Acute Care Essentials for the Primary Care Provider
(Cancer Challenges, ECG, Diagnosis at a Glance and Medical Literature Review)

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Maine Medical Center
Tufts University School of Medicine

Disclosures:
I have no financial interests or relationships to disclose.
Cancer Patient Challenges for the Front Line Clinician

Our Time Together

• We will not be reviewing more frequent and likely acute conditions associated with cancer

E.g.
• sepsis
• pulmonary embolism
• coagulopathies
Our Time Together

• We will be reviewing specific acute oncology related conditions that have relevance to Front Line Providers

Our Time Together

Topics to be reviewed:

• Tumor Lysis Syndrome
  • Leukostasis
• Neutropenic Enterocolitis
• Immune Checkpoint Inhibitors
Basic Realities for Front Line Clinicians

- We will not be directly treating the malignancy
- We will be treating the complications of malignancy and its treatment
- We will be immediately involving the patient’s oncology service

A Brief Review of an Illness Script

Short List of Diagnostic Possibilities

<table>
<thead>
<tr>
<th>Top Clues &amp; Cues</th>
<th>Most Likely</th>
<th>Can’t Miss DX</th>
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### Illness Script Chest Pain

#### Possible Diagnoses

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<th>ACS</th>
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CASE 1

A 67-year old man presents with multiple nonspecific complaints

- Nausea with vomiting
- Diarrhea
- Anorexia
- Lethargy
- Muscle cramping

“I think I have the flu.”
CASE 1
Clues and Cues

- He shares that he recently was diagnosed as having acute lymphoblastic leukemia
- He received his first course of cytotoxic therapy earlier in the week
- He is tachycardic, afebrile and appears pale and unwell, but his exam is otherwise unrevealing

Case 1
Illness Script:

Short List of Diagnostic Possibilities

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# Case 1

## Illness Script

**Short List of Diagnostic Possibilities**

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<th>Gastro-enteritis</th>
<th>Drug Reaction</th>
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CASE 1
Test Results

- CBC:
  - H/H 8/24
  - Plts 58k
  - WBC 95k (90% lymphoblasts, ANC 6k)

- [Creatinine] 3.1mg/dL (nl 0.6-1.3)
- [K] 7.5mEq/L (nl 3.7-5.2)
- [Ca] 7.3mg/dL (nl 8.8-10.1)
- [Uric Acid] 14mg/dL (nl 3.4-7.2)
- [Phosphate] 7mg/dL (nl 2.7-4.6)
# CASE 1
## Illness Script

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George Higgins, MD
Acute Care Essentials
CASE 1
Illness Script

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CASE 1
Acute Care Differential

- Most Likely: TLS
- #1 Can't Miss: TLS
- They match!
- Start acting!
Tumor Lysis Syndrome

- **An oncologic emergency**

- Caused by massive tumor cell lysis following the initiation of cytotoxic therapy
  - Most commonly Burkitt’s Lymphoma and ALL
  - Can occur spontaneously prior to treatment

- Release of potassium, phosphate and nucleic acids (which are metabolized to uric acid)

Tumor Lysis Syndrome: High Risk Factors

- **Hematologic malignancies**
  - Lymphomas and leukemias

- **Large tumor burden**
  - Bulky disease > 10cm
  - WBC >50k (ALL) or >100k (AML)

- Baseline elevation of LDH or Uric Acid

- Baseline renal impairment
Tumor Lysis Syndrome: A Kidney Destroyer

- **Hyperuricemia:**
  - Renal tubular deposition and acute renal injury

- **Hyperphosphatemia:**
  - Binds with calcium to deposit in the kidneys
  - Can lead to hypocalcemia

- **Xanthinuria:**
  - Renal tubular deposition and acute renal injury

- **Symptoms and signs are nonspecific**

A Major Cause of Severe Hyperkalemia

- **Tissue breakdown:**
  - Rhabdomyolysis
  - Crush injury
  - Tumor lysis syndrome
CASE 1
Treatment Threshold

- Are you above the treatment threshold for this patient’s...

- Hyperkalemia: **YES**
  - Potentially most life threatening

- Hyperuricemia: **YES**

- Hyperphosphatemia: **YES**
  - Correct prior to replacing calcium in order to decrease the risk of Ca/Phos precipitates

- Hypocalcemia: Probably, not immediately

Emergent Correction of Hyperkalemia

- Usually for [K+] \(\geq\) 7mEq/L in chronic conditions, but possibly lower in acute conditions

- Systemic symptoms/signs:
  - Weakness
  - Paralysis

- Cardiac (ECG) abnormalities
CASE 1
Test Results

Acute Management of Hyperkalemia

- IV Calcium gluconate
  - Directly antagonizes the membrane actions of hyperkalemia
    - Does not redistribute or remove K+
  - Effect is rapid (minutes), but sort-lived
  - Never used as monotherapy
Acute Management of Hyperkalemia

IV Calcium

☐ I suggest always using calcium gluconate rather than calcium chloride
  ▪ Immediate therapy usually requires peripheral IV

☐ 1 amp (10mL) 10% calcium gluconate slow IV push

Acute Management of Hyperkalemia

☐ Redistribution therapies
  ▪ IV Insulin + Glucose
  ▪ IV Sodium Bicarbonate
  ▪ Inhaled Beta-2 Adrenergic Agonists

☐ Removal therapies
  ▪ Cation Exchange Resins
    ☐ Kayexalate associated with an increase incidence of intestinal ischemia/thrombosis
  ▪ Dialysis
Acute Management of Hyperuricemia

- **IV hydration**

- **Rasburicase**
  - Degrades uric acid to water-soluble allantoin
  - Effective and well tolerated
  - 0.2mg/kg IV daily of BID

- **Dialysis**

- Urine alkalinization therapy no longer recommended

Acute Management of Hyperphosphatemia

- **IV hydration**

- **Phosphate Binders**
  - Calcium carbonate
    - Tums, Rolaid, Caltrate
  - Calcium acetate
    - Phoslo, Phoslyra
    - 2-3 tabs with each meal

- **Dialysis**
TLS Teaching Points

❑ Add TLS to your illness script in the right patient scenario
  ▪ Hematologic malignancy
  ▪ Large pretreatment tumor burden
  ▪ Recent institution of chemotherapy
  ▪ Multiple non-specific complaints

❑ Keep your Test Zone wide
  ▪ Including less-common electrolytes

❑ Expect your treatment threshold to be low and multi-tasked

CASE 2
CASE 2
Clues and Cues

❑ A 56 year old man is brought in by his wife

❑ He has been losing weight, feeling progressively fatigued and experiencing night sweats for the past month

❑ Over the past two days he’s been a bit confused and unsteady when he attempts to ambulate

❑ This morning he developed shortness of breath

CASE 2
Clues and Cues

❑ He is anxious, pale, unwell appearing and demonstrates moderate respiratory distress

❑ T39.2 HR115 RR22 BP108/82 O2sat RA 87%

❑ PE
  ▪ Mildly confused
  ▪ Scattered ecchymoses
  ▪ Bilateral rhonchi and rales
  ▪ Unsteady gait
## Case 2

**Illness Script:**

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- Fever
- Night Sweats
- Weight Loss
- SOB/Hypoxia
- Confused
CASE 2
Illness Script

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CASE 2
Test Results

- H/H 7/21
- Platelet count 12k
- WBC 850k, 90% blasts
- Creatinine 2.4/BUN 48
CASE 2
Test Results

CASE 2
Test Results
## CASE 2
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CASE 2
Emergent Differential

- Most Likely: Leukostasis secondary to AML blast crisis with pulmonary and neurologic compromise

- #1 Can’t Miss: Overwhelming sepsis from multifocal pneumonia

- Enough already!

- Start acting!
Hyperleukocytosis

- A laboratory abnormality
- A total leukocyte count of $\geq 50$ to $100k$
- Most commonly associated with AML and CML

Leukostasis
(Symptomatic Hyperleukocytosis)

- A medical emergency!
- Most commonly associated with AML and CML + blast crisis
- Diagnosed empirically in patients with blast crisis + neurologic or respiratory signs/symptoms
Leukostasis
(Symptomatic Hyperleukocytosis)

Pathophysiology

- Blast crisis often results in significant hyperleukocytosis: e.g. 600+k
- Blasts are relatively rigid cells
- Blood viscosity increases
- Microvascular plugging occurs
- Hypoxia generates cytokine release
- Endothelial damage results

Pulmonary manifestations
- Dyspnea and hypoxia
- Interstitial and alveolar infiltrates on imaging studies

Neurologic manifestation
- Every and any neurologic signs and symptoms have been described
  - E.g. vision change, headache, confusion, ataxia, coma
- Increased risk for ICH
Leukostasis
(Symptomatic Hyperleukocytosis)

- Systemic manifestations
  - A majority of patients are febrile
    - Cultures and broad empiric antibiotic therapy for all
  - Acute coronary syndrome
  - Acute kidney injury
  - Bowel infarction
  - Limb ischemia
  - Priapism

CASE 2
Treatment Threshold

- Are you above the treatment threshold for this patient’s...
  - Leukostasis: YES
    - Potentially most life threatening
  - Possible pneumonia with sepsis: YES
Leukostasis
(Symptomatic Hyperleukocytosis)

- Make the diagnosis empirically

- Don’t forget basic interventions to prevent tumor lysis syndrome: e.g. aggressive hydration

- Always culture and cover with broad spectrum antibiotics

- Emergent hematology consultation

Leukostasis
(Symptomatic Hyperleukocytosis)

- Induction chemotherapy targeted to the type of leukemia: most important

- Leukapheresis: controversial
  - Perhaps of greatest value in patients with very high blast counts and acute pulmonary/neurologic compromise

- Avoid RBC transfusions unless absolutely necessary
  - Increases blood viscosity
Leukostasis
Teaching Points

❑ Make the diagnosis empirically in the appropriate clinical context:
  ▪ AML or CML with blast crisis and pulmonary, neurologic and/or systemic signs and symptoms

❑ Always treat for presumed sepsis

❑ Always initiate anti-TLS early

❑ Immediately consult with your hematologist to initiate timely chemotherapy

CASE 3
CASE 3
Clues and Cues

❑ 38 year old woman presents with right lower quadrant abdominal pain
  • Progressive over 12 hours, now severe

❑ She reports associated nausea, vomiting and diarrhea

❑ Had documented fever at home earlier today

❑ No prior abdominal surgeries

❑ No recent travel or suspicious food ingestion

❑ No recent antibiotics

CASE 3
Clues and Cues

❑ Diagnosed with AML 3 weeks ago

❑ Induction chemotherapy started then

❑ T38.9  HR110  RR 14  O2Sat RA 97%

❑ Abdominal distention

❑ RLQ abdominal tenderness
**Case 3**  
**Illness Script:**

**Short List of Diagnostic Possibilities**

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<th>Gastroenteritis</th>
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CASE 3
Illness Script

Short List of Diagnostic Possibilities

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<tr>
<th>Top Clues &amp; Cues</th>
<th>Appy</th>
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<td>N/V/D</td>
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<td>+1</td>
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<tr>
<td>RLQ Pain</td>
<td>2+</td>
<td>-2</td>
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<tr>
<td>Fever</td>
<td>1+</td>
<td>1+</td>
<td>2+</td>
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<tr>
<td>AML/Chemo</td>
<td>2-</td>
<td>0</td>
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</table>

CASE 3
Test Results

- H/H 8/24
- Platelet count 72k
- Absolute neutrophil count 250
- Lactate 6
CASE 3
Test Results

Test Results

Short List of Diagnostic Possibilities

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<tbody>
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<td>N/V/D</td>
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<td>2+</td>
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<th>Peritonitis</th>
<th>Neutropenic Enterocolitis</th>
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</thead>
<tbody>
<tr>
<td>ANC &lt;500</td>
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<tr>
<td>Cecal Thickening</td>
<td>1+</td>
<td>1+</td>
<td>1+</td>
<td>2+</td>
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</tbody>
</table>
**CASE 3**
Emergent Differential

- **Most Likely:** Neutropenic Enterocolitis

- **#1 Can’t Miss:** Peritonitis secondary to bowel perforation

- Enough already!

- Start acting!

---

**Neutropenic Enterocolitis**
*(Typhlitis)*

- A life-threatening complication of chemotherapy-induced neutropenia

- Typically occurs 2-3 weeks post induction
  - When ANC <500

- Frequently associated with fever

- Often involves the right colon
Neutropenic Enterocolitis
(Typhlitis)

Pathophysiology

- Cytotoxic chemotherapy results in...
  - Mucosal injury of the bowel
  - Impaired host defense
- Microbial invasion of bowel wall
- Bowel wall necrosis and edema
- Cecum most vulnerable

Diagnosis made by CT imaging
CASE 3
Treatment Threshold

☐ Are you above the treatment threshold for this patient’s...

☐ Typhlitis: YES

☐ Possible peritonitis: YES

Neutropenic Enterocolitis
(Typhlitis)

☐ Emergency Management

- Broad spectrum antibiotics to cover for peritonitis and C diff
- Oncology and Surgery consultations
  - Surgery to be avoided if possible
- NG suction, IV hydration, nutritional support
- Non-surgical management an option
Neutropenic Enterocolitis
Teaching Points

❑ Always add this to your list of “can’t miss” diagnoses in patients receiving chemotherapy who present with abdominal pain

❑ Move quickly to CT imaging

❑ Have a low treatment threshold for initiating broad-spectrum antibiotics

New Kid on the Block
The Emergence of Immune Checkpoint Inhibitors in Cancer Treatment
Immune Checkpoint Inhibitors: How do they work?

- Cancer cells can hide from the immune system
- They activate cellular “checkpoints” that prevent mobilization of immune cells
-ICI’s inhibit these checkpoints
- This allows the immune system to detect and attack cancer cells

The GOOD

ICI’s Disrupt Cell-Signaling Pathways

Patient’s Immune Response Activated

Cancer Cells are Targeted and Destroyed
The BAD

ICI’s Disrupt Cell-Signaling Pathways

Patient’s Immune Response Activated

Many Auto-immune Adverse Effects
Immune Checkpoint Inhibitors: Teaching Points

- Always ask cancer patients about ICI treatment
  - CLUE: generic names all end in “...umab”

- Expand your differential when the answer is affirmative
  - E.g. add auto-immune pneumonitis when considering pneumonia

- Consult with the patients’ oncologist early and often
Which Organ is at Most Risk for Injury in a Patient with Tumor Lysis Syndrome?

1. Brain
2. Heart
3. Kidney
4. Liver

In the Cancer Patient with a Hematologic Malignancy, Hyperleukocytosis is a Laboratory Abnormality, Whereas Leukostasis is a Medical Emergency.

1. TRUE
2. FALSE
Which of the Following Conditions Most Likely Mimics a Patient with Acute Neutropenic Enterocolitis?

1. Recto/Sigmoid Diverticulitis
2. Acute Appendicitis
3. Hemorrhagic Proctitis
4. Spontaneous Splenic Rupture

BONUS TOPIC

Hypercalcemia of Metastatic Malignancy
CASE 4

Clues and Cues

- A 72 year old man presents complaining of right shoulder and upper arm pain

- He admits to chronic alcoholism and doesn’t really recall, but may have fallen...

- He reports feeling generally weak, easily fatigued and experiencing a 10-pound unintentional weight loss
  - But admits to a very suboptimal diet
CASE 4
Clues and Cues

- EMS providers report his home environment is “a disaster and unlivable”.

- He is afebrile, unkempt, thin and appears unwell, demonstrating limited motion of his upper right arm because of discomfort

- Distal neurovascular function of his right forearm and hand is intact

Case 4
Illness Script:

Short List of Diagnostic Possibilities

<table>
<thead>
<tr>
<th>Top Clues &amp; Cues</th>
<th></th>
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# CASE 4
## Illness Script

### Short List of Diagnostic Possibilities

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<th>Clue &amp; Cue</th>
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<th>Shoulder Dislocation</th>
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<td>Shoulder/Arm Pain</td>
<td>2+</td>
<td>2+</td>
<td>2+</td>
<td></td>
</tr>
<tr>
<td>Alcoholism + ? Fall</td>
<td>1+</td>
<td>1+</td>
<td>1+</td>
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<tr>
<td>Weight Loss</td>
<td>0</td>
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</table>
Case 4: Test Results

CASE 4 Illness Script

<table>
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<td>X-ray: Lytic Humeral Fx</td>
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## CASE 4
### Illness Script

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</tr>
</tbody>
</table>

### Case 4: Test Results

![X-ray Image]

103

104
Case 4
Test Results

- H/H 9/27
- Creatinine 2.4mg/dL
- Total calcium 16mg/dL
CASE 4
Illness Script

<table>
<thead>
<tr>
<th>Clues &amp; Cues</th>
<th>Rotator Cuff Tear</th>
<th>Shoulder Dislocation</th>
<th>Traumatic Fracture</th>
<th>Pathologic Fracture</th>
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<tbody>
<tr>
<td>Mass on CXR</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Hypercalcemia</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2+</td>
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<tr>
<td>Anemia</td>
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<td>Xray: Lytic Humeral Fx</td>
<td>2-</td>
<td>2-</td>
<td>2-</td>
<td>2+</td>
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</table>

Short List of Diagnostic Possibilities

**CASE 4 Emergent Differential**

- **Most Likely:** Metastatic cancer with hypercalcemia and pathologic arm fracture
- **#1 Can’t Miss:** Metastatic cancer with hypercalcemia and pathologic arm fracture
- **They match!**
- **Start acting!**
Hypercalcemia ECG: Short QT-Interval

Metastases
Metastases
CASE 4
Treatment Threshold

- Are you above the treatment threshold for this patient’s...

- Hypercalcemia: YES
  - Potentially most life threatening

- Anemia: NO
  - Monitor and transfuse for hemoglobin <7gm/dL

Hypercalcemia

- There are multiple causes of hypercalcemia (e.g. primary hyperparathyroidism), but...

- Acute, symptomatic hypercalcemia is almost always due to malignancy
  - Solid tumors
  - Leukemias
  - Multiple Myeloma
  - Once the dust settles, check for the source
Hypercalcemia

- Symptoms and signs are nonspecific and more prevalent with acute elevations
  - Neuropsychiatric disturbance
  - Anorexia, nausea, constipation
  - Polyuria, polydipsia
  - Generalized muscle weakness

- The physical exam is not usually helpful

Symptomatic Hypercalcemia: Treatment

- The aims of therapy:
  - Increase urinary calcium excretion
  - Inhibit bone resorption of calcium
  - Decrease intestinal calcium absorption
Symptomatic Hypercalcemia: Treatment

- **Isotonic Saline Hydration**
  - Corrects volume depletion
  - Improves renal calcium clearance
  - Initial fluid bolus, then...
  - 200-300mL/hour to maintain urine output at 100-150mL/hour

- **Calcitonin**
  - Decreases bone resorption and increases renal calcium excretion
  - Works rapidly, but only for 48 hours (tachyphylaxis)
  - 4-IU/kg IM Q12 hours prn
Symptomatic Hypercalcemia: Treatment

- **Bisphosphonates**
  - Very effective in decreasing bone resorption
  - Maximal effect 2-4 days
  - Zoledronic acid 4mg IV over 15 minutes or pamidronate 60-90mg over 2 hours

Hypercalcemia Take to Work Tips

- Metastatic cancer is the most common cause of severe, symptomatic hypercalcemia
- In the patient with known malignancy and multiple non-specific complaints, always make sure to check calcium level
- In the patient with unexpected symptomatic hypercalcemia, search for an occult malignancy
Three Diagnostic ECG Clues that Portend Sudden, Unexpected Death

High Praise for the Incredible Bedside ECG

- Easily mastered technique
- Available in minutes
- No adverse effects
- Cheap
- Immediately available results
- Provides clues that drive point-of-care actions
- Can save lives
Basic Categories of Diagnostic Test Interpretation

- **Binary “YES or NO”**
  - Qualitative urinary pregnancy test
  - PCR influenza swab

Basic Categories of Diagnostic Test Interpretation

- **Quantitative**
  - Quantitative pregnancy test
  - D-dimer
  - CBC
Basic Categories of Diagnostic Test Interpretation

- Pattern Recognition
  - Chest Xray
  - Abdominal CT
  - Bedside ultrasound
  - ECG

We Need to Be Competent in ECG Pattern Recognition
Today’s List of ECG Patterns We’ll Review

- Brugada Syndrome
- Arrhythmogenic Right Ventricular Cardiomyopathy
- Hypertrophic Cardiomyopathy
- Bonus Review: Prolonged QT-interval with Risk of Torsade de Pointe

A 39-year old male accountant presents after experiencing a second syncopal episode within the past 3 months
39-year old male accountant who presents after experiencing a second syncopal episode within the past 3 months

Brugada Syndrome

- Autosomal dominant condition that adversely effects sodium channel function
- Prevalence varies:
  - 0.4% USA, 1% Japan
Brugada Syndrome

- Much more common in men
- Average age of onset 41 years
- A relatively common cause of sudden cardiac death in patients without structural heart disease

Brugada Syndrome
Type 1 ECG Pattern (“Coving”)
Brugada Syndrome
Type 1 ECG Pattern ("Coving")

Brugada Syndrome
Type 2 & 3 ECG Patterns ("Saddle")
Brugada Syndrome
Type 2 ECG Pattern (“Saddle”)

- Only proven treatment for symptomatic patients is ICD implantation
- ECG changes can be transient
  - A normal ECG does not rule out the syndrome in the right clinical context
  - Provocative testing can be diagnostic
    - E.g. flecainide or procainamide
Brugada Syndrome

- Arrange cardiac consultation for appropriate patients
  - Classic ECG findings
  - Unexplained syncope and pre-syncope in patients with a family history of sudden cardiac death in relatively young members
  - Young survivors of cardiac arrest

Take-to-Work Points

- Be on the lookout for Brugada Syndrome ECG changes
- Worry about BS in young adult patients with unexplained syncope even in the presence of a normal ECG
  - Especially those with a concerning family history
An ECG Demonstrating a Funny Looking Squiggle After the QRS-complex

Let me introduce the Epsilon Wave and Arrhythmogenic Right Ventricular Cardiomyopathy

Epsilon Waves
**Epsilon Waves:**
Associated with Arrhythmogenic Right Ventricular Cardiomyopathy

- A cardiomyopathy causing fibro-fatty degeneration of the myocardium
  - Right ventricle primarily involved
  - Left ventricle can also be involved
  - Young men most at risk
  - Prevalence 1:2500 to 1:5000
ARVC Pathology

Fatty Dysplasia of the Right Ventricular Myocardium
ARVC Syndrome

- Symptoms:
  - Palpitation
  - Syncope
  - Atypical chest pain
  - Dyspnea
  - RV failure
  - Sudden death

- Sudden cardiac death
- Most often during routine daily activities
- Causes about 5% of exertional SCD
ARVC Syndrome

- ECG changes
  - QRS prolongation
  - BBB, especially RBBB
  - Precordial T-wave inversions
  - Epsilon waves (30%)
    - Caused by delayed RV activation
Epsilon Waves

ARVC Syndrome

- **Treatment**
  - Avoid strenuous physical activities
  - Avoid any activities that cause symptoms
  - Beta-blockers
  - ICD implantation
Take-to-Work Points

☐ Always look for epsilon waves when examining the ECG of young adults with cardiac symptoms or syncope

☐ If present, refer these patients for timely cardiac consultation

A 17-year Old Male Athlete who Collapsed During a Soccer Match
A 17-year Old Male Athlete who Collapsed During a Soccer Match

Hypertrophic Cardiomyopathy
Hypertrophic Cardiomyopathy

- Autosomal dominant condition affecting the cardiac sarcomere
- Prevalence <1%
- Leads to left ventricular outflow obstruction
- Needs to be differentiated from “athlete’s heart” in young patients

Dyspnea, chest pain, palpitations and syncope/pre-syncope are common complaints

Always ask about family history of HC in the right context
Hypertrophic Cardiomyopathy: Precipitating Events

- Withdrawal of beta- or calcium channel blockers
- Dehydration
- Initiation of diuretic therapy
- Anemia
- Preload reduction therapy
  - e.g. nitrates
- Afterload reduction therapy
  - e.g. anti-hypertensive agents
- Tachyarrhythmias
  - e.g. PAF, SVT

Hypertrophic Cardiomyopathy: Physical Exam Clues

- Decreasing preload increases systolic murmur intensity
  - Standing position
  - Valsalva maneuver
  - Preload reduction (e.g. nitroglycerine)
  - Afterload reduction (e.g. dehydration)
Hypertrophic Cardiomyopathy: Physical Exam Clues

- Increasing preload decreases systolic murmur intensity
  - Squatting
  - Passive leg elevation
  - Intravascular volume expansion

Hypertrophic Cardiomyopathy ECG Findings

- LVH voltage criteria
- Q-waves in the inferior and lateral leads
  - Due to septal depolarization
- Deeply inverted T-waves in V2-4
Hypertrophic Cardiomyopathy
ECG Findings

Apical Hypertrophic Cardiomyopathy
MRI Image of Hypertrophic Cardiomyopathy

Symmetrical Hypertrophy on MRI

Ultrasound Images of Hypertrophic Cardiomyopathy
Another Example of Hypertrophic Cardiomyopathy

Hypertrophic Cardiomyopathy Management

- Medical therapy is often effective
  - Beta-blockers
    - E.g. esmolol and propranolol
  - Fluids
  - Phenylephrine for hypotension

- ICD for high likelihood of malignant arrhythmias

- Rarely, surgical intervention
  - E.g. septal myomectomy
Take-to-Work Points

- Always obtain an ECG on younger patients with unexplained syncope

- Search for ECG findings suggestive of HCM

Bonus Review:

Prolonged QT-Interval: A Risk for Torsade de Pointe
A 32-year Old Woman Being Treated for UTI with Ciprofloxacin Suffers a Transient Syncopal Episode at Home

A 32-year Old Woman Being Treated for UTI with Ciprofloxacin Suffers a Transient Syncopal Episode at Home
Prolonged QT-Interval: A Risk for Torsade de Pointe

- Measure from beginning of QRS to end of T-Wave
  - Men > 0.45 Seconds
  - Women > .47 Seconds
- Worry when greater than 2 Large Boxes
Prolonged QT-Interval: A Risk for Torsade de Pointe

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TdP
Classic ECG

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Prolonged QT-Interval: A Risk for Torsade de Pointe

Torsade de Pointes
Primary Care Conference

Tuesday, July 7, 2020

George Higgins, MD
Acute Care Essentials

TdP
Classic Monitor Tracing

Torsade de Pointes

- Common Causes:
  - Drugs which prolong the QT-interval
    - Many, including antibiotics, anti-arrhythmics, psychotropics
  - Hypomagnesemia, hypokalemia, hypocalcemia
  - Familial Long QT-interval Syndrome
Torsade de Pointes

☐ First-line Treatment:
  ▪ Magnesium sulfate 2gm IV over 2-15 minutes, repeated in 15 minutes PRN

☐ Overdrive pacing

☐ Isoproterenol overdrive pacing

☐ Correction of electrolyte abnormality

Take-to-Work Points

☐ Always closely examine the QT-interval for prolongation in patients with unexplained pre-syncope or syncope

☐ If present, search for a correctable cause: e.g. offending drug or electrolyte abnormality
We Need to Be Competent in ECG Pattern Recognition

A candlestick or two faces?

OK

How are your pattern recognition synapses firing right now?
Diagnosis at a Glance:
The Power of Bedside Image and Pattern Recognition

Learning Objectives

- Present visual images of actual case studies
- Briefly discuss key clinical points of each case
- Share other images of the same condition
Basic Realities for Frontline Clinicians

☐ The most critical and difficult role we play is to make the correct diagnosis

☐ Once the diagnosis is made, developing a management plan is relatively easy
  ■ You already know it or...
  ■ You immediately access a trusted online site or...
  ■ You consult emergently

IMAGE #1

49-year old male body builder
who complains of the
sudden onset of left upper arm pain while lifting weights
IMAGE #1
Long-head Biceps Tendon Rupture

- Chronic micro-trauma
- 95+% long-head tendon involved
- Risk factors include steroid use, poor conditioning and age over 40 years

Sudden onset of biceps pain
Weakness of elbow flexion and supination
Deformity of the muscle
IMAGE #1
Long-head Biceps Tendon Rupture

- Diagnosis is made on physical exam

- Both surgical and conservative management options can be effective
  - Tailored to individual patient needs and expectations

IMAGE #1a
Long-head Biceps Tendon Rupture
59-year old woman noticed “something is wrong with my face” while brushing her teeth

Higgins: Journal of Emergency Medicine 2013
She also mentions her PCP is treating her with cephalexin for an infection of her left ear.
IMAGE #2

Ramsay Hunt Syndrome

- Peripheral facial nerve palsy + ipsilateral ear rash
  - Herpes Zoster Oticus

- More severe than typical Bells Palsy
  - Vertigo, tinnitus, hearing loss, ipsilateral sensory loss
Ramsay Hunt Syndrome

- Early recognition and treatment is essential for optimal outcome

- Start steroids, antiviral agents and artificial tears as soon as possible (don’t forget Lyme!)

- Prepare your patient for a less than ideal response
A 4-month old female infant is brought in by a concerned mother. She has observed the development of a rash around her daughter’s mouth. No witnessed trauma. The patient appears to be otherwise well.
What further questions do you have for this toddler’s mother?
IMAGE #3
Cold Panniculitis

- Inflammation of the subcutaneous tissue after cold exposure
  - Crystallization of saturated fats

- Young children at greatest risk
  - “Chubby Cheeks”

- Popsicles and environmental cold exposure

Erythema and induration develop 1-2 days after cold exposure

- Usually asymptomatic
- No specific treatment
- Resolves spontaneously over weeks
IMAGE #3a
Cold Panniculitis

[Image of a baby with cold panniculitis]

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IMAGE #3a
Cold Panniculitis

[Image of a baby with cold panniculitis]

213
42-year old, healthy, non-smoking male mechanic presents with progressive pain over the ulnar aspect of his left dominant-hand with associated finger pain and ulceration
A CT-angiogram of his arms and hands was obtained.
IMAGE #4

IMAGE #4
### IMAGE #4
Hypotenar Hammer Syndrome

- Repetitive trauma to the palmar aspect of the hand
  - Striking the heel of the hand repetitively (occupation, sports)

- Aneurysmal deformation of the ulna artery

- Vasospasm and/or emboli

<table>
<thead>
<tr>
<th>Typically men over 40 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominant hand hypothenar tenderness and ischemic ulceration of the fingers</td>
</tr>
</tbody>
</table>

- Conservative management usually effective
  - Surgical intervention rarely required
IMAGE #4a
Hypothenar Hammer Syndrome

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IMAGE #4a
Hypothenar Hammer Syndrome

223
43-year old woman with progressive pain and ulceration of her fingers over the past four months. History of hypertension and daily cigarette smoking for many years.

Grugan: Annals of Emergency Medicine 2010
Buerger’s Disease (thromboangiitis obliterans)

- Nonatherosclerotic inflammation of small and medium sized vessels of the distal extremities
- Predominant risk factor is tobacco smoking
- Men more commonly affected
IMAGE #4b
Buerger’s Disease
(thromboangiitis obliterans)

- Raynaud’s phenomenon can be associated
- Larger vessels rarely involved: cerebral, coronary, aorta
- Only treatment is total smoking cessation

IMAGE #4c
Buerger’s Disease
(thromboangiitis obliterans)
IMAGE #4d
Buerger’s Disease
(thromboangiitis obliterans)

A 71-year old male presents with bothersome left shoulder “spasms”.

Present for several days.

Intermittent light-headedness

Higgins: Journal of Emergency Medicine 1996
Twiddler’s Syndrome

- Displacement of pacemaker or ICD leads due to coiling within the insertion pocket

- Spontaneous or intentional

- Results in device malfunction and extra-cardiac pacing
  - E.g. diaphragm, shoulder, chest wall
Twiddler’s Syndrome

- Diagnosis made with CXR
- Cardiology consultation required for repositioning of the leads
- External pacing can be instituted as a bridge if needed

---

Twiddler’s Syndrome

A

B
A 2-week old female infant is brought to you for evaluation after parents discovered a rash involving her abdomen.

The infant has been afebrile and behaving normally.
Neonatal Lyme Disease

- Most LD in children occurs during the primary school ages

- Neonatal LD is rare, but must be considered when rash develops
Neonatal Lyme Disease

☐ These patients require full septic workup, including LP to exclude LD meningitis

☐ Doxycycline is contra-indicated
☐ Ceftriaxone increases the risk of kernicterus
☐ Amoxicillin is safe and effective

Pediatric Lyme Disease
IMAGE #6b
Pediatric Lyme Disease

IMAGE 6c
Pediatric Lyme Disease
A 21-year old female presents complaining of an itching rash involving a tattoo she had received two weeks previously. A course of antibiotics followed by a course of antiviral agent and steroids brought no relief.
IMAGE #7

IMAGE #7
IMAGE #7
Local Tattoo Dye Allergy

- Most common with red dyes
  - But associated with all colors

- Symptoms are typically allergic and local in character
  - Pruritis, vesicular, non-systemic

- Must consider bacterial and viral cellulitis, toxic shock syndrome
- Tattooing is now the leading cause of hepatitis C
- Treat with topical and/or oral steroids
- May require surgical removal of the tattoo
A 41-year old healthy male presents complaining of pain over the left anterior aspect of his neck. This developed over the past two days.
On further questioning he shares that he is being treated for an infected left lower molar tooth with Augmentin®.

You ask him to open his mouth.
IMAGE #8

Ultrasound of His Neck
Ludwig’s Angina

- Life-threatening infection of the submandibular space
- Most often associated with dental infections
  - Lower posterior molars
- Airway compromise and aspiration are major complications
Immediate management priorities

- Airway stabilization

- IV antibiotics
  - E.g. clindamycin, ampicillin-sulbactam, penicillin G (immunocompetent patient)

- Surgery to drain abscesses

- ICU observation
IMAGE #8a
Ludwig’s Angina

IMAGE #8b
Ludwig’s Angina
Ludwig’s Angina

The Only Known Cure for Buerger's Disease Involving the Fingers is:

1. Local arterial thrombolysis
2. Radial and ulnar artery stenting
3. Total tobacco smoking cessation
4. Prolonged nocturnal wrist splinting
The Person Most at Risk for Cold Panniculitis is:

1. A 78-year old woman with dementia
2. A 46-year old man with an opioid use disorder who is homeless
3. A healthy 2-year old toddler
4. A morbidly obese 32-year old man

Ludwig’s Angina is a Life-threatening Complication of:

1. Dental infection
2. Suppurative maxillary sinusitis
3. Suppurative parotitis
4. Suppurative otitis media
On the same frigid December evening these two patients presented.

Patient 1 described intense bilateral hand pain.
Patient 2 described intense bilateral foot pain.
BONUS IMAGE

- Both patients were experiencing severe frostbite
- Both received timely thrombolytic therapy
- One improved, one did not
  Which is which?

Case 1 Pre-treatment

Left Hand
BONUS IMAGE
Case 1 During Treatment

B: @ 24 hours
C: @ 48 hours

BONUS IMAGE
Case 2 Pre-treatment

Left Foot
Thrombolytic therapy for severe frost bite is controversial

Both received timely thrombolytic therapy
- Case 1 did not respond
  - Required digit amputations
- Case 2 demonstrated reperfusion
  - Full recovery
BONUS IMAGE

- Risks
  - Homelessness, intoxication, mental illness, extreme winter sports
  - Feet, hands, ears, nose, cheeks and penis most vulnerable
  - Immediately rewarm: 37-39ºC water bath
  - Consider thrombolysis with concurrent heparin infusion

BONUS IMAGE

14-year old adolescent female with two weeks of progressive cough
She was treated with bronchodilators and steroids, but her condition worsened.
She was treated with BiPAP and antibiotics for possible sepsis, but her condition continued to deteriorate. She was transferred to the regional tertiary care center.
On arrival she was in acute respiratory distress with copious pink, frothy secretions emanating from her mouth.

She was immediately intubated.
Bedside ultrasonography was performed to rule out cardiac tamponade, evidence of massive PE, cardiomyopathy, etc.
A rare condition

Presents with:
- Acute cardiac complications
  - Heart failure, arrhythmia, sudden death
- Embolization
  - Systemic: lung, cutaneous
  - CNS: TIA, acute stroke
- Constitutional signs/symptoms
BONUS IMAGE
Left Atrial Myxoma with dynamic acutely decompensated heart failure

- A great mimic
- Consider it when things just don’t add up
- Diagnosed with ultrasound
- Surgical resection is curative

---

BONUS IMAGE
Unidentified male found on the ground, unresponsive initially, now confused

BONUS IMAGE

BONUS IMAGE
BONUS IMAGE
Lightning Strike

- Classic cutaneous findings
  - Ferning
  - Lichtenberg Figures
  - Transient
  - Due to electron acceleration in the skin

- Keraunoparalysis
  - Temporary loss of motor and sensory function
  - Resolves over hours

BONUS IMAGE
Lightning Strike

- Lightning strikes
  - Up to 300 deaths in the US annually
  - Neurologic, cardiac and traumatic complications
  - Up to a 30% mortality
  - Many survivors suffer permanent injuries
    - Memory loss
    - Personality change
    - Chronic pain
Practice Changing Medical Literature Review 2020

Learning Objectives

1. Review clinically relevant articles from the recent medical literature

2. Discuss their strengths and weaknesses

3. Incorporate practice changing information into medical decision making
This 63-\text{yo} man, who is on warfarin for chronic AF, presents with a very minor head injury.

His exam is entirely normal. Do I really need to image his head?

What is the Incidence of ICH Among Anticoagulated Patients with Minor Head Trauma?
Anticoagulation + Head Injury

Background:

None of us wants to be the one who discharges (without neuroimaging) a well-appearing, anticoagulated patient with a trivial head injury who returns four hours later with this CT finding.

Carlson: Annals of Emergency Medicine 2019

Anticoagulation + Head Injury

Background:

Minor head injury is a common condition that results in acute care presentation

> 1-million ED visits annually

The true risk of traumatic ICH in patients receiving anticoagulation who have normal mental status is not addressed by current clinical decision tools.

Therefore, the fallback position has been to scan them all.

Is this practice supported by any evidence?

Carlson: Annals of Emergency Medicine 2019
Anticoagulation + Head Injury

**Methods:**
Systematic Review

#10,391 citations reviewed

#5 citations eligible
- The largest study had high risk for bias for outcome assessment

#4,080 study subjects (all ages)

98% were receiving vitamin K antagonists

#189 diagnosed with ICH on initial visit

#20 diagnosed on follow-up visit (0.49%)

Carlson: Annals of Emergency Medicine 2019

---

**Results:**

<table>
<thead>
<tr>
<th></th>
<th># of Studies/ # of Participants</th>
<th>% ICH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence of ICH in All 5 Studies</td>
<td>#5 #4,080</td>
<td>8.9% [95%CI 5.0 to 13.8]</td>
</tr>
<tr>
<td>Incidence of ICH Excluding Biased Study</td>
<td>#4 #1,209</td>
<td>10.9% [95%CI 4.6 to 19.6]</td>
</tr>
</tbody>
</table>

Carlson: Annals of Emergency Medicine 2019
Bud’s Editorial Comments

• What are the take-to-work lessons provided by this systematic review?

• Until further studies are conducted to identify anticoagulated patients with minor head trauma and a normal GCS who are at low risk for ICH...

All of these patients require point-of-care CT neuro-imaging

For those with a normal CT, the risk of delayed ICH is very low

I recommend arranging next day phone follow-up in patients being discharged

The CT on my patient confirms my suspicion for a kidney stone.

But wouldn’t you know it, I now have to figure out what to tell him about the 4.3-cm AAA he’s got.
Safety of Men with Small and Medium AAAs Under Surveillance in the NAAASP

AAA Surveillance

Background:
Population screening for AAA is becoming more routine

Effective screening can decrease AAA-related mortality by up to 50%

The threshold for referral for potential treatment is 5.5-cm. Is this a safe plan?
AAA Surveillance

Methods:

AAA screening program provided by the National Health Service in the UK

All men are invited to participate when they reach 65 yo
– Older men can self-refer

For identified AAA;
If 3.0 to 4.4 cm, “small”, surveillance US Q12 months
If 4.5 to 5.4 cm, “medium”, surveillance US Q3 months
If 5.5+ cm, “large”, referral for intervention

Oliver-Williams: Circulation 2019

AAA Surveillance

Oliver-Williams: Circulation 2019
AAA Surveillance

Results:

<table>
<thead>
<tr>
<th>AAA Size</th>
<th>Annual Rupture Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small 3.0 to 4.4 cm</td>
<td>0.03% 95% CI 0.02%</td>
</tr>
<tr>
<td>#16,430</td>
<td>0.05% 95% CI 0.02%</td>
</tr>
<tr>
<td>Medium 4.5 to 5.4 cm</td>
<td>0.28% 95% CI 0.17%</td>
</tr>
<tr>
<td>#2,222</td>
<td>0.44% 95% CI 0.22%</td>
</tr>
<tr>
<td>High Medium 5.0 to</td>
<td>0.40% 95% CI 0.22%</td>
</tr>
<tr>
<td>5.4 cm #769</td>
<td>0.73% 95% CI 0.22%</td>
</tr>
</tbody>
</table>

Oliver-Williams: Circulation 2019

Bud’s Editorial Comments

- This large surveillance study supports current understanding that AAA’s less than 5.5 cm have a very low rupture rate and, therefore, can be followed without immediate intervention.

- Currently the USA does not have a similar comprehensive surveillance program and likely won’t for now.

- But this study does provide clinicians with evidence-supported guidance in the following situation:

  - When an abdominal/pelvic CT is acquired for an unrelated reason, the incidental discovery of a AAA less than 5.5-cm in diameter requires timely, and not emergent/urgent, referral to Vascular Surgery.
Quick Take

Are there any evidence-based recommendations for AAA screening in this country?

Screening for Abdominal Aortic Aneurysm: US Preventive Services Task Force Recommendation Statement
### USPSTF AAA Recommendations

**Recommendation Summary**

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men aged 65 to 75 years who have ever smoked</td>
<td>The USPSTF recommends 1-time screening for abdominal aortic aneurysm (AAA) with ultrasonography in men aged 65 to 75 years who have ever smoked.</td>
<td>B</td>
</tr>
<tr>
<td>Men aged 65 to 75 years who have never smoked</td>
<td>The USPSTF recommends that clinicians selectively offer screening for AAA with ultrasonography in men aged 65 to 75 years who have never smoked rather than routinely screening all men in this group. Evidence indicates that the net benefit of screening all men in this group is small. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the balance of benefits and harms on the basis of evidence relevant to the patient’s medical history, family history, other risk factors, and personal values.</td>
<td>C</td>
</tr>
<tr>
<td>Women who have never smoked</td>
<td>The USPSTF recommends against routine screening for AAA with ultrasonography in women who have never smoked and have no family history of AAA.</td>
<td>D</td>
</tr>
<tr>
<td>Women aged 65 to 75 years who have ever smoked</td>
<td>The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for AAA with ultrasonography in women aged 65 to 75 years who have ever smoked or have a family history of AAA.</td>
<td>I</td>
</tr>
</tbody>
</table>

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**What was this famous actress’ potentially career ending acute neurologic condition? What did she believe caused it?**

![Image of Brad Pitt and Angelina Jolie](image_url)
Antivirals with Corticosteroids for the Treatment of Bell’s Palsy

Bell’s Palsy Rx

Background:

- Idiopathic facial nerve paralysis can be a cosmetically devastating condition
- Annual incidence up to 40 cases per 100,000

- Peak incidence: ages 30 to 45 years and >70 years
- Maximal disability occurs within 48 to 72 hours
- Various infectious agents, e.g. herpes zoster, have been associated with Bell’s
Bell’s Palsy Rx

Background:

– Almost always unilateral

– If bilateral, think Lyme

– Involves both the upper and lower face

Methods:

– Cochrane meta-analysis

– Eight trials, #1,365 study subjects

– Anti-viral agents + steroids vs. steroids alone vs. placebo/no treatment

– Primary Outcome: Risk of incomplete recovery
Bell’s Palsy Rx

Results:

<table>
<thead>
<tr>
<th>Treatment Comparison</th>
<th>Relative Risk</th>
<th>95% CI</th>
<th>Absolute Risk Reduction</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antivirals + steroids vs. placebo/no treatment</td>
<td>0.56</td>
<td>0.41 to 0.76</td>
<td>12%</td>
<td>8</td>
</tr>
<tr>
<td>Antivirals + steroids vs. steroids alone</td>
<td>0.61</td>
<td>0.39 to 0.97</td>
<td>6.5%</td>
<td>15</td>
</tr>
<tr>
<td>Antivirals alone vs. steroids alone</td>
<td>1.52</td>
<td>1.08 to 2.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antivirals alone vs. placebo/no treatment</td>
<td>1.10</td>
<td>0.87 to 1.40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other complications were significantly reduced with the antiviral/steroid combination:

- Abnormal involuntary facial movement
- Unilateral tearing while eating (crocodile tears)
Bud’s Editorial Comments

- I always initiate all evidence-based effective treatments for Bell’s Palsy in order to increase the likelihood of complete facial paralysis recovery

- These include:
  - Steroids
  - Antivirals
  - Artificial Tears
  - Lyme treatment (in the right context)

You manage a healthy 25-yo woman who is in her first trimester of pregnancy for viral pharyngitis. As she is leaving she asks, “Will my smoking harm my baby?”
Maternal Smoking Before and During Pregnancy and the Risk of Sudden Unexpected Infant Death

Maternal Smoking/SUID

- **Background:**

  Sudden unexpected infant death (SUID) is an absolutely devastating event for all involved

  Several potentially predisposing risk factors have been identified, such as prone sleeping position

  Maternal smoking during pregnancy is another identified risk factor

  Image: Pregnant woman smoking a cigarette
Maternal Smoking/SUID

Methods:

Analysis of the CDC’s Birth Cohort Linked Birth/Infant Death Set 2007 to 2011

#20,685,463 births

#19,127 SUIDs

SUID defined as:

• <1 year of age
• SIDS
• Ill-defined or unknown cause
• Accidental suffocation or strangulation in bed

Results:

SUID risk more than doubled with any maternal smoking during pregnancy

\[ \text{aOR} = 2.44 \]

SUID increased two-fold between no smoking and smoking 1 cigarette daily throughout pregnancy

The risk of SUID increased linearly with each additional cigarette smoked daily

Each additional cigarette increased aOR by 0.07

Risk plateaued beyond 20 cigarettes per day

Anderson: Pediatrics 2019
Maternal Smoking/SUID

Results:

Adjusted Odds Ratios Associated with Number of Daily Cigarettes Smoked During Pregnancy

Maternal Smoking/SUID

Results:

Mothers who quit or reduced their smoking during pregnancy decreased the risk of SUID when compared to mothers who did not

Reduced: aOR = 0.88
Quit: aOR = 0.77

Assuming causality, 22% of SUID’s can be directly attributed to maternal smoking during pregnancy

Anderson: Pediatrics 2019
Bud’s Editorial Comments

- The report is, in my opinion, a WOW!
- This is an impressive analysis of a massive database
- The results have resulted in a change in my practice
- Whenever I can, I inform pregnant patients of...
  - The likely association between maternal smoking during pregnancy and SUID
  - The beneficial impact of quitting or at least cutting down
- Without any evidence to support it, I also discuss the theoretical risk of being exposed to passive smoke as well

I am about to see one of my young patients for an acute care visit. Just yesterday he was treated with naloxone for an opioid overdose. He swears he’s learned his lesson.

What should I tell him?
One Year Mortality of Patients After ED Treatment for a Nonfatal Opioid Overdose

Background:

– Over 50,000 people die from opioid OD annually in the US

– Naloxone is now increasingly available for pre-hospital intervention

What is the near-term and long-term risk of mortality for patients surviving an ED visit for an opioid overdose?
Opioid Overdose

Methods:

- 11,557 patients discharged after an opioid overdose
- Retrospective 1-year observational study
- All Massachusetts ED’s

Results:

635 of 11,557 Patients Died within 1 Year

<table>
<thead>
<tr>
<th>Died within 2 Days</th>
<th>Died within 1 Month</th>
<th>Died within 1 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>#29 0.25%</td>
<td>#130 1.1% [95%CI 0.94 to 1.33%]</td>
<td>#635 5.5% [95%CI 5.08 to 5.92%]</td>
</tr>
</tbody>
</table>

Opioid Overdose

Results:

– Of the 635 deaths at 1-year:
  • 20.5% occurred within 1 month
  • 4.6% within 2 days

– Patient characteristics
  – 71% male
  – Mean age 39 years
  – 67.4% died of opioid OD
  – 2% died of suicide

Weiner: Annals of Emergency Medicine 2020

Opioid Overdose

Hot off the press:
Ashburn NP: Annals of Emergency Medicine May 2020

– #3,085 patients in North Carolina received out-of-hospital naloxone

– 73% (#2,244) improved

These responders had a 13-fold increase in mortality over the next year when compared that a matched cohort of the general population
Bud’s Editorial Comments

• WOW!

• Huston, we have an addiction problem!

• Opioid use disorder, after an initial life-threatening overdose, is associated with a significant increase in 1-year mortality in young adults

• A significant proportion of these untimely deaths will occur within days of the initial encounter

• We must intervene at the time of the index event!
  • Buprenorphine
  • Referral for treatment

Bud’s Editorial Comments
What’s the Diagnosis?

Update on Emerging Infections: Wound Botulism from Black Tar Heroin

Kalinowski: Annals of Emergency Medicine 2019
**Botulism/Black Tar Heroin**

**Background:**
- Opioid misuse syndrome is exploding across the USA with devastating results
- Most of us are comfortable recognizing and managing victims of this condition
- Black tar heroin and its association with botulism is less well recognized

**Methods:**
- CDC report in MMWR 2019
- Detailed description of nine cases of black tar heroin associated wound botulism in IUD users, six of whom “skin popped”

Kalinoski: Annals of Emergency Medicine 2019
351

Kalinoski: Annals of Emergency Medicine 2019
352
Botulism/Black Tar Heroin

Results in these 9 patients:

- Most common symptoms:
  - Muscle weakness
  - Difficulty swallowing
  - Blurred vision

- All admitted to ICU

- 6 required mechanical ventilation, 1 died

- Delays in diagnosis because symptoms initially attributed to drug intoxication

- None responded to naloxone

- Median LOS 15 days (range 9 to 67 days)

---

Botulism: Brief Review

- Paralytic disease caused by C. botulinum

- Spores germinate in wounds or necrotic tissue

- Spores are resistant to high temperature

- Most common symptoms include dysphagia, ptosis, blurred vision and other cranial nerve abnormalities

- Descending paralysis may compromise respiratory status

- Botulinum antitoxin is curative

---

Kalinowski: Annals of Emergency Medicine 2019
Bud’s Editorial Comments

- Add black tar heroin injection in adults to honey administration in young infants as a cause of botulism
- Consider this diagnosis in the IVD user, especially skin poppers, who present with confusing neurologic symptoms and signs
- When suspicious that the patient has botulism.....
- Arrange for ICU admission for close monitoring of respiratory status
- Immediately contact your state health department to request botulinum antitoxin

A 65-year old man who in on warfarin for atrial fibrillation presents with a minor head injury. His exam is normal.

What if the Likelihood that He has an Occult Intracerebral Hemorrhage?

1. <1%
2. 3%
3. 5%
4. 10%
What is the Likelihood that an Asymptomatic Abdominal Aortic Aneurysm with a Diameter of 5.3 cm will Rupture within One Year?

1. <1%
2. 2%
3. 5%
4. 4%

Adding Antivirals to Steroids in the Treatment of Bells Palsy Improves the Likelihood of Complete Facial Nerve Recovery.

1. True
2. False
An Otherwise Healthy Woman Continues to Smoke Cigarettes During Her Pregnancy. This is Associated with Which of the Following Risks for Her Newborn Over the First Year of Life?

1. Idiopathic seizure disorder
2. Mild developmental delay
3. Sudden unexplained death
4. Acute Flaccid Myelitis

BONUS ARTICLE REVIEWS

Tramadol and mortality
Timing of paroxysmal atrial fibrillation cardioversion
Timing of outpatient cardiac stress testing
And More!
The majority of patients with AF are anticoagulated. Many of them are also on aspirin for secondary prevention of ACS. Does this increase their risk of bleeding?

Antithrombotic Therapy for Atrial Fibrillation with Stable Coronary Artery Disease
AF/CAD Dual Therapy

Background:

– Patients with persistent AF are almost always on chronic anticoagulation therapy, assuming....
  • The CHA2DS2-VASc score places them at risk for stroke
  • The HAS-BLED score doesn’t place them at significant risk for bleeding complications

– Patients with a significant cardiac history are almost always on daily, low-dose aspirin

– Many patients have both conditions

– Is dual therapy beneficial and without increased risk?

Yasuda: NEJM 2019

AF/CAD Dual Therapy

Methods:

– Large, multi-center, prospective, open label Japanese study

– #2,236 patients with AF and stable CAD

– Randomized to:
  • Rivaroxaban alone
  • Rivaroxaban + aspirin

– Primary outcomes
  • Incidence of stroke, systemic embolism, ACS, death
  • Incidence of major bleeding

Yasuda: NEJM 2019
AF/CAD Dual Therapy

Results: Trial Terminated Early Because of Increased Bleeding in the Dual Therapy Group

<table>
<thead>
<tr>
<th></th>
<th>Incidence of Vascular Events Per Patient-Year</th>
<th>Incidence of Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rivaroxaban</td>
<td>4.1%</td>
<td>1.62%</td>
</tr>
<tr>
<td>Rivaroxaban + ASA</td>
<td>5.75%</td>
<td>2.76%</td>
</tr>
<tr>
<td></td>
<td>Hazard Ratio 0.72 [95%CI 0.55 to 0.95]</td>
<td>Hazard Ratio 0.59 [95%CI 0.39 to 0.89]</td>
</tr>
</tbody>
</table>

Yasuda: NEJM 2019

Bud’s Editorial Comments

• This large study provides us all with more provocative information to ponder

• For stable patients with chronic AF and known coronary artery disease...
  – Anticoagulation alone may provide maximal benefit
  – Adding anti-platelet therapy may increase bleeding risk

• Let’s keep our collective eyes and ears out to determine if this study generates a larger discussion

• In the meantime, consider how to best educate our patients
I just learned that the patient I discharged from acute care to have an outpatient cardiac stress test within three days failed to show up for testing as scheduled.

Now I’m worried.

Evaluation of Outpatient Cardiac Stress Testing after ED Encounters for Suspected ASC

# Cardiac Stress Testing

## Background:
- Many patients who present with chest pain are considered to be at low risk
- Often they are discharged with the expectation of timely out-patient cardiac stress testing
  - Within 3 days
- But we all know that lots of challenges often make this type of follow-up impossible
  - Systemic factors
    - Access delays
  - Patient factors
    - Noncompliance

Natsui: Annals of Emergency Medicine 2019

## Methods:
- Retrospective, multi-center analysis
- #7,988 patients with low risk chest pain discharged for stress testing within 3 days
  - Normal ECG
  - Normal troponin(s)
  - Non-concerning gestalt
- Primary outcome:
  - Actual patient compliance
- Secondary outcome:
  - 30-day MACE

Natsui: Annals of Emergency Medicine 2019
Cardiac Stress Testing

Results:

<table>
<thead>
<tr>
<th></th>
<th>3-Day Testing #2,497</th>
<th>4 to 30-Day Testing #4,695</th>
<th>No Testing #7,988</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>31%</td>
<td>59%</td>
<td>10%</td>
</tr>
<tr>
<td>MACE</td>
<td>1.1%</td>
<td>0.8%</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

Odds Ratio of a Rapid Testing Benefit:
Not Significant
OR 0.92 [95%CI 0.55 to 1.54]

Natsui: Annals of Emergency Medicine 2019

Bud’s Editorial Comments

This study’s results are provocative.

Once we’ve evaluated a patient who complains of chest pain with...
  - History and observation (gestalt)
  - ECG(s)
  - Troponin(s)
  - Clinical decision tools (e.g. HEART Score)

And we’ve categorized the patient as being at low risk for cardiac chest pain....

It appears that the timing of follow-up cardiac stress testing in most patients certainly is not urgent.
Bud’s Editorial Comments

This study’s results are provocative. One might even be tempted to question the value of such testing in this low risk group.

And this study doesn’t address the proven weaknesses of stress testing. E.g. High False Positive rate

Stay tuned as future guidelines incorporate better evidence and better tests.

My patient developed palpitations 12 hours ago. He’s in new-onset AF. I’ve controlled his rate, but am unable to cardiovert his rhythm. Do I need to urgently transfer him to the tertiary care hospital?
Early or Delayed Cardioversion in Recent-Onset Atrial Fibrillation

AF Cardioversion

Background:

- Patients with recent onset (36 to 48 hours duration) AF commonly undergo immediate cardioversion
  - Pharmacologic (e.g. flecainide or procainamide)
  - Electrical

- However, AF often self-terminates spontaneously

- How does immediate restoration of sinus rhythm compare to a “wait-and-see” approach compare?
AF Cardioversion

**Methods:**

- Multi-center, open label trial

- #427 patients with recent onset AF
  - Symptomatic
  - Onset within 36 hours
  - Hemodynamically stable

- #212 in the **DELAYED** group
  - Rate control only (beta-blocker, CCB or digoxin)
  - If AF still present within 48 hours of onset, cardioversion

- #215 in the **EARLY** group
  - Immediate cardioversion (pharmacologic followed with electrical cardioversion as needed)

---

Pluymaekers: NEJM 2019

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AF Cardioversion

**Methods:**

- Patients in both groups at high risk for stroke were anticoagulated
  - CHA2DS2-VASc Scale

- Trans-esophageal echo was not performed

- All patients were evaluated at 4 weeks

- Primary Outcome:
  - Presence of sinus rhythm at 4 weeks

---

Pluymaekers: NEJM 2019
**CHA2DS2-VASc Score for Atrial Fibrillation Stroke Risk**

Calculates stroke risk for patients with atrial fibrillation, possibly better than the CHADS<sub>2</sub> Score.

### Critical Actions

One recommendation suggests a 0 score is "low" risk and may not require anticoagulation; a 1 score is "low-moderate" risk and should consider antplatelets or anticoagulation, and a score 2 or greater is "moderate-high" risk and should otherwise be an anticoagulation candidate.
## AF Cardioversion

### Results:

#### EARLY:
- Spontaneous conversion to RSR prior to intervention: 16%
- Conversion with intervention: 78%
- Recurrence of AF during the 4-week trial: 29%
- Overall rate of RSR at 4-weeks: 94%
- Cardiovascular complications: 5%

#### DELAYED:
- Spontaneous conversion to RSR within 48 hours: 69%
- Conversion with 48-hour intervention: 28%
- Recurrence of AF during the 4-week trial: 30%
- Overall rate of RSR at 4-weeks: 91%
- Cardiovascular complications: 4%

---

### Bud’s Editorial Comments

OK, I admit it.
- I love converting appropriate patients in PAF to RSR!
- I get a buzz when I buzz

But this well designed and conducted study suggests that an alternative option is likely equally effective and safe

If immediate cardioversion is not an option for you:
- Initiate rate control intervention as appropriate
- Initiate anticoagulant therapy as appropriate
- Arrange timely out-patient follow-up

---

Pluymaekers: NEJM 2019

386

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George Higgins, MD
Acute Care Essentials
Here’s a very brief update on a pretty good, non-addicting analgesic, ibuprofen.

Comparison of Oral Ibuprofen at Three Single-Dose Regimens for Treating Acute Pain in the ED

Motov; Annals of Emergency Medicine 2019
# Ibuprofen Dosing

## Methods:
- RCT with blinding
- #225 patients with acute pain
- Ibuprofen, single dose orally:
  - 400-mg
  - 600-mg
  - 800-mg

## Results:
**No difference between groups in acute pain reduction**

Motov: Annals of Emergency Medicine 2019

## Bud’s Editorial Comments
- There appears to be a ceiling for ibuprofen’s analgesic effects
- Similar findings for ketorolac in recent studies
- This study did not examine dosing impact on ibuprofen’s anti-inflammatory effects
- I take time to educate my patients about the rather impressive analgesic properties of NSAIDs
- For non-geriatric patients, ibuprofen 400-mg every 6 hours appears to be a very reasonable baseline pain management strategy
Another reason to choose a direct oral anticoagulant (DOAC) over warfarin in patients with chronic atrial fibrillation.

Lutsey: JAMA Internal Medicine 2019

Association of Anticoagulant Therapy with Risk of Fracture Among Patients with Atrial Fibrillation

Lutsey: JAMA Internal Medicine 2019
Anticoagulation/Fractures

Background:

- Most patients with chronic AF are maintained on an oral anticoagulant
- Warfarin may be associated with adverse effects on bone health

- DOAC’s have proven to be at least as beneficial as warfarin with a lower risk of bleeding
- Can DOAC’s also reduce the risk of fractures?

Methods:

- Analysis of a large claims databases
- 167,275 patients with AF receiving anticoagulation
  - Warfarin
  - DOAC

- Patients matched for:
  - Age
  - Gender
  - Co-morbidities
  - CHA2DS2-VASc

- Exposure:
  - Warfarin vs. DOAC

- Main Outcome:
  - Incidence of fractures
Anticoagulation/Fractures

Main Results:

- DOAC’s were associated with a modestly lower fracture risk
- DOAC’s were associated with a lower risk of fractures requiring hospitalization
- DOAC-associated benefit was increased in patients with pre-existing osteoporosis
- Apixaban was the DOAC that provided greatest benefit

Bud’s Editorial Comments

- This large observational study provides another important issue to consider when deciding the benefits and risks of initiating oral anticoagulant therapy for our patients
  - The increased risk of fracture associated with warfarin in the osteoporotic patient
- However, other issues must also be considered:
  - Impact on embolic risk
  - Bleeding risk
  - Effectiveness and cost of coagulopathy reversal
  - Patient compliance with monitoring
- Shared decision making is essential
I used to be confident that I could diagnose a simple skin abscess using just my fingers. But now it seems I can only diagnose one using ultrasound.... and I don’t have a US machine!

Effect of Initial Bedside US on ED Skin and Soft Tissue Infection Management
Abscess/US

Background:  
More patients are presenting to Acute Care Clinicians with skin and soft tissue infections. US has emerged as a point-of-care test that is being promoted as improving the accuracy of diagnosis. Is there any evidence that US is better than physical exam in identifying abscesses?

Mower: Annals of Emergency Medicine 2019

Abscess/US

Background: Typical US findings

Abscess

Cellulitis with Cobble Stoning

Mower: Annals of Emergency Medicine 2019
Abscess/US

Methods:

#1,216 patients presenting with skin and soft tissue infections

Patient outcomes over the next week

Pre- and post-US clinician survey:
– Certainty of abscess presence
– Management plan

Abscess/US

Results:

Overall Accuracy: Clinical Exam vs. US

<table>
<thead>
<tr>
<th></th>
<th>Clinical Exam</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity [SNOUT]</td>
<td>90%</td>
<td>94%</td>
</tr>
<tr>
<td>Specificity [SPIN]</td>
<td>98%</td>
<td>94%</td>
</tr>
</tbody>
</table>

Mower: Annals of Emergency Medicine 2019
### Abscess/US

**Results:**

**Physical Exam Certain that Abscess was Present [#1,111 (91%)]:**

<table>
<thead>
<tr>
<th></th>
<th>Clinical Exam</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity [SNOUT]</td>
<td>97%</td>
<td>96%</td>
</tr>
<tr>
<td>Specificity [SPIN]</td>
<td>97%</td>
<td>96%</td>
</tr>
</tbody>
</table>

For patients with PE “certain” for abscess (#1,111):

- US management change in #13 (1.2%)
  - Appropriate change in #10 (77%)
  - Inappropriate change in #3 (23%)

For patients with PE “uncertain” for abscess (#105):

- US management change in #25 (24%)
  - Appropriate change in #21 (84%)
  - Inappropriate change in #4 (16%)

Mower: Annals of Emergency Medicine 2019
Bud’s Editorial Comments

- This study supports my clinical experience

- When I’m certain that my PE identifies an abscess, I don’t believe the US if it doesn’t agree
  - I&D is performed

- When I’m uncertain if an abscess underlies obvious cellulitis, I will include my US findings in my final diagnostic opinion and management plan

Another recent glimpse at Tramadol
Association of Tramadol with All-Cause Mortality Among Patients with Osteoarthritis

Zeng: JAMA 2019

Osteoarthritis/Tramadol

**Background:**

The American Academy of Orthopedic Surgeons recommends tramadol for patients with osteoarthritis of the knee

The American College of Rheumatology recommends tramadol for patients with osteoarthritis of the knee, along with an NSAID

Zeng: JAMA 2019
# Osteoarthritis/Tramadol

## Methods:

**Sequential, propensity score-matched cohort study**

- Large UK general practice database

**Primary Outcome:**

- Association of initial tramadol prescription with all-cause mortality in patients with knee osteoporosis

---

**Osteoarthritis/Tramadol**

## Methods:

**Initial prescription:**

- Tramadol: #44,451
- Naproxen: #12,397
- Diclofenac: #6,512
- Celecoxib: 5,674
- Etoricoxib: #2,946
- Codeine: #16,922

---

Zeng: JAMA 2019
### Osteoarthritis/Tramadol

**Results: Follow-up within 1 year, Tramadol vs. Naproxen**

<table>
<thead>
<tr>
<th></th>
<th>Tramadol #44,451</th>
<th>Naproxen #12,397</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-Cause Mortality [deaths per person-years]</td>
<td>23.5/1000</td>
<td>13.8/1000</td>
</tr>
<tr>
<td>Hazard Ratio</td>
<td>1.71</td>
<td></td>
</tr>
</tbody>
</table>

Zeng: JAMA 2019

---

### Osteoarthritis/Tramadol

**Results: Follow-up within 1 year, Tramadol vs. Diclofenac**

<table>
<thead>
<tr>
<th></th>
<th>Tramadol #44,451</th>
<th>Diclofenac #6,512</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-Cause Mortality [deaths per person-years]</td>
<td>36.2/1000</td>
<td>19.2/1000</td>
</tr>
<tr>
<td>Hazard Ratio</td>
<td>1.88</td>
<td></td>
</tr>
</tbody>
</table>

Zeng: JAMA 2019
### Osteoarthritis/Tramadol

#### Results: Follow-up within 1 year, Tramadol vs. Celecoxib

<table>
<thead>
<tr>
<th></th>
<th>Tramadol #44,451</th>
<th>Celecoxib #5,674</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-Cause Mortality [deaths per person-year]</td>
<td>31.2/1000</td>
<td>18.4/1000</td>
</tr>
<tr>
<td>Hazard Ratio</td>
<td>1.70</td>
<td></td>
</tr>
</tbody>
</table>

Zeng: JAMA 2019

### Osteoarthritis/Tramadol

#### Results: Follow-up within 1 year, Tramadol vs. Etoricoxib

<table>
<thead>
<tr>
<th></th>
<th>Tramadol #44,451</th>
<th>Etoricoxib #2,946</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-Cause Mortality [deaths per person-year]</td>
<td>25.7/1000</td>
<td>12.8/1000</td>
</tr>
<tr>
<td>Hazard Ratio</td>
<td>2.04</td>
<td></td>
</tr>
</tbody>
</table>

Zeng: JAMA 2019
# Osteoarthritis/Tramadol

## Results: Follow-up within 1 year, Tramadol vs. Codeine

<table>
<thead>
<tr>
<th></th>
<th>Tramadol #44,451</th>
<th>Codeine #16,922</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-Cause Mortality [deaths per person-years]</td>
<td>32.2/1000</td>
<td>34.6/1000</td>
</tr>
<tr>
<td>Hazard Ratio</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>[95% CI 0.83 to 1.05]</td>
<td></td>
<td>No Difference</td>
</tr>
</tbody>
</table>

Zeng: JAMA 2019

---

## Bud’s Editorial Comments

This large database analysis is susceptible to confounding errors
- E.g. patients initially prescribed tramadol were a sicker cohort
- The investigators attempted to minimize this risk with propensity score-matching

However, the results are at least worthy of our consideration

It is also worth mentioning that tramadol is now emerging as a street drug of abuse
This young lobsterman has an uncomplicated Boxer’s fracture. I just know he won’t keep a gutter splint on and follow-up with the hand surgeon. Is there a better option for him?

Is Buddy Taping as Effective as Plaster Immobilization for Adults with an Uncomplicated Neck of 5th Metacarpal Fracture?
Boxer’s Fracture Rx

**Background:**
Boxer’s fractures account for approximately 20% of hand injuries

These typically involve young men

Work-related and economic realities can hamper management

Pellatt: Annals of Emergency Medicine 2019

---

Boxer’s Fracture Rx

**Background:**
Surgical intervention, once considered the standard of care, is now rarely required

Buddy taping and functional strapping have been introduced as more patient-friendly alternatives

Prolonged ulnar gutter splinting with hand surgery follow-up is currently a common practice

Are the outcomes of buddy taping acceptable?

Pellatt: Annals of Emergency Medicine 2019
### Boxer’s Fracture Rx

**Methods:**

- RCT, two Australian hospitals
- Adult patient with uncomplicated Boxer’s fractures

Study subject randomization:

- #48 buddy taping
- #49 plaster casting

Primary outcome:

- Hand function at 12 weeks

Secondary outcomes:

- Activities, pain, satisfaction

---

**Methods:**

- “Uncomplicated”
  - Minimally displaced
  - Closed
  - Isolated
  - No more than 70 angulation

---

Boxer’s Fracture Rx

Methods:

Hand function assessment tool

The lower the score, the better the function
Boxer’s Fracture Rx

Results: Follow-up @ 12 weeks:

<table>
<thead>
<tr>
<th></th>
<th>quickDASH Score</th>
<th>Missed Work Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buddy Taping</td>
<td>0 Range 1 to 2.3</td>
<td>0 Range 0 to 7</td>
</tr>
<tr>
<td>Casting</td>
<td>0 Range 0 to 4</td>
<td>2 Range 0 to 14</td>
</tr>
</tbody>
</table>

No differences in pain, satisfaction, final fracture angle

Pellatt: Annals of Emergency Medicine 2019

Bud’s Editorial Comments

- Although not a large study, I believe the results are potentially practice changing

- A middle of the ground approach at this time may be buddy taping with hand surgery/orthopedic follow-up

- For the young, active person (usually male) with an uncomplicated Boxer’s fracture, buddy taping appears to be a viable option

- If possible, discuss this article and its implications with your referral specialist(s) to best coordinate care
What, another messy anterior nosebleed?! Time to hazmat up. See you in an hour.

Does Oral or Topical Tranexamic Acid Control Bleeding from Epistaxis?
**TXA/Epistaxis**

**Background:**
Epistaxis will occur in at least 60% of people during their lifetime.

A number of interventions have been around for decades:
- vasoconstrictors
- cautery
- packing

These interventions are not always effective and can cause patient discomfort.

Can TXA add anything?

Bridwell: Annals of Emergency Medicine 2019

---

**Methods:**
Systematic review
- #6 RCT’s with #692 patients

Topical or oral TXA vs. placebo or usual care

Bridwell: Annals of Emergency Medicine 2019
TXA/Epistaxis

Results:

Hemostasis within 10 minutes (topical only) compared to usual care

Relative Benefit favors TXA

| RB 2.35 |
| [95%CI 1.90 to 2.92] |

Bridwell: Annals of Emergency Medicine 2019

432

TXA/Epistaxis

Results:

Rebleeding within 7 to 10 days (topical or oral) compared to placebo

Relative Risk favors TXA

| RR 0.71 |
| [95%CI 0.56 to 0.94] |

Bridwell: Annals of Emergency Medicine 2019

433
Evaluating Effectiveness of Nasal Compression with TXA Compared to Simple Nasal Compression and Merocel Packing: An RTC

Methods:

RTC: #135 patients presenting to an ED with uncomplicated epistaxis

#45: Atomized TXA (500mg diluted to 5ml with saline) + compression for 15 minutes

#45: Atomized saline + compression for 15 minutes

#45: Merocel packing with 2% lidocaine for 24 hours
**TXA/Epistaxis**

**Results:**

<table>
<thead>
<tr>
<th></th>
<th>Saline + Compression</th>
<th>TXA + Compression</th>
<th>Merocel Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Bleeding @ 15 Minutes</td>
<td>71.1%</td>
<td>91.1%</td>
<td>93.3%</td>
</tr>
<tr>
<td>Rebleeding Rate</td>
<td>40%</td>
<td>13.3%</td>
<td>26%</td>
</tr>
</tbody>
</table>

15% of patients in the packing group wanted the pack removed because of discomfort

Akkan: Annals of Emergency Medicine 2019

**Bud’s Editorial Comments**

- I’ve incorporated TXA into my epistaxis management, with impressive results
- For patients who refuse packing, atomized TXA appears to be an effective option as well
- I recommend topical administration, e.g. soaking gauze in 500-mg TXA and packing the involved nares for 15 minutes
So, while we’re on the topic of TXA for ENT challenges....

Nebulized TXA Use for Pediatric Secondary Post-Tonsillectomy Hemorrhage

Schwuertz: Annals of Emergency Medicine 2019
## TXA/Post-Tonsillectomy

### Methods:
- Case report
- 3-yo boy four days post-operative from tonsillectomy
- Massive oropharyngeal hemorrhage
- Uncooperative and terrified
- Nebulized racemic epinephrine ineffective
- Nebulized TXA 250-mg (2.5 mL) over 2-3 minutes resulted in prompt hemostasis

---

**Schwartz: Annals of Emergency Medicine 2019**

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## Bud’s Editorial Comments

- OK, OK!! It’s just a case report.
- But I recently treated an adult who presented with a post-tonsillectomy hemorrhage.
- He achieved persistent hemostasis 10 minutes after topical TXA gauze application.
- Try it, you’ll like it!
And while we’re updating Geriatric Medicine....

Antibiotic Management of UTI in Elderly Patients in Primary Care
Elderly UTI

**Background:**
Clinicians are often criticized for over-diagnosing and over-treating uncomplicated bacteriuria in elderly patients. Are there downsides to this practice?

This has resulted in more of these patients receiving delayed or no treatment.

Gharbi: BMJ 2019

---

Elderly UTI

**Methods:**
Retrospective European population-based cohort study

Adults aged 65+ presenting to primary care with suspected or confirmed UTI

#312,896 episodes in #157,264 patients

Outcomes measured within 60 days of index diagnosis:

- Bloodstream infections
- Hospital admissions
- All cause mortality

Gharbi: BMJ 2019
## Elderly UTI

### Results:

<table>
<thead>
<tr>
<th>ABX @ Initial Visit</th>
<th>Delayed ABX (within 7 days)</th>
<th>No ABX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bloodstream Infection</strong></td>
<td>0.2%</td>
<td>2.2%</td>
</tr>
<tr>
<td></td>
<td>aOR 7.12 [95%CI 6.22 to 8.14]</td>
<td>aOR 8.08 [95%CI 7.12 to 9.16]</td>
</tr>
<tr>
<td></td>
<td>NNH = 51</td>
<td>NNH = 37</td>
</tr>
</tbody>
</table>

*Gharbi: BMJ 2019*

---

### Elderly UTI

### Results:

<table>
<thead>
<tr>
<th>ABX @ Initial Visit</th>
<th>Delayed ABX (within 7 days)</th>
<th>No ABX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital Admission</strong></td>
<td>15%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>P = 0.001</td>
<td></td>
</tr>
</tbody>
</table>

*Gharbi: BMJ 2019*
### Elderly UTI

#### Results:

<table>
<thead>
<tr>
<th></th>
<th>ABX @ Initial Visit</th>
<th>Delayed ABX (within 7 days)</th>
<th>No ABX</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Cause Mortality</td>
<td>1.6%</td>
<td>2.8%</td>
<td>5.4%</td>
</tr>
<tr>
<td></td>
<td>NNH 83</td>
<td>NNH 27</td>
<td></td>
</tr>
</tbody>
</table>

Gharbi: BMJ 2019

---

#### Elderly UTI

#### Results:

All-cause mortality was higher if ABX were not prescribed at initial visit:
- Delayed
  
  Adjusted hazard ratio 1.16 [95%CI 1.06 to **1.27**]

- None
  
  Adjusted hazard ratio 2.18 [95%CI 2.04 to **2.33**]

Men older than 85 years were at higher risk for bloodstream infection and all-cause mortality.

Gharbi: BMJ 2019
Bud’s Editorial Comments

- This large UK study is somewhat provocative, but I found it to be of value

- We need to resist treating elderly patients with uncomplicated, asymptomatic bacteriuria

- However, if our pretest probability for UTI is moderate to high, starting ABX early is clearly beneficial for this patient population

- Be particularly aggressive with older men

What are my options for treating symptomatic carpal tunnel syndrome in my patients other than sending them to a hand surgeon?
The Clinical and Cost-effectiveness of Corticosteroid Injection vs. Night Splints for Carpal Tunnel Syndrome

Background:

– CTS is a relatively common condition that can adversely impact quality of life

– For mild to moderate CTS, non-surgical management is usually attempted as a first step

– Night splints or steroid injections are the conservative treatments more often implemented

Chesterton: Lancet 2018
Carpal Tunnel Syndrome RX

**Methods:**
- Randomized, open-label study
- #234 patients with mild to moderate CTS

**Night splinting for 6 weeks:**
#118

**Single steroid injection:**
#116
- 20-mg methylprednisolone acetate

**Primary Outcome:**
- BCTQ Scores

---

**Boston CT Questionnaire**

**Boston Carpal Tunnel Syndrome Questionnaire (BCTQ)**

<table>
<thead>
<tr>
<th>(—) Symptom severity scale (11 items)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How severe is the hand or wrist pain that you have at night?</td>
<td>Normal</td>
<td>Slight</td>
<td>Medium</td>
<td>Severe</td>
<td>Very serious</td>
</tr>
<tr>
<td>2. How often did hand or wrist pain wake you up during a typical night in the past two weeks?</td>
<td>Normal</td>
<td>Once</td>
<td>2 to 3 times</td>
<td>4 to 5 times</td>
<td>More than 5 times</td>
</tr>
<tr>
<td>3. Do you typically have pain in your hand or wrist during the daytime?</td>
<td>No pain</td>
<td>Slight</td>
<td>Medium</td>
<td>Severe</td>
<td>Very serious</td>
</tr>
<tr>
<td>4. How often do you have hand or wrist pain during daytime?</td>
<td>Normal</td>
<td>1-2 times / day</td>
<td>3-5 times / day</td>
<td>More than 5 times</td>
<td>Continued</td>
</tr>
<tr>
<td>5. How long on average does an episode of pain last during the daytime?</td>
<td>Normal</td>
<td>&lt; 10 minutes</td>
<td>10-60 minutes</td>
<td>&gt; 60 minutes</td>
<td>Continued</td>
</tr>
<tr>
<td>6. Do you have numbness (loss of sensation) in your hand?</td>
<td>Normal</td>
<td>Slight</td>
<td>Medium</td>
<td>Severe</td>
<td>Very serious</td>
</tr>
<tr>
<td>7. Do you have weakness in your hand or wrist?</td>
<td>Normal</td>
<td>Slight</td>
<td>Medium</td>
<td>Severe</td>
<td>Very serious</td>
</tr>
<tr>
<td>8. Do you have tingling sensations in your hand?</td>
<td>Normal</td>
<td>Slight</td>
<td>Medium</td>
<td>Severe</td>
<td>Very serious</td>
</tr>
<tr>
<td>9. How severe is numbness (loss of sensation) or tingling at night?</td>
<td>Normal</td>
<td>Slight</td>
<td>Medium</td>
<td>Severe</td>
<td>Very serious</td>
</tr>
<tr>
<td>10. How often did hand numbness or tingling wake you up during a typical night during the past two weeks?</td>
<td>Normal</td>
<td>Once</td>
<td>2 to 3 times</td>
<td>4 to 5 times</td>
<td>More than 5 times</td>
</tr>
<tr>
<td>11. Do you have difficulty with the grasping and use of small objects such as keys or pens?</td>
<td>Without difficulty</td>
<td>Little difficulty</td>
<td>Moderately difficulty</td>
<td>Very difficulty</td>
<td>Very difficult</td>
</tr>
</tbody>
</table>

---

Chesterton: Lancet 2018
### Boston CT Questionnaire

(二) Functional status scale (8 items):

<table>
<thead>
<tr>
<th>Activity</th>
<th>No difficulty</th>
<th>Little difficulty</th>
<th>Moderate difficulty</th>
<th>Intense difficulty</th>
<th>Cannot perform the activity at all due to hand and wrist symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Buttoning of clothes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Holding a book while reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Gripping of a telephone handle</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Opening of jars</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Household chores</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Carrying of grocery basket</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Bathing and dressing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

### Night Splints

![Night Splints Image](image-url)
Injection Technique

Carpal Tunnel Syndrome RX

Results at 6-week Follow-up:

<table>
<thead>
<tr>
<th></th>
<th>BCTQ Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splinting</td>
<td>2.29</td>
</tr>
<tr>
<td>Injection</td>
<td>2.02</td>
</tr>
</tbody>
</table>

Injection therapy demonstrated superior clinical effectiveness compared to night-resting splints

Adjusted Mean Difference -0.32
[95%CI -0.48 to -0.16; P = 0.0001]

Chesterton: Lancet 2018
## Bud’s Editorial Comments

- This study has limitations, e.g. blinding was impossible
  - ?? Placebo effect

- But the results are impressively in favor of injection therapy for mild to moderate CTS
  - Moderately better symptom improvement
  - Significant quality of life improvement

- I have incorporated this technique into my clinical practice

- Without any evidence to support this, I have my patients use night-splinting for 1-week post-injection