker – expert opinion)
  - Regulate cycles and control bleeding, contraception
- **Levonorgestrel IUD**
  - Induces amenorrhea, may cause atrophy
- **HRT** – sequential more effective than continuous
  - Prevents hyperplasia but NO contraception
• Don’t obtain follicle-stimulating hormone (FSH) levels in women in their 40s to identify the menopausal transition as a cause of irregular or abnormal menstrual bleeding.
5. A 55 yo postmenopausal woman presents with 2 days of vaginal bleeding (spotting). She initiated HT 10 months ago because of significant nocturnal hot flashes. Which of the following statements is most accurate?

A. Irregular bleeding is uncommon after HT is initiated.
B. Postmenopausal women on hormone therapy for > 4 months who experience bleeding require prompt evaluation.
C. Postmenopausal women on HT for < 12 months who experience bleeding may be observed for one year before diagnosing abnormal uterine bleeding.
D. The sensitivity of endometrial biopsy for the detection of endometrial abnormalities is 50%.
Postmenopausal Bleeding

• Irregular bleeding is common after HT is initiated and improves within 6-12 months for most women.

• Evaluate
  - Cyclic HT, experience unusually prolonged or heavy bleeding that occurs near the end of the progestogen phase of the cycle, or breakthrough bleeding that occurs at any other time.
  - Continuous HT, experience bleeding that persists > 6 months or that occurs after amenorrhea has been established.
  - HT < 12 months may be observed for 1 year before diagnosing abnormal uterine bleeding.
  - Postmenopausal on no HT or HT > 12 months with bleeding.
Practice Recommendations

✓ Screen all women with postmenopausal vaginal bleeding for endometrial cancer [SOR:A].
✓ Use transvaginal ultrasound for the initial study for patients at low risk for endometrial cancer, and endometrial biopsy for those at higher risk [SOR:B].
✓ Use saline infusion sonography as a second step in the evaluation of postmenopausal bleeding if the diagnosis remains unclear after a biopsy or the bleeding persists despite a normal initial workup [SOR:B].
Summary
# SORT Key Recommendations for Practice

<table>
<thead>
<tr>
<th>Clinical Recommendation</th>
<th>Evidence Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The International Federation of Gynecology and Obstetrics classification system should be used to characterize abnormal uterine bleeding.</td>
<td>C</td>
</tr>
<tr>
<td>All patients with abnormal uterine bleeding should be tested for pregnancy and anemia.</td>
<td>C</td>
</tr>
<tr>
<td>Endometrial biopsy should be performed in all patients with abnormal uterine bleeding who are 45 years or older, in younger patients with a significant history of unopposed estrogen exposure, persistent bleeding, or in whom medical management is ineffective.</td>
<td>C</td>
</tr>
<tr>
<td>Transvaginal ultrasonography is the first-line imaging choice for evaluating abnormal uterine bleeding in most patients.</td>
<td>C</td>
</tr>
<tr>
<td>The 20-mcg-per-day formulation of the levonorgestrel-releasing intrauterine system (Mirena) is more effective than other medical therapies for reducing heavy menstrual bleeding.</td>
<td>A</td>
</tr>
<tr>
<td>Hysterectomy is the most effective treatment for reducing heavy menstrual bleeding.</td>
<td>A</td>
</tr>
</tbody>
</table>

Answers

1. A
2. B
3. C
4. C
5. C
References

References


Unique Geriatric Pharmacologic Issues

Russell Blackwelder, MD, MDiv, CMD
Department of Family Medicine
Medical University of South Carolina
Disclosure Statement

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Geriatric Pharmacoeconomics

2011: Age 65+ are 13% of U.S. population and consume 33% of prescription drugs. In 2040, will be 25% of population and consume 50% of prescription drugs.
What Evidence-Based Medicine?

• Cardiovascular drugs: Percentages of all patients in a given age group treated with cardiovascular drugs (Italy) vs percentages in each age group included in cardiovascular drug trials (globally)

Learning Objectives

1. Identify clinical importance of effects of age on pharmacokinetics and pharmacodynamics.
2. Recognize the risk factors for adverse drug events in older patients and ways to mitigate them.
3. Describe the principles of prescribing for older patients.
1. Which of the following pharmacokinetic factors changes least with age?

A. Absorption
B. Distribution
C. Metabolism
D. Elimination
2. An 80 yo hypertensive woman is switched from atenolol to propranolol to treat tremor. A week later she seems more bradycardic, confused, and despondent. The most likely cause is:

A. Taking extra propranolol
B. Decreased metabolism of propranolol
C. Lipophilia of propranolol
D. Reduced elimination of propranolol
Effects of Aging on Volume of Distribution (VD)

- ↓ body water $\rightarrow$ lower VD for hydrophilic drugs
- ↓ lean body mass $\rightarrow$ lower VD for drugs that bind to muscle
- ↑ fat stores $\rightarrow$ higher VD for lipophilic drugs and lipid soluble more likely to get into brain
- ↓ plasma protein (albumin) $\rightarrow$ higher percentage of drug that is unbound (active)
3. An 84 yo man has been less alert and his balance is deteriorating. He was taking 5 mg of diazepam twice a day and agrees to stop. One week later, he’s no better. Three weeks later he’s improved. The most likely explanation is:

A. Withdrawing drug too quickly
B. Active drug metabolites
C. Increased receptor sensitivity
D. Patient must have continued taking the diazepam
Metabolism

• Active metabolites may account for prolonged toxicity of medication after discontinuation
• Phase 1 (oxidation, cytochrome P450) in the liver may be reduced with age; phase 2 (conjugation) usually unaffected
• Thus, drugs dependent on phase 1 metabolism (e.g., diazepam) are more likely to cause toxicity than drugs dependent on phase 2 (e.g., lorazepam)
4. Change in which of the following pharmacokinetic factors accounts for the most differences in drug effects with advancing age?

A. Absorption
B. Distribution
C. Metabolism
D. Elimination
Which patient is likely to have greater difficulty renally clearing drugs?

- 50 yo woman weighing 150 lbs., serum creatinine 2.2 mg/dL
  OR
- 80 yo woman weight 110 lbs., serum creatinine 1.4 mg/dL
Cockroft-Gault Equation

(Ideal weight in kg) \( \times \) \((140 - \text{age})\) \( \times \) \((0.85 \text{ if female})\) \( \times \) (72) (serum creatinine in mg/dL)

50 yo = 33 cc/min
80 yo = 23.6 cc/min
Serum Creatinine Does Not Reflect Creatinine Clearance

- ↓ lean body mass $\rightarrow$ lower creatinine production and less creatinine to clear

- Result: In older persons, serum creatinine may stay in normal range, masking decline in creatinine clearance ($\text{CrCl}$).
5. An 80 yo on warfarin has an INR of 2.5. The best explanation for increased bleeding risk compared with a younger patient is:

A. Difference in elimination
B. Difference in metabolism
C. Difference in volume of distribution
D. Pharmacodynamic differences
Pharmacodynamics

• Pharmacokinetics: What the body does to the drug.
• Pharmacodynamics: What the drug does to the body.*

• Elderly are at greater risk for bleeding at any given INR because they are more likely to have additional problems that increase that risk (e.g., friable stomach, more likely to fall and suffer head trauma, etc.).

Learning Objectives

1. Identify clinical importance of effects of age on pharmacokinetics and pharmacodynamics.

2. Recognize the risk factors for adverse drug events for older patients and ways to mitigate them.

3. Describe the principles of prescribing for older patients.
The greatest risk factor for adverse drug reactions in the elderly is the number of drugs prescribed.
Beers Criteria for “Potentially Inappropriate Medication Use in Older Adults”

- Comprehensive review and grading of drug-related problems and adverse drug events in older adults
- Examples: all “muscle relaxers,” tricyclic antidepressants
- 2019 version of Beers’ List (see also STOP/START)
Beers’ Other Top Drugs to Avoid

- Diphenhydramine, hydroxyzine, and first-generation antihistamines
- Clonidine
- Amiodarone, class 1 antiarrhythmic drugs
- Digoxin >0.125 mg daily
- All benzodiazepines
- Glyburide, chlorpropamide
- Indomethacin, meperidine
Prescription Errors

• > 20% of ambulatory older adults receive at least one potentially inappropriate drug (e.g., 1/5 receiving cholinesterase inhibitor for Alzheimer’s also take anticholinergic drug).

• Nearly 4% of office visits and 10% of hospital admissions result in prescription of medications classified as never or rarely appropriate.
Monitoring Errors

• Example: 12-63% of patients taking ACE inhibitor had inadequate monitoring of K or Cr.

• Preventable ADEs: “Most ADEs do not result from improper choices of drugs or drug doses but instead represent known side effects of drugs that have a rightful place in the therapeutic armamentarium.”
Case Discussion

On Friday evening at 8 pm, the answering service puts through a call from a 72 yo man who is followed by a colleague. The patient is coughing and sneezing. In a nasal voice he says “Doc, I couldn’t pee all afternoon and I just wet myself!”
Over-the-Counter Medication

• Elderly account for 13-15% of the population but account for 40% of all OTC purchases.

• May not consider these “medications” and may not report to physician because no prescription required.

• Increasing array of OTCs leads to increased risk of unsuspected ADR, drug interactions (e.g., antihistamine + alpha adrenergics can precipitate urinary retention).
Learning Objectives

1. Identify clinical importance of effects of age on pharmacokinetics and pharmacodynamics.

2. Recognize the risk factors for adverse drug events for older patients and ways to mitigate them.

3. Describe the principles of prescribing for older patients.
Case Discussion

Ms Mannie Pils is an 80 yo woman brought to your office by her daughter because she moved her mother from Indiana 1 month ago and wants you to provide her primary care. Her mother “had not been taking care of herself,” and the daughter found her thin and disheveled during a recent visit.
Case Discussion

• The patient has eaten poorly, lost weight, and spends more time in bed. The daughter thinks her mother was treated for arthritis, asthma, anxiety, gout, constipation, and high blood pressure. The daughter now wants drug refills.

• Patient seems tired and affect is flat. Her memory is impaired. Her BP is 115/75, pulse is 58 and regular. Mucous membranes are dry; she’s photophobic. She cannot arise from a chair without assistance and walks with a shuffle. Her muscle tone seems increased.
• Digoxin 0.25 mg daily
• Clonidine 0.2 mg po tid
• Theophylline (delayed release) 300 mg po bid
• Propranolol 20 mg po bid
• Verapamil 240 mg (sustained release) daily
• Furosemide 20 mg po daily
• Indomethacin 25 mg po bid

• Metoclopramide 10 mg po tid with meals
• Amitriptyline 50 mg po hs
• Aspirin 325 mg po daily
• Carbidopa/levodopa 25/100 tid
• 3 different laxatives and antacids for prn use (her mother also insists on taking acetaminophen [Tylenol PM] for sleep)
6. Your next step is:

A. Stop all medications immediately.
B. Stop the medications except digoxin and theophylline.
C. Stop the medications but taper down the clonidine and amitriptyline.
D. Continue all meds but cut doses in half.
When to Be Cautious About Medication Withdrawal

• Sudden cessation of amitriptyline may cause a cholinergic rebound syndrome (i.e., agitation, borborygmi, diarrhea).

• Sudden withdrawal of clonidine may cause rebound hypertension, but less likely with dose less than 1 mg daily.
ADE Mimic Disease

• Bradycardia: Digoxin, verapamil, and propranolol; slow cardiac conduction (note: Verapamil increases digoxin levels 50-75%)

• Weight loss: Theophylline and digoxin may cause nausea and dysgeusia (food tastes bad). Clonidine and amitriptyline cause dry mouth (harder to eat) and photophobia.
Side Effects Beget More Polypharmacy

- Theophylline causes tremor (propranolol).
- Verapamil, clonidine, and amitriptyline may cause constipation in the elderly (laxatives).
- Verapamil and propranolol cause fluid retention and edema (furosemide).
- Metoclopramide can induce parkinsonism (carbidopa/levodopa).
- Aspirin and theophylline exacerbate gastroesophageal reflux (antacids).
Digoxin: No Longer a Geriatric Staple

• Absence of LV systolic dysfunction or atrial fibrillation with rapid ventricular response (RVR) means digoxin can be discontinued.

• In atrial fibrillation with RVR, slows rate at rest but not with exertion.
Which Medication May Contribute to Her Confusion and Apathy?

• Digoxin?
• Propranolol?
• Verapamil?
• Indomethacin?

• Metoclopramide?
• Clonidine?
• Diphenhydramine?
• Amitriptyline?

All of the above!!!
Drugs-impairing Cognition

• Everything we prescribe … except acetaminophen and docusate.

• Most often psychoactive meds or those with anticholinergic side effects.

• “Discontinue amitriptyline” is always the correct answer on boards.
Drugs-impairing Cognition

- Anticholinergics (e.g., diphenhydramine, trihexyphenidyl, oxybutynin)
- Anticonvulsants (phenytoin, gabapentin, valproate)
- Muscle relaxers (carisoprodol [e.g., Soma], cyclobenzaprine)
- Antiemetics (prochlorperazine, metoclopramide)
- Digoxin, clonidine, amantadine, amiodarone
- Benzodiazepines, antipsychotics
Drug-induced Cognitive Impairment

- >50% who stop medication will improve.
- Often a single medication implicated.
- Patients with drug-induced cognitive impairment were also 3 times more likely to fall.
- Most offending drugs taken for several years prior to diagnosis.

Lessons from the Case of Manny Pills

• Beware of enforced compliance
• Assume that any patient taking five or more medications is likely to have drug interactions; find them
• Look for medications that have been added to treat the side effects of other medications
• Do not be afraid to challenge the indication for medications the patient has taken for many years
#9 Don’t prescribe a medication without conducting a medication review
“Deprescribing”

• Inappropriate polypharmacy, especially in older people, imposes a substantial burden of adverse drug events, ill health, disability, hospitalization, and even death

• Most important predictor of inappropriate prescribing and risk of adverse drug events in older patients is the number of prescribed drugs

To Reduce Polypharmacy

• Evidence-based Medicine for patients of this age and disability?
• Do benefits outweigh known possible adverse effects?
• If benefit > risk, does the patient have adverse symptoms that may be drug-induced?
• Is there a better/safer drug?
• If there is no better choice, can the dose be reduced?

(Arch Intern Med. 2010;170:1648-1654.)
Results

• Mean age @ 83 yo.
• @ 60% had three or more chronic diseases.
• Mean number of medications 7.7.
• @ 60% had medications discontinued; mean of 5 meds eliminated.
• 2% of meds restarted, 17% not discontinued; 81% meds NOT restarted 19 months follow-up.
• 88% reported global improvement.
Three More Principles

• Danger of silo thinking
• One size fits all
• Time to benefit
The Danger of Silos...

81 yo man with CHF (EF 30%), atrial fib, and diabetes transfers primary care to you. Notes dyspnea on exertion with routine ADLs. Medications include furosemide, lisinopril, digoxin, glipizide, warfarin, Toprol XL. Hct 38, K 4.7, creat 2.1, Na 135. A cardiologist recommended spironolactone but patient wary of more medication. Patient asks for your advice.
Spironolactone in Patients With Severe CHF: The RALES Trial

• Spironolactone 12.5-25 mg combined with standard CHF reduces morbidity and mortality without significant side effects (e.g., hyperkalemia)

The RALES Trial

• Average age 65 +/- 12.

• Trial stopped early @ two-year avg., because interim analysis determined that spironolactone was efficacious.

• Death rate: 46% placebo vs 35% spironolactone (NNT 9!)

• Lower risk of death from progressive heart failure and sudden cardiac death. Minimal side effects.

• Significant improvement in the symptoms of heart failure.
Conclusion

• Spironolactone, in addition to standard therapy with ACE inhibitor and diuretic (and digoxin), substantially reduces the risk of both morbidity and death among patients with severe heart failure

• (if serum creatinine <2.5)
Rates of Hyperkalemia After Publication of RALES

• Review spironolactone prescription rates among hospitalized patients >65 who were taking ACE inhibitors (Ontario 1994-2001)

• Marked increased use of spironolactone in CHF patients after publication of RALES, average age 78
Findings

• Increased rate of hospitalization for hyperkalemia with modest but significant hospital death from hyperkalemia

• No significant change in gradual decline of hospital readmission for CHF (trend preceded publication of RALES trial)
Risk of “Ageless” Guidelines

• Serum creatinine of 2.5mg/dL in 65 yo, 70 kg man is equivalent to
  – Creatinine of 2.0mg/dL in 80 yo 70 kg man
  – Creatinine of 1.7mg/dL in 80 yo 60 kg man
  – Creatinine of 1.7mg/dL in 80 yo 70 kg woman
  – Creatinine of 1.4mg/dL in 80 yo 60 kg woman
Conclusions Re: Spironolactone

• Use increased dramatically after publication of RALES trial without anticipated benefit.

• Prescribing for pts (e.g., chronic renal disease) who would have been excluded from RALES likely a major factor.

• “Silo thinking”: Failure to account for impact of multiple chronic diseases on treatment efficacy and safety.
One Size Fits All
(Risk of Generalizing From Healthy Elderly Trials)

• HYVET trial confirms that treating hypertension (>160/90) in patients >80 reduces all-cause mortality.

• “HYVET puts the question of the usefulness of treating hypertension to rest and provides important guidance to physicians and writers of such guidelines.”

What They Didn’t Tell You About HYVET

• No study patients from North America; many from Asia where risk of stroke with hypertension is considerably greater
• Over 75% of patients were <85 years old
• Very healthy octogenarians; no patients with multiple medical problems
SPRINT trial

• More aggressive treatment of blood pressure (<130 systolic) associated with better cardiovascular outcomes
• Average starting BP approximately 140 systolic
• Most patients <75 years old; very healthy; excluded diabetics, those with previous strokes, and institutionalized elderly
(Note: BP measured after sitting in a quiet room)
SPRINT MIND TRIAL and Dementia Risk

• Intensive BP control (less than 120 systolic); n=4678
• Standard BP control (less than 140 systolic): n=4683
• Mean follow up of 5.11 years
• No significant decrease in Dementia
• Significant decrease in Mild Cognitive Impairment
• DM, CVA, Nursing Home, dx of Dementia all excluded
Frailty and Hypertension
(Wu,C et.al., J Am Geriatr Soc. 65:1482, 2017.)

- NHANES included 7492 participants age >65; blood pressure, grip strength and gait speed measured
- “Walk at your usual pace”; walking speed <0.6m/sec “slow”
- BP >150/90 associated with 24% increased risk of mortality if gait speed and grip strength normal.
- BP >150/90 associated with lower mortality among those with weak grip, especially those who had weak grip and slow walk
• “There is no such thing as an average octogenarian”
• Many robust elderly have hypertension; treat them
• Frail older individuals with hypertension may deserve a more cautious approach
ABIM and AGS Choosing Wisely

#3: Avoid using medications other than metformin to achieve hemoglobin A1c<7.5% in most older adults; moderate control is generally better.
Time to Benefit of Tight Control

• For type 2 diabetics, time to benefit of tight control to prevent eye and renal microvascular complications may be a decade or more

• Little evidence that tight control reduces macrovascular disease
Role of ACE Inhibitors in Diabetes

• Time to see benefit in slowing progression of renal disease (decline in creatinine clearance) may be as little as one year.
Practical Management of Elderly With Multiple Chronic Diseases

• Choose treatments that have clinical impact within life expectancy of patient and fewest adverse effects.

• Choose treatments that may have benefit for more than one chronic disease.
Principles of Prescribing for the Elderly

- Avoid polypharmacy.
- Beware of changes in compliance.
- Parsimony applies to treatment, not just differential diagnosis.
- Don’t assume what’s good for a younger patient (or otherwise healthy elderly) with one disease is good for an older patient with multiple diseases (silo thinking & time to benefit).
Answers

1. A
2. C
3. B
4. D
5. D
6. C
Disclosure Statement

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Learning Objectives

1. Explain the examination process for certification/recertification in Family Medicine.
2. Develop an individual plan of study for the certification/recertification examination in Family Medicine.
3. Demonstrate specific test-taking techniques.
4. Manage anxiety in the anticipation of an important examination.
FMC Certification Requirements

50 Points
- Complete a Minimum of 1 Knowledge Self-Assessment, Performance Improvement (PI) Activity for Clinically Active Physicians and Additional Approved Self-Assessment or PI Activities to Reach a Minimum of 50 Points

CME
- Complete 150 CME Credits (Minimum 50% from Formal Activities Awarding Division I Credits)

Professionalism
- Continuously comply with ABFM Guidelines for Professionalism, Licensure, and Personal Conduct which includes holding medical license(s) which meet the licensure requirements of the Guidelines

Process Fees
- Submit Your Annual Process Fees

Examination
- Successfully Complete Your Family Medicine Certification Examination Every 10 Years
Cognitive Assessment

Demonstrates that you possess the cognitive expertise that a patient should expect from any board-certified family physician, regardless of age, experience, work context, or scope of practice.

• One-Day Exam, Every 10 years
  • 300 MCQ
  • Pooled Flexible Break Time
  • 90% Pass Rate
  • Past Performance Predicts Future Performance

• Longitudinal Exam
  • 25 Questions Per Quarter; 300 Needed Over Four Years for Pass/Fail Decision
  • Done at Your Own Pace, Own Time, at Location of Your Choice
  • Ability to use References
  • Timed Questions – 5 mins each
  • Critique and References provided
Keep in mind…

• This is an EXAM
• This will require systematic preparation
  − a small amount of review daily/weekly
• Anticipate what is to come
• Be aware each question is timed
• Learn from each 25-question installment of the examination
Completion Requirements

• In order to complete FMCLA so that it satisfies one's examination requirement (MOC, Part III), answer 300 questions over a four-year time period AND achieve a passing score.
• Since the platform delivers 25 questions each quarter, FMCLA provides one with flexibility to complete the entire process in three years or extend to a maximum of four years.
THE EXAM
Family Medicine Certification Examination

This component of Family Medicine Certification involves the successful completion of a cognitive examination. The Family Medicine Certification examination contains multiple-choice (one best answer) questions and is the same for certification and continuing certification candidates. It is a test of cognitive knowledge and problem-solving ability relevant to Family Medicine. The examination is one full day in length, consisting of morning and afternoon sessions (with a lunch break in between). The examination is offered in computer-based format only. Although permitted to take the examination prior to residency completion and prior to obtaining a permanent license, both requirements must be met by the specified deadlines in order to obtain certification. Failure to meet these requirements by the specified deadline will result in invalidation of the examination.

Family Medicine Certification Examination
You are currently certified through 12/31/2026; therefore you are not due to apply for the Family Medicine Examination.
Homework Assignment #1

CANDIDATE INFORMATION BOOKLET
FAMILY MEDICINE CERTIFICATION EXAMINATION

EXAMINATION DATES
APRIL 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 20 & 21, 2020
NOVEMBER 9, 10, 11, 12, 13 & 14, 2020
Meaningful Participation

• Choosing to participate in the longitudinal assessment pilot, it is important that you fully participate.

• Meaningfully participate by answering at least 80% of the questions in the first year and answering the pilot surveys is the only way that ABFM can generate the data and information necessary to evaluate the feasibility and validity of the assessment for the future.
  – Report to ABMS Fall 2019 and Fall 2020

• You will continue participating in the full 300-item assessment only if you meaningfully participate in year one.
Family Medicine Certification
Longitudinal Assessment (FMCLA) Pilot

Year 1
- 100 Questions
  - Up to 25 Questions per Quarter
  - Less Than Meaningful Participation (Less than 80 questions answered)

Year 2
- 100 Questions
  - Up to 25 Questions per Quarter
  - One-Day Examination
    - Remain Certified until End of Year 2

Year 3
- 100 Questions
  - Up to 25 Questions per Quarter

Year 4
- 0–100 Questions
  - 25 Questions per Quarter if needed to Complete 300
  - Longitudinal Assessment Final Score of 300 Items

Year 5
- Pass FMCLA
  - Continue Certification

One-Day Examination
- Unsuccessful on FMCLA (Score below minimum passing standard)
  - Remain Certified until End of Year 5

Meaningful Participation (Answer 80 questions)
Recertification Examination - 2020

• Exam Format
  – All multiple choice questions (MCQ) – 4 OR 5 answers
    • Stem and options (A, B, C, D, +/-E)
  – Four Sections
    • 75 MCQ/section (Total exam – 300 questions)
    • 95 minutes allocated per section (Time per question has been increased for each item)
  – ONE module choice – during section two of examination (One-day secure exam)
    • 40 topic-focused MCQs
    • Selected on exam day during the exam
    • Reducing the number of content-specific modules would likely benefit more examinees than it would harm (in terms of passing the examination) by a 4:1 ratio
A 38-year-old female sees you for a routine evaluation. She asks you what strategies you would recommend to help her improve her overall health. She says she usually has coffee and a couple of doughnuts for breakfast, and usually eats lunch and dinner at fast food restaurants. Her only activity consists of a few household chores performed for a couple of hours on the weekend. She has gained approximately 15 kg (33 lb) over the past 10 years.

Which one of the following would be the best recommendation?

- A. Increasing her intake of saturated fat
- B. Increasing her intake of caffeine
- C. Decreasing her level of physical activity
- D. Improving her diet and exercising more
Scheduled Breaks in Exam

• Customizable in length
• 100 minutes of pooled break time
• Choose how much of the 100-minute allotment you use during each scheduled break that occurs between EACH exam section.
Computer-Based Testing Format

• Enhanced testing format – Prometric has upgraded their exam delivery platform
  • Easier navigation
  • More efficient testing experience
• Familiarize yourself with new look and feel of exam – Interactive demonstration
Family Medicine Certification Examination

This component of Family Medicine Certification involves the successful completion of a cognitive examination. The Family Medicine Certification examination contains multiple-choice (one best answer) questions and is the same for certification and continuing certification candidates. It is a test of cognitive knowledge and problem-solving ability relevant to Family Medicine. The examination is one full day in length, consisting of morning and afternoon sessions (with a lunch break in between). The examination is offered in computer-based format only. Although permitted to take the examination prior to residency completion and prior to obtaining a permanent license, both requirements must be met by the specified deadlines in order to obtain certification. Failure to meet these requirements by the specified deadline will result in invalidation of the examination.

Family Medicine Certification Examination

You are currently certified through 12/31/2026; therefore you are not due to apply for the Family Medicine Examination.
ONE-DAY FAMILY MEDICINE CERTIFICATION EXAMINATION INFORMATION

FORMAT
The One-Day Family Medicine Certification Examination is divided into four separate sections of equal length and 100 minutes of pooled break time is available to be used between sections.

<table>
<thead>
<tr>
<th>Exam Section</th>
<th>Exam Section Format</th>
<th>Time Allotted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>75 Multiple Choice Questions</td>
<td>95 Minutes</td>
</tr>
<tr>
<td>Section 2</td>
<td>75 Multiple Choice Questions</td>
<td>95 Minutes</td>
</tr>
<tr>
<td>Section 3</td>
<td>75 Multiple Choice Questions</td>
<td>95 Minutes</td>
</tr>
<tr>
<td>Section 4</td>
<td>75 Multiple Choice Questions</td>
<td>95 Minutes</td>
</tr>
</tbody>
</table>

It is administered and proctored by staff at Prometric in approximately 350 locations around the United States and 180 international locations.

You do not need to have extensive familiarity with computers, but you should have experience with the use of a computer keyboard and mouse. Computer-based testing functions include the ability to navigate forward and backward through the examination, mark items for further review, highlight/erase question content, review answered, unanswered and marked items. A listing of completed questions, incomplete questions, and marked items may be accessed at any time during the examination for the currently active section. You must review or change items prior to the time expiration for each section. Once you end an exam section, or the exam has timed out, you cannot return to the questions in that section. The computer-based examination contains a clock showing the time remaining in the top center of the exam screen.

CONTENT
The test plan specifications for the current Secure One-Day Family Medicine Certification Examination administered in a test center, provides you with the targeted percentage of questions in each content category of your examination. The test plan specifications outline also includes the list of available modules that will be available during your examination. You will have the opportunity to select one of these modules prior to starting section two of your examination.

Test Plan Specifications:
2020 (rev. Jan)
2019 (rev. Apr)

ONLINE TUTORIAL
You may access an Online Tutorial to help you gain helpful insights into the computer-based testing system and to review the exam functionality before you take the exam. Please note that while the online tutorial may show various question formats, the One-Day Family Medicine Certification Examination consists only of single best response, multiple-choice questions. On exam day there will be a brief orientation/tutorial prior to starting, which will allow you to re-familiarize yourself with the exam process.
Exam Tutorial

• Go to

• Note: Questions in the exam tutorial are generic and NOT specific to the ABFM examination.
Scoring

• No penalty for incorrect answers
  • Leave no question unanswered
  • Guess if you don’t know

• Setting a passing score
  – Angoff Method – using a group of peers to estimate the percentage of family physicians who would answer each question correctly
Angoff Method

Standard Setting Approach in Test Development

• Passing grade for the Certification Examination
• Panel of more than 24 diplomates who recently took the exam and did well are enlisted as Subject Matter Experts (SMEs)
• Each SME individually rates each test item based on whether or not a minimally-qualified candidate would answer the item correctly or incorrectly
• Once the first round or ratings has been conducted, everyone on the panel is given access to the ratings of the other SMEs so that they could compare what they determined about a particular item
Angoff Method
**Standard Setting Approach in Test Development**

- SMEs are asked to rate the items *again* for a second round.
- The second round of ratings would give the SMEs the opportunity to review their initial rating of an item and decide whether or not they might change their decision based on the expert judgments of the other SMEs.
- The second round of ratings are averaged across SMEs to determine the cut score for the test.
# Pass Rates
*(Combined Spring/Fall)*

<table>
<thead>
<tr>
<th>Year</th>
<th>Recerts (First/Total)</th>
<th>Certs (First/Total)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>82%</td>
<td>81%</td>
<td>390</td>
</tr>
<tr>
<td>2014</td>
<td>85%</td>
<td>90%</td>
<td>380</td>
</tr>
<tr>
<td>2015</td>
<td>91.1%/80.6%*</td>
<td>95.6%/90.6%</td>
<td>380</td>
</tr>
<tr>
<td>2016</td>
<td>91.1%/85.5%*</td>
<td>97.8%/94.4%</td>
<td>380*</td>
</tr>
<tr>
<td>2017</td>
<td>94.1%/89.3%*</td>
<td>98.1%/94.3%</td>
<td>380</td>
</tr>
<tr>
<td>2018</td>
<td>95.3%/91.8%</td>
<td>99.3%/95.1%</td>
<td>380</td>
</tr>
</tbody>
</table>

* Initial/Total

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**NOTE** First-time takers (Certs) can be applying for initial certification or maintaining their certification, but they are not testing on this occasion due to an immediate prior failure.

* Correlates with about 60% correct on the 2016 ITE.
Learning Objectives

1. Explain the examination process for certification/recertification in Family Medicine.
2. Develop an individual plan of study for the certification/recertification examination in Family Medicine.
3. Demonstrate specific test-taking techniques.
4. Manage anxiety in the anticipation of an important examination.
Preparing Yourself Prior to the Examination

• Manage Your Stress
## Summary

### Steps to Creating an Effective Study Plan

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Know what material is going to be on the exam in what proportions</td>
</tr>
</tbody>
</table>
| 2    | Identify your level of need for study  
  • How did you perform on last standardized ABFM exam?  
  • Do you practice broad-based family medicine? |
| 3    | Identify how many hours you will need, would like, or will be able to study (Consider a minimum 3-month lead time – if seeking serious score improvement [> 100 points, or if you are retaking the examination]) |
| 4    | Evaluate how the designated amount of study will fit into your weekly schedule |
| 5    | Identify and obtain the materials you plan to use |
| 6    | Focus on relevant material with which you are least comfortable and familiar |
| 7    | Divide up the material into your schedule as specifically as is reasonable |

Adapted from The ABFM.org
## ABFM Examination Test Plan Specifications - 2020

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular</td>
<td>12%</td>
</tr>
<tr>
<td>Endocrine</td>
<td>8%</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>7%</td>
</tr>
<tr>
<td>Heme/Immune</td>
<td>3%</td>
</tr>
<tr>
<td>Integumentary</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Musculoskeletal</strong></td>
<td><strong>12%</strong></td>
</tr>
<tr>
<td>Nephrologic</td>
<td>3%</td>
</tr>
<tr>
<td>Neurologic</td>
<td>3%</td>
</tr>
<tr>
<td>Nonspecific</td>
<td>9%</td>
</tr>
<tr>
<td>Psychogenic</td>
<td>7%</td>
</tr>
<tr>
<td>Reprod – Female</td>
<td>4%</td>
</tr>
<tr>
<td>Reprod – Male</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Respiratory</strong></td>
<td><strong>13%</strong></td>
</tr>
<tr>
<td><strong>Special Sensory</strong></td>
<td><strong>2%</strong></td>
</tr>
<tr>
<td><strong>Population-based Care</strong></td>
<td><strong>5%</strong></td>
</tr>
<tr>
<td>- Epidemiology, EBM, prevention, health policy &amp; legal issues, bioterror, quality improvement, geographic/urban/rural issues</td>
<td></td>
</tr>
<tr>
<td><strong>Patient-based Systems</strong></td>
<td><strong>5%</strong></td>
</tr>
<tr>
<td>- Clinical decision-making, communication and doctor-patient interaction, family &amp; cultural issues, ethics, palliative care, end-of-life care</td>
<td></td>
</tr>
</tbody>
</table>

1. Know what material is going to be on the exam.
2. Identify your level of need for study

- **Broad population of practice**
  - Studying is most likely to be effective (memorable) if you keep specific clinical practice cases in mind while studying material that applies to those cases
  - Referring back to an article or study resource after seeing a complex patient aids retention

- **Narrowly defined population of practice**
  - Systematic approach to reviewing the spectrum
  - Medical knowledge fades without periodic re-exposure
  - Include those areas not included in practice any longer, as well as common entities seen every day
3. Identify how many hours you will need, would like, or be able to study

- Be realistic
- Talk with coworkers, friends, and family
4. Evaluate how the designated amount of study will fit into your weekly schedule

- **Schedule your study time** – on your calendar
- **Daily time** –
  - Key ingredient in exam success is scheduling regular time to study
- **Minimize long periods of study** just on weekends
5. Identify and obtain the materials needed

- Nearly any high-quality, comprehensive study material can be used effectively
“Your” Study Materials

✓ Board Review Express syllabus
✓ USPSTF A-Z
  ➢ http://www.uspreventiveservicestaskforce.org/usps/topics.htm
✓ ABFM Self-Assessment Modules
✓ AFP by Topic
  ➢ http://www.aafp.org/afp/topicModules/viewAll.htm
Short-Term Study Tips

• Gaining points involves studying medical information – and there is a strong dose-response relationship
• Use the in-training exams or AAFP Board Review CME Questions as a pre- and post-test
In-Training Exams
Prepare How, When, and Where You Want
The Family Medicine Board Review Self-Study Package features 49 30-45 minute sessions, interactive learning, webinars, webcasts, retention testing, and online learning community where you can pose tough questions to faculty.

View Package

AAFP CME is designed to help you meet the ABFM's Family Medicine Certification requirements when and how it works for you. With the very best in live courses, self-study products, and online learning, you can earn the CME you need on your schedule with the AAFP.
Pre- and Post-Test

• Mark your starting point prior to studying and then to see if your study schedule is effective

• Try to take it according to the standardized timing and instructions

• Promotes focus on study
  - Allows one to actually SEE improvement
Using the AAFP CME Questions for Pre- and Post-Tests - *an example*.

<table>
<thead>
<tr>
<th>Date</th>
<th>Exam Questions</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday following course</td>
<td>Mixed Review – 30 questions</td>
<td>30 minutes</td>
</tr>
<tr>
<td>(Pretest)</td>
<td>(3 “tests”)</td>
<td></td>
</tr>
<tr>
<td>One week later</td>
<td>Mixed Review – 30 questions</td>
<td>30 minutes</td>
</tr>
<tr>
<td>(Post-test 1)</td>
<td>(3 “tests”)</td>
<td></td>
</tr>
<tr>
<td>One week later</td>
<td>Mixed Review – 30 questions</td>
<td>30 minutes</td>
</tr>
<tr>
<td>(Post-test 2)</td>
<td>(3 “tests”)</td>
<td></td>
</tr>
</tbody>
</table>

✓ **Goal is a minimum of 70% correct?**
6. Focus on the relevant material with which you are least comfortable and familiar

- Focus on established medicine
- Answer the question using THE MOST CURRENT information
- 9-month development cycle for the examinations, so brand new information, no matter how reliable, is unlikely to appear as an item
7. Divide Up the Study Material Into Your Schedule, as Specifically as Is Reasonable

• Lectures(??)/Number of days until exam = number of lectures reviewed each day
  − Schedule regular time to study
  − Start with those content areas that you find more challenging
  − Keep a “fact sheet” for last-minute review
  − Second attempt at examination
    • Serious score improvement needs 10-14 hours of study time per week (100 points)
    • Doing a lot of review questions is secondary (30 points)
Using the In-Training exams for Pre and post tests and “additional questions.”

<table>
<thead>
<tr>
<th>Date</th>
<th>Exam Questions</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday following course (Pretest)</td>
<td>Mixed Review – 30 questions (3 “tests”)</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Tuesday following course (Studied for 50 minutes; 10 minutes “remain.”) Time for 5 questions</td>
<td>Next Mixed Review Quiz 5 questions</td>
<td>5 minutes for questions then 5 minutes to review annotated answers</td>
</tr>
<tr>
<td>Friday following course (Studied for 40 minutes; 20 minutes “remain.”) Time for 10 questions</td>
<td>Next Mixed Review Quiz 10 questions</td>
<td>10 minutes for questions then 10 minutes to review annotated answers</td>
</tr>
<tr>
<td>One week later (Monday) (First post-test)</td>
<td>Mixed Review – 30 questions (next 3 “tests”)</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>
Proceed With Studying, Taking Weekly Inventory of Progress

• Reevaluate at end of first week. If schedule is not as accommodating as you anticipated, consider changes to your schedule OR the ambitiousness of your study plan
• Using AAFP mixed-type tests before beginning and weekly to see if performance seems to be improving
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Test-Taking Strategies

• How can we improve our response strategy in translating our knowledge into the exam’s response format…
ABFM Tips for Test-Taking

• Read the stem carefully
• Read every response option (cross out the wrong ones)
• Consider the tables and images carefully
• Answer only after considering all options
• If you do not know – guess!
• Go with the first thoughtful answer, unless you realize that you actually made a mistake
ABFM Tips for Test-Taking

• Attempt to determine whether general knowledge or patient-specific knowledge is being assessed
• DO NOT try to out-guess the item number
• Don’t read the answers first and try to find it in the questions. Knowledge is TOO vast
• Carefully manage exam time
• ALWAYS answer all items before exiting exam
TIP

• Both questions and answers have catch words; look carefully for them
  – “except”
  – “least likely”
  – “most likely”
  – “all but”
  – “never”
  – “always”
  – “all”
Six-year-old Hillary DeLong is brought to the emergency room by her mother. Half an hour ago she was bitten on her right arm by a neighbor’s dog. The recommended first step in emergency treatment is to:

A. Thoroughly cleanse the area with soap and water
B. Report the accident to the police
C. Encourage free bleeding
D. Cauterize the wound and suture it
TIP

• Avoid unfamiliar choices
• These are made up by good test writers
A pregnant woman at term with a 4-cm dilated cervix is found to have marginal placenta previa with mild bleeding. The appropriate management is:

A. Cesarean section
B. Rupture of the membrane
C. Internal podalic version
D. Use of Willett’s scalp traction forceps
TIP

• Analyze similar answers carefully
• If one merely restates the other, both are wrong
• If one is the opposite of the other, one is correct
• If answers look similar, but have different numbers, one is correct
The most appropriate treatment for erythrocytosis associated with polycythemia vera and a hemoglobin of 18.5 g/dL is:

A. Chlorambucil  
B. Phlebotomy to maintain hemoglobin at 14 g/dL in men and 12 g/dL in women  
C. Phlebotomy to maintain hemoglobin at 16 g/dL in men and 14 g/dL in women  
D. Radioactive phosphorus (³²P)

“If answers look similar, but have different numbers, one is correct”
“Similar Answers”

A 55-year-old woman has had pain and swelling of her left calf for 4 days while driving across the country. Physical examination shows slight swelling and tenderness of the left calf, but no other signs of deep venous thrombosis. She reports anaphylaxis after a previous injection of dye for intravenous pyelography. To promptly confirm the suspected deep venous thrombosis of the calf vein, you would now order:

A. Impedance plethysmography
B. Doppler ultrasound
C. Radionuclide venography using 99m Tc macroaggregated albumin
D. Radionuclide venography using 99m Tc-labeled erythrocytes

“*If one merely restates the other, both are wrong*”
TIP

• For answers with numbers or percentages
  – Pick mid-range levels
  – Pick values that look like the others
Implantation of the fertilized ovum usually occurs:

A. 2 to 3 days following ovulation
B. 6 to 7 days following ovulation
C. 10 to 12 days following ovulation
D. Exactly 14 days following ovulation
At the end of 28 weeks of gestation (7 lunar months), the fetus weighs (in grams):

A. 15
B. 600
C. 1000
D. 1800
TIP

• Choose answers that are consistent with good family medicine values…
“Values”

Three times in the past month, a 32-year-old woman has arrived unexpectedly for consultation after hours at her family physician’s office. She has also complained about the arrogance of the receptionist. The next time she arrives to see the doctor when he is working alone in the evening, he should:

A. Tell her family that there is nothing wrong with her and that she should see a psychiatrist
B. Point out that she needs careful, thorough evaluation and give her the next available appointment during scheduled office hours
C. Ask her to call the office the next morning
D. Drive her out of the office
“Values”

In your urban family practice office, you encounter a female patient with features of potential “AIDS.” Your best decision is to:

A. Immediately refer the patient to an AIDS clinic
B. Send the patient to a hospital emergency room
C. Provide concerned comprehensive and continuous care for the patient and the family
D. Politely ask the patient to see the other family physician located on the next street
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The Last Week Before the Exam

- Study Notes/Charts/“Fact Sheet”
- Plan to stop studying 48 hours before the exam
- Drive to the testing site before exam day
- Plan exam day
Plan Your Exam Day

• Food
  – Can put in locker for break

• Clothing
  – Comfort
  – Look good, feel good, score good
  – “Lucky clothing”

• Identification – 1 photo identification (government issued)
The Exam Begins

• Write down the seven equations on your “dry erase board”
  • Epidemiology Lecture (Home Study Course)
• Deep breaths; periodically pause and breathe
• Keep a positive attitude
• Read questions carefully
Sitting down to take each 25-question Exam…

• Quiet environment away from distractions and interruptions
• Open Book Resources
  – Organization referenced
  – Trusted Online/Text Resources
    • AFP
    • Journal of Family Practice
• Do not try to out-guess the item writers. Rely simply on your knowledge to respond to the selections
• Be optimistic
HOMEWORK – BEFORE Monday

✓ ABFM Website
  ✓ Candidate Information Book
  ✓ Computer Simulation of Examination
  ✓ Test Preparation Videos (if you like)
Exam Preparation Guidance

- 6 videos from the ABFM’s psychometrician
- [https://www.theabfm.org/moc/exampreparation.aspx](https://www.theabfm.org/moc/exampreparation.aspx)
HOMEWORK – BEFORE Monday

✓ ABFM Website
  ✓ Candidate Information Book
  ✓ Computer Simulation of Examination
  ✓ Test Preparation Videos (if you like)

✓ Set you study time on your calendar
In the End…

Plan to Study
Keep Calm
Be Confident
Summary

• Any high-quality, comprehensive study material can be used effectively
• Key ingredient in exam success is scheduling regular time to study
• Gaining points on the exam involves studying medical information, and there is a strong dose-response relationship
• Use the AAFP Board Review CME Questions as a pre- and post-test
• Do not try to out-guess the item writers. Rely simply on your knowledge to respond to the selections
We Are Done…