Surgical Problems in Primary Care

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Faculty Disclosure

• I have nothing to disclose
The closest I’ll get to being a surgeon
Road Map for Our Journey

- Gastrointestinal Problems/Acute Abdominal Pain
- Preop/periop/postop care, wounds, and infections
- Other surgical specialties:
  - Trauma surgery
  - Vascular surgery
  - Thoracic surgery
  - Otolaryngology/head and neck surgery
  - Urology
  - Neurosurgery
Top 30 High Yield Items
GASTROINTESTINAL PROBLEMS
ACUTE ABDOMINAL PAIN
Right Upper Quadrant Pain

- 42 year old woman with right upper quadrant pain
- Worse with eating
- Nausea, no vomiting
- No fever
- Exam:
  - Tender to palpation in the RUQ
  - Murphy’s sign: reproducible pain & halts breathing on inspiration on palpation at right costal margin at the midclavicular line
RUQ Ultrasound = Test of Choice

Cholangiocarcinoma
Cholangiocarcinoma

- Treatment: complete surgical resection
- Generally poor prognosis
  - Only 10% present at an early enough stage to consider curative resection
  - 5-year survival rate up to 40% for patients with completely resected tumors
Cholangiocarcinoma: Klatskin tumor

Klatskin tumor: Palliative stent placement

RIGHT LOWER QUADRANT PAIN
Case: 34 yo man with Right Lower Quadrant Pain in Urgent Care

• **History**
  – Periumbilical for 3 days, then right lower quadrant for 2 days

• **Physical exam**
  – Tenderness to palpation at McBurney’s point
McBurney’s Point (#1)

Case: 34 yo man with Right Lower Quadrant Pain in Urgent Care

• 5 day history
  – Periumbilical for 3 days, then right lower quadrant for 2 days

• Physical exam
  – Tenderness to palpation at McBurney’s point
  – (-) psoas, (+) obturator signs

• Labs
  – Normal
Physical Diagnosis

- McBurney’s point tenderness LR+ 3.4
- Peritonitis:
  - Rigidity LR+ 3.6
  - Abdominal wall tenderness LR+ 0.1

LR+ 10.0 = +45% probability
LR+ 0.1 = -45% probability

Labs

- no WBC cutoff has sufficient sensitivity or specificity to rule out appendicitis
- 25% of appys have normal WBC


Alvarado (MANTRELS) Score

- Migration (1 pt)
- Anorexia (1)
- Nausea and vomiting (1)
- Tenderness RLQ (2)
- Rebound tenderness (1)
- Elevation of temperature (1)
- Leukocytosis WBC > 10 (2)
- Shift to the left > 75% neutrophils (1)

Score ≥ 7 → LR+ 3.1
≤ 4 → LR+ 0.1

Better to help rule out appendicitis than to diagnose it

Appendicitis on CT

Imaging: ACR appropriateness criteria

• Classical presentation
  – CT abd/pelv w/ contrast (8 – usually appropriate)
  – CT abd/pelv w/o contrast (7 – usually appropriate)
  – RLQ US (6 – may be appropriate)

• Atypical presentation
  – CT abd/pelv w/ contrast (8 – usually appropriate)
  – X-ray abd, RLQ US, pelvic US, CT abd/pelv w/o contrast (6 – may be appropriate)

Bottom Line: Diagnosis of Appendicitis

• H&P and labs low sensitivity and specificity by themselves
• CT and MRI have better sensitivity/specificity compared to H&P and labs; ultrasound slightly less sensitive than CT/MRI (studies varied widely)
• No single lab or clinical test has superior sensitivity or specificity. Specific cutoffs could not be defined.
• Few studies evaluating clinical decision aids

Case: 34 yo man with Right Lower Quadrant Pain in Urgent Care

What is the most appropriate treatment for this patient?

A. Appendectomy
B. IV broad spectrum antibiotics
C. PO antibiotics
D. Watchful waiting

71% 12% 9% 9%
Case: 34 yo man with Right Lower Quadrant Pain in Urgent Care

- Appendectomy is historically the treatment of choice
Case: 34 yo man with Right Lower Quadrant Pain in Urgent Care

• Conservative treatment with antibiotics and watchful waiting?
  
  Historically, reports of cases treated successfully with antibiotics
  
    • 471 pts treated
    • Mortality 0.2%
    • Recurrent appendicitis 14.4%
Case: 34 yo man with Right Lower Quadrant Pain in Urgent Care

- Conservative treatment with antibiotics and watchful waiting?
  - Antibiotics not definitively “non-inferior” to surgery

Uncomplicated Appendicitis: Antibiotics vs. Surgery

• APPAC
  – Did not demonstrate “noninferiority” of antibiotics:
    27% in Antibiotics group had surgery within 1 year of presentation (cutoff for “noninferiority” ≤24%)
  – Surgery group had higher rate of complications
    20.5% vs. 7.0% in Antibiotics group

Uncomplicated Appendicitis: Antibiotics vs. Surgery Meta-analyses

• Higher rate of complications in surgery group
• Antibiotics group: 8.2% had surgery at 1 mo
  22.6% had recurrence at 1 yr
• No difference in hospital length of stay or incidence of complicated appendicitis


Non-operative treatment of uncomplicated appendicitis in children

• Preliminary reports of ongoing studies indicate:
  – Success rates 89.2% at 30 days
  – 75.7% at 1 year
  – Lower incidence of complicated appendicitis (2.7% vs. 12.3%)
  – Fewer disability days
  – Lower costs

Antibiotic treatment post appendectomy in children

• Extended-spectrum antibiotics not superior to narrow-spectrum antibiotics re: 30 day readmission rates of children

Appendicitis: Red Flags

• **Signs of rupture**
  
  – Change in condition:
    
    • Fever
    
    • Increased pain
    
    • Abdominal rigidity

  – Could see improvement in pain (think of a walled-off ruptured abscess) until peritonitis more fully develops
Appendicitis: Red Flags

• Higher proportion of patients with ruptured appendicitis at the extremes of age (early childhood, elderly)
  – May be due to lower incidence, because absolute rate of rupture is constant across ages

Meckel’s Diverticulum
Meckel’s Diverticulum: Rule of 2’s

• 2% prevalence
• 2 years of age at presentation
• 2 feet from the ileocecal junction
• 2 inches in length
• 2 types of common ectopic tissue
  – Gastric
  – Pancreatic
• 2% symptomatic
• 2 times more symptomatic in boys
LEFT LOWER QUADRANT PAIN
Diverticulitis

• Typical story:
  – Acute constant abdominal pain in LLQ
  – Fever
  – Can also see nausea, vomiting, constipation, diarrhea, “sympathetic cystitis” (dysuria and frequency caused by bladder irritation from inflamed colon)

• Typical physical exam findings:
  – LLQ tenderness, guarding, rebound
Which one of the following is NOT associated with complications of diverticulitis?

A. NSAIDs
B. Opioids
C. Corticosteroids
D. Recurrences of diverticulitis
Diverticulitis

• Risk factors: Smoking, obesity
• Negative risk factor: Increased physical activity
• Associated with complications:
  — Yes: NSAIDs, opioids, corticosteroids
  — No: Recurrences
• Recurrences are uncommon (13.3%) & not clustered

Diverticulitis

- **Diagnostics:**
  - CBC (leukocytosis)
  - Urinalysis
  - CT of abdomen and pelvis with contrast (US, MRI acceptable alternatives)

Diverticulitis

Treatment of diverticulitis with antibiotics has been shown to reduce which of the following?

A. Complications
B. Need for surgery
C. Recurrence
D. Median length of inpatient stay
E. None of the above
Uncomplicated Diverticulitis: Treatment

- **Stable, tolerating oral fluids: outpatient**
  
  Cochrane review – best available data do not support abx
  
  No effect on complications, need for surgery, recurrence, median length of inpatient stay
  
  1st episode – observation decreased hospital LOS, no effect on complications or recovery time

- **Older or ill pts, not tolerating fluids: admit**
  
  IV fluids, bowel rest/NPO, ? Antibiotics


Diverticulitis: Treatment

- Complicated (sepsis, perforation, abscess, fistula, obstruction)
  - stabilize, IV fluids, antibiotics, surgical consultation, percutaneous drainage, intraperitoneal lavage

- Broad-spectrum antibiotics to cover anaerobes, gram negative rods
Diverticulitis: Treatment

• **Indications for surgery**
  – Sepsis, acute peritonitis
  – No improvement with medical therapy, percutaneous drainage, or both
  – Trend toward minimally invasive surgical techniques (laparascopic preferred in American Society of Colon and Rectal Surgeons guideline)
  – Consider after complicated episode


AGA Recommendations: Diverticulitis

For
• Selective use of abx
• Colonoscopy after resolution to r/o CA
• Fiber
• ASA, seeds, nuts, popcorn OK
• Vigorous physical activity

Against
• Elective colon resection after 1st uncomplicated episode
• NSAIDs
• Mesalamine
• Rifaximin
• Probiotics

Which of the following is the most common cause of lower GI bleeding?

A. Hemorrhoids
B. Diverticulosis
C. Inflammatory bowel disease
D. Colon polyps
E. Ischemic bowel
## Causes of lower GI bleeding

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverticulosis</td>
<td>30</td>
</tr>
<tr>
<td>Hemorrhoids</td>
<td>14</td>
</tr>
<tr>
<td>Ischemic</td>
<td>12</td>
</tr>
<tr>
<td>Inflammatory Bowel Disease</td>
<td>9</td>
</tr>
<tr>
<td>Post-polypectomy</td>
<td>8</td>
</tr>
<tr>
<td>Colon cancer/polyps</td>
<td>6</td>
</tr>
<tr>
<td>Rectal ulcer</td>
<td>6</td>
</tr>
<tr>
<td>Vascular ectasia</td>
<td>3</td>
</tr>
<tr>
<td>Radiation colitis/proctitis</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
</tr>
</tbody>
</table>

Diverticulosis

• Typical story: abrupt onset of painless voluminous bleeding (arterial)
• Diagnostics: nuclear bleeding scan, angiography, colonoscopy
• Treatment: colonoscopy; may require surgery
Diverticulosis

Diverticulosis
Case: 53 yo woman with hemorrhoids
Hemorrhoids

Volvulus

- Midgut volvulus from malrotation of the gut
- Sigmoid volvulus
Midgut Volvulus:
Malrotation of the Gut

• Typical story:
  – 1\textsuperscript{st} month of life: \textbf{bilious vomiting}, feeding intolerance, sudden onset of abdominal pain, upper abdominal distention
  – Older children: More vague (chronic, unexplained) abdominal pain, irritability, anorexia, nausea/vomiting, failure to thrive

Shalaby MS, Kuti K, Walker G. Intestinal malrotation and volvulus in infants and children \textit{BMJ} 2013;347:f6949
Midgut Volvulus: Malrotation of the Gut
Midgut Volvulus: Malrotation of the Gut

• Diagnostics
  – Physical exam: normal, or subtle findings
  – Abdominal x-ray: “double bubble” sign (gastric and duodenal dilatation); lack gas in lower GI tract; pneumatosis coli (ominous sign)
  – UGI contrast w/ “bird’s beak”, spiral, corkscrew signs of duodenal obstruction
    • Sensitivity 96%, false negative rate 3-6%
  – Ultrasound scanning of the mesenteric vessels
    • Sensitivity 86.5%, specificity 75%, positive predictive value 42%, negative predictive value 96%
Midgut Volvulus: Malrotation of the Gut

- **Treatment: Ladd’s procedure**

  1. Untwist the intestine,
  2. Divide any adhesive bands,
  3. Widen the mesentery to result in the bowel being in a “safe” non-rotated position
Sigmoid Volvulus

• **Older patients**

• **Typical story – sx of bowel obstruction/ischemia:**
  – Abdominal pain, distention, inability to pass stool or flatus (obstipation), history of constipation
  – Vomiting may be late presenting feature

• **Diagnostics: abdominal x-ray shows distended sigmoid colon**

• **Treatment: sigmoidoscopy/rectal tube placement; resection & primary anastomosis**
Sigmoid Volvulus

EPIGASTRIC PAIN
Case: 34 yo man with epigastric pain

Ranson’s criteria at admission: GA LAW
• Glucose > 200
• AST > 250
• LDH > 350
• Age > 55
• WBC > 16

Ranson’s criteria at 48 hours: Cal(vin) & HOB(BE)S
• Calcium < 8
• Hematocrit drop > 10 % pts
• pO₂ < 60
• BUN incr > 5 after fluid hydration
• Base deficit > 4 (Base Excess < -4)
• Sequestration of fluid > 6 L
Grey Turner’s Sign

Fred H, van Dijk H. Images of Memorable Cases: Case 21 [Connexions Web site]. December 3, 2008. Available at: http://cnx.org/content/m14942/1.3/.
Cullen’s Sign

Fred H, van Dijk H. Images of Memorable Cases: Case 120 [Connexions Web site]. December 8, 2008. Available at: http://cnx.org/content/m14904/1.3/.
Pancreatitis

• Surgery indicated for infected necrosis
  – 80% of deaths from acute pancreatitis caused by infection of dead pancreatic tissue

• Pancreatic pseudocysts
  – Endoscopic drainage as effective as surgery, both more effective than percutaneous drainage

Peptic Ulcer Disease

- Surgery rarely needed
- Vagotomy
- Gastrectomy
Surgical Treatment for GERD

Nissen Fundoplication

(a) Before
(b) Sutures
(c) After
Surgical Treatment for GERD

• Unresponsive to aggressive antisecretory therapy (proton pump inhibitors)
• After surgery, some patients still require antisecretory therapy
• Potential obstructive complications of Nissen:
  – dysphagia
  – rectal flatulence
  – inability to belch or vomit
Right Inguinal Hernia
Inguinal Hernia

- Small bowel
- Internal inguinal ring
- External inguinal ring
- Spermatic cord
- Testes
16th Century Hernia Surgery
21st Century Hernia Surgery
Hernia Surgery

• **Indications for surgery**
  
  – **Emergent**
    
    • Strangulated hernias
      
      – Nonreducible bulge with pain, sometimes after heavy lifting
  
  – **Urgent**
    
    • Incarcerated hernias
Hernia Surgery

• **Indications for surgery**
  
  – **Elective**

  • Inguinal hernias – watchful waiting recommended

  • Femoral hernias – higher risk of strangulation

  • Ventral hernias

  • Umbilical

  – Normally resolve without intervention by age 5
Umbilical Hernia
Hernia Surgery: What about mesh?

- Fewer recurrences
  - 5-7% absolute risk reduction
- More long-term complications requiring surgical intervention
  - 3-5% absolute risk reduction


Case: 6 year old boy with severe abdominal pain in the Peds ED
Small Bowel Obstruction

Large Bowel Obstruction

A 48-year-old male presents with a 4-week history of rectal pain associated with minimal rectal bleeding. On examination there is a small tear of the anorectal mucosa at the 6 o’clock position.

The most appropriate initial treatment would be topical:

A. Botulinum toxin
B. Clobetasol (Temovate)
C. Capsaicin (Capzasin-HP, Zostrix)
D. Nitroglycerin
Anal Fissure
Anal Fissure

• Nonsurgical measures that are proven effective in relaxing the sphincter:
  – Topical nitroglycerin ointment
  – Diltiazem, nifedipine (topical preparations usually have to be compounded by a pharmacist)
  – Botulinum toxin injected into the internal sphincter
  – Corticosteroid creams may decrease the pain temporarily
• Surgery: internal sphincterotomy

Pilonidal Cyst

PREOP/PERIOP/POSTOP CARE WOUNDS INFECTIONS
Preoperative Workup

- **Source #1**: 2014 ACC/AHA Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery

Preoperative Workup


• Free App: Joshua Steinberg
Preoperative Workup

• No routine/indiscriminate testing
• Base testing on H&P, perioperative cardiac risk assessment, clinical judgment
• Not required for cataract surgery
Preoperative Workup

• EKG:
  – Signs/symptoms of cardiovascular disease
  – Consider in elevated-risk procedure, patients with cardiac risk factors
  – Not needed for low-risk procedures
Preoperative Workup

Noncardiac Surgery Risk of Cardiac Death or Nonfatal MI:

- Elevated ($\geq 1\%$)
- Low ($< 1\%$)
  - Ambulatory, breast, endoscopic, superficial, cataract
Preoperative Workup
Revised Cardiac Risk Index (RCRI)

• Risk factors:
  – Cerebrovascular disease
  – Congestive heart failure
  – Creatinine level >2.0 mg/dL
  – Diabetes mellitus requiring insulin
  – Ischemic cardiac disease
  – *Suprainguinal vascular surgery, intrathoracic surgery, or intra-abdominal surgery

<table>
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<th>RF’s</th>
<th>% Risk major cardiac event (95% CI)</th>
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<tbody>
<tr>
<td>0</td>
<td>0.4 (0.05 to 1.5)</td>
</tr>
<tr>
<td>1</td>
<td>0.9 (0.3 to 2.1)</td>
</tr>
<tr>
<td>2</td>
<td>6.6 (3.9 to 10.3)</td>
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<tr>
<td>≥3</td>
<td>≥11 (5.8 to 18.4)</td>
</tr>
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</table>
Preoperative Workup

Stress Tests

• Elevated cardiac risk and poor or unknown functional capacity

• Only if a positive test would change management
Preoperative Workup

CXR:
- New or unstable cardiopulmonary signs or symptoms
- Increased risk of postop pulmonary complications if results would change management

UA:
- Urologic procedures
- Implantation of foreign material (e.g., heart valve or joint replacement)
Preoperative Workup

BMP:
- At risk of electrolyte abnormalities or renal impairment (based on history, medications)

Glucose, A1c:
- Signs/symptoms or very high risk of undiagnosed diabetes, if abnormal result would change periop management

CBC:
- At risk for anemia
- Significant blood loss anticipated

Coags:
- On anticoagulants
- History of abnormal bleeding
- At risk for coagulopathy (e.g., liver disease)
Perioperative Areas of Focus

• Anticoagulation management
• Venous thromboembolism (VTE) prevention
• Beta-blocker therapy
• Antibiotic prophylaxis
• Chronic disease
Anticoagulation

• Stop ASA 7-10 days (3 days?) pre-op (unless benefit preventing ischemia outweighs bleeding risk), restart 8-10 days post-op
• Stop warfarin 4-5 days pre-op
• Stop heparin
  – LMWH 12 hrs pre-op
  – UFH
    • IV 4-6 hrs pre-op
    • SQ 12 hrs pre-op

Venous Thromboembolism

• Assess risk
• Check renal function
• Consider prophylaxis
• Bridge therapy (treat w/ LMWH after holding warfarin) for patients with mechanical heart valve, h/o VTE
BRIDGE trial: Do patients with atrial fibrillation on warfarin need bridge therapy with LMWH when warfarin is held pre-op?

- **Placebo was noninferior to LMWH with respect to preventing atrial thromboembolism**
- More bleeding complications in LMWH group
- Excluded patients: stroke, mechanical valves
- Relatively low risk population (only 13% high-risk by CHADS2)

In patients undergoing noncardiac surgery, which of the following outcomes does perioperative beta blockade decrease?

A. Nonfatal MI
B. Stroke
C. Death
D. Hypotension
E. Bradycardia
In patients undergoing noncardiac surgery, which of the following outcomes does perioperative beta blockade decrease?

<table>
<thead>
<tr>
<th>Outcome</th>
<th>RR</th>
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<tbody>
<tr>
<td>A. Nonfatal MI</td>
<td>0.69</td>
</tr>
<tr>
<td>B. Stroke</td>
<td>1.76</td>
</tr>
<tr>
<td>C. Death</td>
<td>1.30*</td>
</tr>
<tr>
<td>D. Hypotension</td>
<td>1.47</td>
</tr>
<tr>
<td>E. Bradycardia</td>
<td>2.61</td>
</tr>
</tbody>
</table>

**INCREASED risk**

*excluding DECREASE trial data

Beta Blockade

• Stay on them if already on them
• Modify or discontinue based on clinical picture
• Assess risk (Revised Cardiac Risk Index)
• If administering perioperative beta blockers:
  – Start well in advance of surgery (2-7 d preop)
  – Do not start on day of surgery
Perioperative Beta blockade? Not routinely in pts w/ uncomplicated HTN

- Increased incidence of CV death, nonfatal ischemic stroke, nonfatal MI
- NNH 140 for pts > 70 yo
  142 for men
  97 for pts undergoing emergency surgery

Perioperative Diabetes Management

• Best if A1c < 7

• Tight glycemic control controversial
  – 140-180 may be adequate
Statins

• Stay on them if already on them
• Consider initiating in selected high-risk patients
Postoperative Care

• Monitor cardiovascular, pulmonary, fluid status
• Pain management
• Complications
Postop fever

• Non-evidence based workup:
  5 (or 6) W’s
  – Wind – atelectasis
  – Water – UTI
  – Wound – wound infection
  – Walk (“Wegs”) – deep venous thrombosis
  – Wonder drug – drug fever
  – Winnebagos (or upside down “W”) – Mastitis
Postop fever

• Recommendations for Evaluation of Fever Within 72 Hours of Surgery

Postop fever

• Recommendations for Evaluation of Fever Within 72 Hours of Surgery
  – CXR, UA, UCx not mandatory if fever is only indication
  – UA, UCx in febrile patients w/ indwelling catheter > 72 hrs
  – High level of suspicion for VTE in at-risk patients
  – Open & culture incisions w/ signs of infection
Care of Surgical Wound

• Sterile dressing 24-48 hrs
• Minor surgical wounds can be allowed to get wet in the first 48 hours without increasing risk of infection
• Extremity wounds may be covered with a clear film dressing (reduced rate of blistering, exudates)
Case: 23 yo man with swelling, redness, pain, pus from thigh
I & D of Skin Abscesses

• **Antibiotics after I & D?**
  
  – I & D alone is usually sufficient for uncomplicated abscesses
  
  – Indications: Large abscess > 10 cm, cellulitis, immunocompromised, multiple or recurrent abscesses, extremes of age, failure of I&D alone

I & D of Skin Abscesses

- Slight benefit using trimethoprim-sulfamethoxazole after I&D of uncomplicated abscesses
  - Increases cure rate by 7% (NNT = 14)
  - Already high cure rates in control group 80-85%

Time Out
OTHER SURGICAL SPECIALTIES:

TRAUMA SURGERY
VASCULAR SURGERY
THORACIC SURGERY
OTOLARYNGOLOGY/HEAD AND NECK SURGERY
UROLOGY
NEUROSURGERY
TRAUMA SURGERY
Primary Survey: ABCDE

• Airway
• Breathing
• Circulation
• Disability
• Exposure/Environment
Secondary Survey

• Vital Signs
• Repeat Primary Survey
• Review patient’s history
• Physical exam: “Fingers or tubes in every orifice”
# Shock Classification

<table>
<thead>
<tr>
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<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
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<tr>
<td>Blood Loss (mL)</td>
<td>Up to 750</td>
<td>750-1500</td>
<td>1500-2000</td>
<td>&gt;2000</td>
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<td>Blood Loss (% blood</td>
<td>Up to 15%</td>
<td>15-30%</td>
<td>30-40%</td>
<td>&gt;40%</td>
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<tr>
<td>volume)</td>
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</tr>
<tr>
<td>Pulse Rate</td>
<td>&lt; 100</td>
<td>&gt;100</td>
<td>&gt;120</td>
<td>&gt;140</td>
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<td>Blood Pressure</td>
<td>Normal</td>
<td>Normal</td>
<td>Decreased</td>
<td>Decreased</td>
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<tr>
<td>Pulse Pressure (mm Hg)</td>
<td>Normal or increased</td>
<td>Decreased</td>
<td>Decreased</td>
<td>Decreased</td>
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<td>Respiratory Rate</td>
<td>14-20</td>
<td>20-30</td>
<td>30-40</td>
<td>&gt;35</td>
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<tr>
<td>Urine Output (mL/h)</td>
<td>&gt;30</td>
<td>20-30</td>
<td>5-15</td>
<td>Negligible</td>
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<tr>
<td>CNS/Mental Status</td>
<td>Slightly anxious</td>
<td>Mildly anxious</td>
<td>Anxious, confused</td>
<td>Confused, lethargic</td>
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<tr>
<td>Fluid Replacement (3:1</td>
<td>Crystalloid</td>
<td>Crystalloid</td>
<td>Crystalloid and</td>
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<tr>
<td>rule)</td>
<td></td>
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<td>blood</td>
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</tr>
</tbody>
</table>
Signs of Basilar Skull Fracture

• Periorbital ecchymosis (raccoon eyes)
• Mastoid ecchymosis (Battle’s sign)
• Hemotympanum
Raccoon Eyes
(Periorbital Ecchymoses)
Clearing C-spines: NEXUS Criteria

When a significant mechanism of injury is present, a cervical spine is stable if:

• No posterior midline cervical tenderness
• No evidence of intoxication
• Patient is alert and oriented to person, place, time, and event
• No focal neurological deficit
• No painful distracting injuries (e.g., long bone fracture)
Clearing C-spines: Canadian C-Spine Rule

- Only applies to GCS=15 and stable trauma
- Not applicable for:
  - GCS<15
  - Non-trauma
  - Hemodynamically unstable
  - Age <16
  - Acute paralysis
  - Previous spinal disease or surgery
Clearing C-spines: Canadian C-Spine Rule

X-ray if ANY of the following High Risk factors:

• Age >65 years

• Dangerous mechanism
  – fall from elevation ≥ 3 feet / 5 stairs
  – axial load to head, e.g. diving
  – MVC high speed (>100km/hr), rollover, ejection
  – motorized recreational vehicles
  – bicycle struck or collision

• Parasthesia in extremities
Clearing C-spines: Canadian C-Spine Rule

If ANY Low-Risk factor present, assess clinically with ROM testing (If all NO: x-ray)

• **Simple rear-end MVC which DOES NOT include the following**
  – pushed into oncoming traffic
  – hit by bus / large truck
  – rollover
  – hit by high speed vehicle

• **Sitting position in ED**

• **Ambulatory at anytime**

• **Delayed onset of neck pain**

• **Absence of midline C-spine tenderness**
Clearing C-spines:
 Canadian C-Spine Rule

• (If at least 1 low-risk factor present) Able to actively rotate neck 45 degrees left and right?
  – If able then NO x-ray needed
  – If unable, X-ray.
Clearing C-spines: Which is Better?

- Sensitivity: Canadian 99.4% vs. NEXUS 90.7%
- Specificity: Canadian 45.1% vs. NEXUS 36.8%

Stiell IG, Clement CM, McKnight RD et al. The Canadian C-Spine Rule versus the NEXUS Low-Risk Criteria in Patients with Trauma. N Engl J Med 2003; 349:2510-2518
C-Spine Films: Lateral

C-Spine Films:
Odontoid

C-Spine Films: Flexion & Extension

VASCULAR SURGERY
Peripheral Vascular Disease
Peripheral Vascular Disease

• Intermittent claudication (many may not have classic symptoms)
• Late symptoms: rest pain, ulcers, gangrene
• Risk Factors = CAD, esp. smoking
• Diagnosis: ABI, PE – pulses, bruits, hair loss (watering the plants), poor nail growth, dependent rubor, ulcers
Peripheral Vascular Disease

- Treatment: modify risk factors, exercise, meds (ASA, clopidogrel, cilostazol)
- Ticagrelor no better than clopidogrel

Peripheral Vascular Disease

- Surgery: not enough evidence to favor bypass surgery over angioplasty

Medical vs. Surgical Management: Asymptomatic Carotid Artery Stenosis

• No evidence clearly favoring:
  – Carotid endarterectomy vs. carotid artery stenting
  – Surgery vs. medical management

• Low rates of ipsilateral stroke in patients managed medically
  – 1.68% all studies, 1.18% newer studies

THORACIC SURGERY
Aortic Aneurysm
Ruptured Aortic Aneurysm

USPSTF Recommendation for Ultrasound Screening for AAA

• One time screening in men aged 65-75 who have ever smoked (B recommendation)
• No recommendation for or against screening in men aged 65-75 who have never smoked (C recommendation)
• Recommends against routine screening in women (D recommendation)
Coronary Artery Disease

Indications for CABG

• Disease in left main, or all 3 coronary vessels (L Cx, LAD, RAD)
• Diffuse disease not amenable to PCI
• Severe CHF, diabetes
Valvular Surgery: Stenotic vs. Regurgitant Lesions

• Stenotic:
  – can be monitored until symptoms appear

• Regurgitant:
  – may require surgery even if asymptomatic
  – carefully monitor LV function by echo
Aortic Stenosis

• Classical presentation: asymptomatic, then angina, exertional syncope, dyspnea

• After symptoms develop
  – Average survival 2-3 years
  – 75% die w/in 3 yrs w/out valve replacement
Aortic Stenosis: Workup

- Echocardiogram
  - mild/moderate AS – q2-5 yrs
  - severe AS – annual (to check LV function)
    - Critical stenosis: Valve area < 0.8 cm² or
      gradient > 50 mm Hg
- CXR, EKG
- CT (thoracic – ascending aortic aneurysm)
- NO stress testing
Transcatheter vs. Surgical Aortic Valve Replacement

• Clear mortality benefit in high-risk pts w/ severe aortic stenosis (NNT = 20 to avoid 1 death at 1 year)

• Similar benefit in intermediate-risk patients at 2 years


Mitral Stenosis

- Symptoms mimic CHF
- Atrial fibrillation, pregnancy bring out symptoms
Mitral Stenosis: Treatment

- Mild disease: diuretics
- Atrial fibrillation: rate control
- Surgery: > mild symptoms, or pulmonary hypertension
  - Balloon valvotomy, open commissurotomy, MV reconstruction, MV replacement
Aortic Regurgitation

• Causes: endocarditis, rheumatic fever, collagen vascular disease, aortic dissection, syphilis

• Typical presentation:
  Initially asymptomatic, then subtle initial signs (decreased functional capacity or fatigue), then sx of L-sided heart failure
Aortic Regurgitation: Treatment

- AV replacement even in asymptomatic patients
  - before EF < 55 % or end systolic dimension reaches 55 mm
- Severe AR + normal LV function:
  - afterload reduction w/ vasodilators, especially nifedipine, can delay surgery
Mitral Regurgitation

• Causes: infectious endocarditis, mitral valve prolapse, rheumatic fever

• Surgery:
  – if > mild sx
  – If asymptomatic but EF < 60%, or end-systolic dimension approaches 45 mm
  – Usually MV repair preferred over replacement
What about Mitral Valve Prolapse?

• Typical symptoms: chest pain, dyspnea, anxiety, palpitations

• *Treatment: reassurance – no need for surgery*
OTOLARYNGOLOGY
HEAD AND NECK SURGERY
Otitis Media with Effusion


Otitis Media with Effusion

- Candidates for surgery
  - persistent hearing loss or other signs and symptoms
  - recurrent or persistent OME in at-risk children regardless of hearing status
  - structural damage to the tympanic membrane or middle ear
- Shared decision-making re: surgery
- Tympanostomy tube insertion is the preferred initial procedure (+/- adenoidectomy in children ≥ 4 yo)

Indications for Functional Endoscopic Sinus Surgery (FESS)

- Failed medical therapy for chronic rhinosinusitis
- Nasal polyps

Epistaxis

• Pressure
• Silver nitrate cauterization (only 1 side of nasal septum at a time)
• Packing
  – Anterior: F/U w/ ENT w/in 2-3 days, avoid ASA & NSAIDs but can continue warfarin
  – Posterior: Admit

For which of the following patients with recurrent pharyngitis/tonsillitis is tonsillectomy indicated?

A. History of peritonsillar abscess
B. 2 episodes in each of the last 3 years
C. 4 episodes in each of the last 2 years
D. 7 episodes in the past year
E. Allergies to or intolerance of multiple antibiotics
Tonsillectomy in Recurrent Pharyngitis/Tonsillitis: Paradise Criteria

• At least 7 episodes in past year, or 5/yr x 2yrs, or 3/yr x 3 yrs
  – Each episode: sore throat + one of the following:
    T>38.3, cervical adenopathy, tonsillar exudate, Group A beta hemolytic strep test +
• Episodes of strep throat properly treated with antibiotics
• Each episode documented OR subsequent observance by the clinician of 2 episodes
• Modifying factors
  – allergies to or intolerance of multiple antibiotics, PFAPA (periodic fever, aphthous stomatitis, pharyngitis, and adenitis), history of peritonsillar abscess

Peritonsillar Abscess

UROLOGY
Urinary Retention

Urinary Retention: Treatment with Catheterization

- Look out for: **hematuria, hypotension, postobstructive diuresis**

- **How long to leave in?**
  - **Unknown** in pts with known or suspected BPH
  - **Alpha blocker at time of catheter insertion x 3 d.** can increase chance of returning to normal voiding

- Urinary retention from BPH: **at least one trial of voiding without catheter** before considering surgical intervention

- Long-term treatment with **5-alpha reductase inhibitors** can prevent acute urinary retention in men with BPH
Kidney and Ureter Stones: Indications for Surgery

- No passage after reasonable period of time
- Constant pain
- Hydronephrosis
- Damaging kidney tissue
- Constant bleeding
- Ongoing urinary tract infection
- Too large to pass on its own or stuck
- Growing larger

Kidney and Ureter Stones: Treatment

- Extracorporeal shock wave lithotripsy (ESWL)
- Percutaneous nephrolithotomy
  - Large stone
  - Location does not allow effective use of ESWL
- Ureteroscopic Stone Removal
Case: 53 year old man with gross hematuria
Renal Cell Carcinoma: Risk Factors

- Men
- African Americans
- Exposure to household & industrial chemicals
- Hypertension
- Family history of RCC
- Occupational exposure to cadmium
- Dialysis patients w/ acquired cystic disease of the kidney (30x)
- Hysterectomy (2x)

Renal Cell Carcinoma: Diagnosis

- Classic triad in 10-15%: hematuria, flank pain, abdominal mass
- Often diagnosed incidentally at asymptomatic stage
- Imaging
  - Sensitivities: CT 94%, ultrasound 79%
  - MRI better than CT at distinguishing benign lesions
Renal Cell Carcinoma

• Treatment
  – Nephrectomy
  – Doesn’t respond well to XRT or chemo
Incidental Adrenal Mass

• Depends on size
  – Refer >6 cm for surgery (high incidence of cancer)
Incidental Adrenal Mass

->3 cm < 6 cm:
  • MRI, additional endocrine eval

<3 cm:
  • Look for Cushing’s syndrome, pheochromocytoma, hyperaldosteronism (HTN, low K, high Na)
  • No signs/symptoms and labs normal: radiographic surveillance at 3 mos, then q6mo x 2 yr
  • Anything abnormal: refer
Bladder Carcinoma

• Demographics: older Caucasian male smokers
  – > 60 years old (80%)
  – men 3x > women
  – Caucasians > African Americans
  – mortality higher in African Americans because of delayed diagnosis

Bladder Carcinoma

• Risk factors:
  – smoking 4-7x > nonsmokers
  – Occupational exposure (aromatic amines – chemical dyes and pharmaceuticals; gas treatment plants)
    – *Schistosoma haematobium*
  – Radiation treatment to pelvis
  – Cytoxan
  – Arsenic in well water
  – Chronic infection

Bladder Carcinoma: Presentation

• Painless hematuria
• “Irritative” symptoms (dysuria, frequency)
• Urinary obstructive symptoms
• Symptoms of advanced disease
  – lower extremity edema, renal failure, suprapubic palpable mass
Bladder Carcinoma: Diagnostics

• Urine cytology
  – 66-79% sensitive, 95-100% specific
• Cystoscopy, bladder wash cytology
• Evaluate upper urinary tract – CT preferred
• Metastatic workup
  – CBC, chemistries (alkaline phosphatase, LFT’s), CXR, CT or MRI, Bone scan if alkaline phosphatase is elevated or other symptoms suggest bone metastases
Bladder Carcinoma

• **Treatment:**
  – **Non-muscle invasive:** transurethral resection +/- intravesical chemotherapy (mitomycin) or immunotherapy (intravesical BCG)
  – **Muscle-invasive:** radical cystectomy +/- chemotherapy
  – **Metastatic:** chemotherapy
NEUROSURGERY
Case: 30 year old man with progressive sciatica
Herniated Disc

When do patients need surgery for low back pain?

- Severe or progressive neurologic deficits
- Serious underlying conditions are suspected
- Persistent low back pain and signs or symptoms of radiculopathy or spinal stenosis
  - Only if they are potential candidates for surgery or epidural steroid injection (for suspected radiculopathy)
- MRI (preferred) or CT

Herniated Disc

- Disc herniation
- Decompressive laminectomy
- Post-operative scar
- Spinal canal
Which patients need neuroimaging (noncontrast head CT) for headaches?

• Emergent:
  – headache and **new abnormal neurologic findings** (e.g., focal deficit, altered mental status, altered cognitive function)
  – **new sudden-onset severe** headache (thunderclap)
  – **HIV-positive patients** with a new type of headache (consider)

• Urgent:
  – Patients > **50 years old** w/ new type of headache but normal neuro exam

Which patients need neuroimaging for headaches?

• Atypical headaches and change in headache pattern (CT)
• Unexplained focal neurological findings and recurrent headache (MRI)
• Unusual precipitants
  – Exertion, cough, Valsalva (MRI)
  – Standing (MRI w/ gadolinium)
  – Lying down (CT, MRI)
• Late onset (> age 50), no other red flags (CT)

Which patients need lumbar puncture for headaches?

- Sudden-onset, severe headache + negative noncontrast head CT (rule out subarachnoid hemorrhage)

- Who needs neuroimaging before LP?
  
  Adult patients with headache and signs of increased intracranial pressure
  
  - papilledema, absent venous pulsations on funduscopic examination, altered mental status, focal neurologic deficits, signs of meningeal irritation
Can this patient w/ HA go home?

• Patients with a sudden-onset, severe headache who have
  – negative findings on a head CT
  – normal opening pressure
  – negative CSF findings
do not need emergent angiography
can be discharged from the ED with follow-up
When do you order head CT in patient with mild traumatic brain injury (TBI)?

With loss of consciousness or posttraumatic amnesia only if one or more of the following is present:

- headache
- vomiting
- age greater than 60 years
- drug or alcohol intoxication
- short-term memory deficits
- physical evidence of trauma above the clavicle
- posttraumatic seizure
- Glasgow Coma Scale (GCS) score less than 15
- focal neurologic deficit
- coagulopathy

When do you order head CT in patient with mild traumatic brain injury (TBI)?

Consider in patients with no loss of consciousness or posttraumatic amnesia if there is

- age 65+ yrs
- GCS < 15
- focal neurologic deficit
- vomiting
- severe headache
- physical signs of a basilar skull fracture
- coagulopathy
- dangerous mechanism of injury
  - ejection from a motor vehicle
  - a pedestrian struck
  - fall from a height of more than 3 feet or 5 stairs
Can this patient w/ mild TBI go home?

• Isolated mild TBI + negative head CT
  – May be safely discharged from the ED
  – However, inadequate data to include patients
    • with a bleeding disorder
    • receiving anticoagulation therapy or antiplatelet therapy; or
    • had previous neurosurgical procedure

• Inform about postconcussive symptoms
Phew!

• Questions?

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