



Making Your “What Can Kill” List & Identifying That “Needle in a Haystack”

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Learning Objectives

- Recognize 3 of the most common complaints with potentially high morbidity
- Name 2 elements of history taking essential to r/o life threatening pathology
- Identify 4 physical exam findings that warrant concern for sepsis
- Understand 2 clinical tools that can aid in the risk stratification of chest pain.
- Distinguish 2 potential “red flags” for each the most common clinical complaints
- Review clinical cases



Introduction

- 136.9 million ED visits annually
 - 9% admission
 - 1% critical care
- Consistent increases in ED use last 2 decades
 - 69% are non/semi/urgent
 - Up to 56% are avoidable
- Reasons for seeking care
 - Limited access to timely primary care
 - Convenient after-hours care
 - Immediate evaluation and reassurance
 - Legal/financial obligation to treat
 - Referral

(CDC, 2017; New England Healthcare Institute, 2010)

Who is using the ED?



-
- Expected Source of Payment for ED Visits
 - 34.8% Private Insurance
 - 34.8% Medicaid/CHIP
 - 17.7% Medicare
 - 9.8% Uninsured/self pay
 - Expected Source of Payment for Hospital Admissions
 - 52% Medicare
 - Geriatric Population – by 2030 - 20% of US population
 - Complex medical history
 - Physiologic changes
 - Increased likelihood of significant pathology
 - Psychosocial considerations and ADLs
 - Mentation

(AHRQ, 2014; CDC, 2017; CDC, n.d.)

Why are they seeking care?

- Emergency Medicine
 - **Abdominal pain** – 8.1%
 - Chest pain – 5.2%
 - **Fever** – 3.7 %
 - **Headache** - 3.0%
 - **Cough** - 3.0%
- Primary Care
 - **Cough**
 - Back pain*
 - **Abdominal pain**
 - Pharyngitis
 - Dermatitis
 - **Fever**
 - **Headache**



(CDC, 2011; Finley et al., 2018)

General Triage Considerations

- Patient
 - Reliable – will they call or come back?
 - Reachable – can you follow up later?
 - Resources – do they have support at home?
- Evaluation
 - Provider skill set
 - Consider
 - What is your primary concern?
 - What is the end goal?
- Care Delivery Site
 - Day/time
 - Geographic location
 - Available clinical resources



What is the worst-case scenario?



CC: Chest Pain

CC: Chest Pain

#1 Rule out Acute Cardiopulmonary Pathology

- Acute coronary syndrome
- Cardia arrhythmia
- Coronary artery / aortic dissection
- Pneumonia
- Pulmonary embolism
- Secondary cardiopulmonary etiology
 - Heart failure secondary to hyperthyroid
 - Clotting secondary to CA

(Cayley, 2005)

Diagnosis	Primary Care (%)	Emergency Dept (%)
MS condition	36	7
GI disease	19	3
Serious CV disease	16	54
Stable CAD	10	13
Unstable CAD	1.5	13

CC: Chest Pain – PMHX

- History of chronic medical conditions
 - Diabetes, hypertension, hyperlipidemia, and chronic inflammatory dx
- Detailed cardiac history - “Have you ever had chest pain?”
 - Yes – does this fit the typical pattern?
 - h/o cardiac cath, stents, nitroglycerin use
- Stable versus unstable angina
 - *Three Concerning Presentations*
 - 1.) Angina at rest- especially > 20 minutes
 - 2.) New onset angina- limits physical activity
 - 3.) New pattern- more frequent, longer duration, less exertion
- Substance use – ETOH, tobacco, marijuana, cocaine use
 - “holiday heart syndrome” versus chronic alcohol use
 - precipitate arrhythmia – sinus tachycardia / a-fib
 - Demand ischemia, MI risk, cardiac amyloidosis

CC: Chest Pain – HPI / ROS

- HPI findings suspicious for pain of cardiac origin
 - “Classic”
 - Substernal
 - Sharp, crushing, stabbing
 - Radiation - upper extremity, jaw, back, or shoulder
 - Exertional
 - Also consider pain associated with:
 - Fatigue, diaphoresis, nausea, SOB/DOE, dizziness, palpitations, or syncope
 - Particularly in older adults and **women**
- HPI findings more suggestive for pain of XXX

CC: Chest Pain – Physical Exam

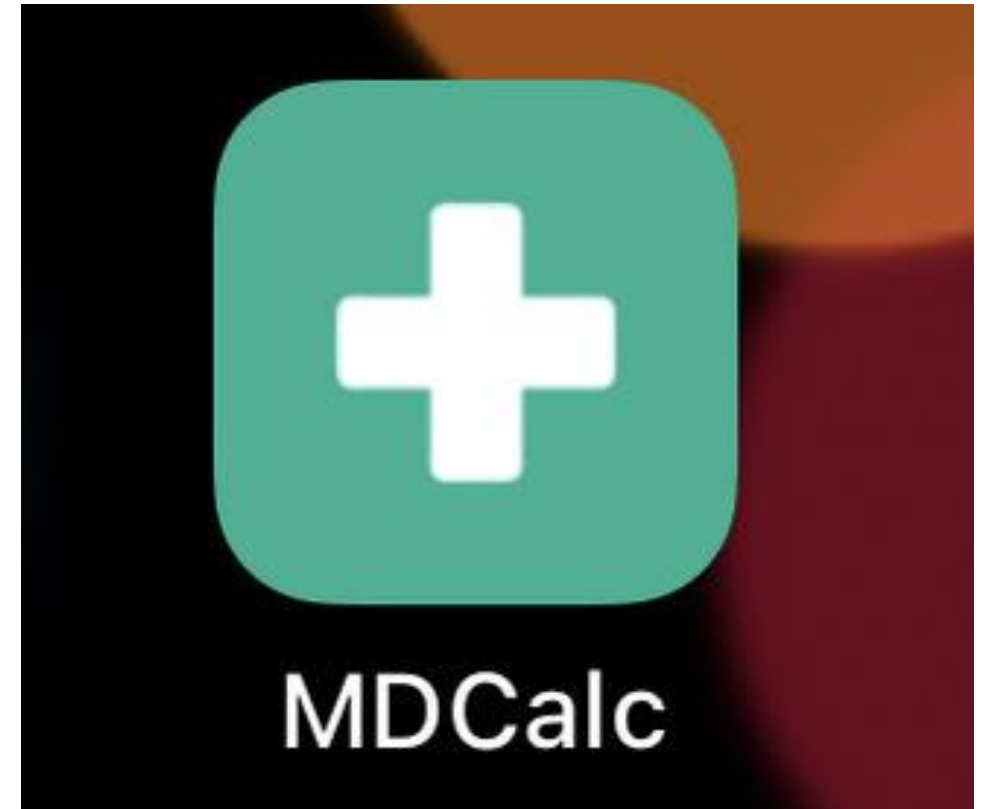
- Vital sign stability
 - Tachycardia / hypotension / oxygenation
- EKG – ideally with baseline for comparison
- Heart Sounds
 - Click, murmur, gallop, or rub
- Lung Sounds
 - Crackles, rales, rhonchi
 - Diminished breath sounds / older adults
- Signs of fluid volume overload
 - JVD / peripheral edema
- Reproducible CP or CP < inspiration
 - May make cardiac dx less likely - does not r/o underlying cardiac pathology
- Prior Echo / Stress test

CC: Chest Pain – Differential Dx

- Geriatric Concerns
 - Statistically higher risk with age, independent of other risk factors
 - Up to 65% of MI's occur \geq 65 yo
 - Increasing incidence of risk factors with age
 - HTN, HLD, DM, prior MI or CABG
 - More likely for atypical presentation
 - Syncope / weakness /confusion
 - More likely to have a NSTEMI than STEMI
 - Higher risk for significant morbidity/mortality if cardiac pathology is missed
- Differential Dx
 - Wide variety of causes
 - Cardiac, pulmonary, GI, musculoskeletal, or radiation from the abdomen
 - Can you reasonably r/o life threatening pathology?
 - EKG in office + "to troponin or not to troponin"
 - Does evaluation warrant a D-dimer?
 - Cardiology consult

CC: Chest Pain

- How do we determine who needs a work-up?
- Clinical Decision Support Tools
 - Clinically validated tools
 - Provide objective information
 - Help stratify risk



Marburg Heart Score

Use pt ≥ 35 yrs old presenting with CP to primary care

Do NOT use readily apparent cause of pain, clear anginal equivalent, or other testing suggests cardiac etiology

Category	No	Yes
Female ≥ 65 or male ≥ 55	No (0)	Yes (+1)
Known CAD, CVD, PVD	No (0)	Yes (+1)
Pain worse with exercise	No (0)	Yes (+1)
Pain reproducible on exam	No (+1)	Yes (0)
Patient assumes pain is cardiac	No (0)	Yes (+1)

- Uses as a NEGATIVE tool to help assess who is low enough risk to NOT require further work up
- Scoring
 - ≤ 2 unstable angina “highly unlikely” (neg predictive value 98%)
 - ≥ 3 unstable angina modest estimate (pos predictive value of 23%)

HEART Score- clinically validated to stratify risk

USE -patients ≥ 21 yrs old presenting with ACS symptoms

DO NOT USE – ST elevation, new EKG change, hypotension, end of life, required admission

Element	0	+1	+2
History	slightly suspicious	moderately suspicious	highly suspicious
EKG	normal	non-specific repolarization disturbance	significant ST deviation
Age	<45	45-64	≥ 65
Risk Factors*	none	1-2	≥ 3 or h/o atherosclerotic disease
Initial Troponin	\leq normal limit	1-3x normal limit	> 3x normal limit

*HTN, HLD, DM, BMI > 30, smoking, or +family history (1st degree relative with CVD <65ys old)

*Atherosclerotic Disease = prior MI, PCI/CABG, CVA/TIA or PAD

Scores

0-3 = 0.9-1.7% risk – discharged from ED

4-6 = 12-16.6% risk – hospital admission

≥ 7 = 50-65% risk - need immediate intervention

PERC Rule- clinically validated r/o PE in low-risk patients

low risk – deemed per provider gestalt

DO NOT USE – pregnancy or other conditions with increased risk for PE

Criteria	+1	0
Age \geq 50 years old	Yes	No
HR \geq 100	Yes	No
O2 Sats on RA $<$ 95%	Yes	No
Unilateral leg swelling	Yes	No
Hemoptysis	Yes	No
Recent surgery/trauma*	Yes	No
Hormone use*	Yes	No

Perc “Negative”

$<$ 2% PE probability

**ANY positive warrants
further workup**

* Recent surgery/trauma - \leq 4wks requiring tx with general anesthesia

*Hormone use – estrogen based oral contraceptives/hormone replacement

CC: Chest Pain – “Red Flags”

- Changes in VS and EKG
- Features suggestive of cardiac pathology
 - h/o chest pain
 - no prior history
- Upper back pain w/o associated injury
 - AAA / pneumonia
- Pain >24hrs – consider utility of troponin
- Known Vasculopathy
 - CV disease in one location is CV disease everywhere
- Scoring on clinical tools – high risk / unable to r/o





CC: Fever

CC: Fever - #1 Rule out Sepsis

- Most common reason for ED to hospital admission in ages 45-85yrs
- Mortality Rate
 - 20-30% for severe sepsis
 - 40-70% for septic shock
- Early Recognition & Management
 - 80% initially tx in ED

(AHRQ, 2011; Gauer et al., 2020)



SEPSIS: KNOW THE SIGNS, SAVE A LIFE

Sepsis is the body's life-threatening response to an infection. More than 80% of sepsis patients are **50 years of age or older.**

T I M E™

TEMPERATURE that's abnormal Signs of an **INFECTION** **MENTAL DECLINE** Feeling **EXTREMELY ILL**

If you suspect sepsis, act quickly. For every hour treatment is delayed, the risk of death increases by as much as 8%.

2019 **SEPTEMBER**
SEPSIS SAY SEPSIS SAVE LIVES
SEPSIS.AWARENESSMONTH.ORG

CC: Fever – PMHx

- Age of >65 years old
 - Febrile response may diminish with age - especially in first 72 hours
- Malnutrition
- h/o chronic disease
- Immunocompromise
- Recent hospitalization and/or surgery
 - 1/3 cases occur postoperatively
 - Indwelling devices
 - Dental procedures
- Exposure- sick contacts, travel, family
- Medications
 - Regular use of pain relievers
 - Immunosuppressive drugs
- Living situation may dictate workup – SNF / LTAC

CC: Fever – Physical Exam

Body System	Findings	Notes
Pulmonary	Cough/SOB / tachypnea	Most common
Cardiac	Tachycardia/hypotension/flushing/new murmur	s/sx of intravascular redistribution
Gastrointestinal	Abd pain/rigidity/decreased BS/diarrhea/vomiting	Early imaging / surgical consultation
Genitourinary	Abd pain/hematuria/vaginal discharge or bleeding	PID -sexually active females Pregnancy – miscarriage/retained products
Musculoskeletal	Joint pain or swelling/regional MS pain/weakness	Immediate surgical consultation
Neurologic	AMS/HA/neck stiffness	Older adults- subtle agitation/irritation
Dermatology	Lesions/ecchymosis/petechiae/splinter hemorrhage	direct lesions vs secondary (DIC)

CC: Fever – Differential Diagnosis

- Acute Cause → infection
 - Most common cause of sepsis – pneumonia
 - Other common causes – GI / GU / skin or soft tissue infection
 - Causative organisms – bacterial, gram-negative (62%) or gram-positive (47%)
 - Less common - fungal, viral or parasitic infection
 - 50% of patients will have no identified organism (“culture negative”)
- FUO → over 200 potential differentials
 - Infection (20-40%) – abd/pelvic abscess, endocarditis, sinusitis, TB (extrapulmonary)
 - Malignancy (20-30%) – colorectal CA, leukemia, lymphoma
 - Non-infectious inflammatory dx (10-30%) – SLE, RA, sarcoidosis, Chron’s / stills disease
 - Miscellaneous (10-20%) – drug-induced, thyroiditis, thromboembolism

(Gauer et al., 2020; Hersch et al., 2014)

CC: Fever - "Red Flags"

- Acute mental status changes w/o clear etiology
- Accompanied by changes in vital signs
 - Assume sepsis and treat accordingly - "work backward"
- Known high risk history elements / groups
 - Elderly /chronic conditions / immunocompromised / ETOH
 - Absence of fever
- With PE minimal findings, consider urgency for workup in FUO





CC: Headache

CC: Headache

#1 Rule out Acute Intracranial Abnormality

- CVA
- TIA
- Intracranial bleeding
- Tumor
- Secondary HA / AMS
 - Drug Rx
 - Meningitis
 - NMS
 - Trauma



CC: Headache – PMHx

- Established HA history
- Hypertension / Increased ICP
- Reported Trauma/Falls
 - Mechanism of injury, LOC, use of anticoagulants
- Recent Procedures
 - LP, rhinoscopy, dental extractions
- Medications – drug related intracranial HTN
 - Older adults may be more sensitive for drug reactions and/or polypharmacy –
 - Amiodarone, tetracycline, Trimethoprim/sulfamethoxazole, tamoxifen, cimetidine, corticosteroids, lithium, etc.

CC: Headache – HPI /ROS

- OLDCARTS
 - Recurrent – pattern of sx onset, duration, resolution
 - Associated systemic / neuro sx
 - Impact of activity on pain
 - Changes in vision
 - Psychosocial changes – stress, sleep, PO intake
- Low Risk Features
 - Age \leq 50yrs
 - History of similar HA sx with similar pattern of symptoms
 - No high-risk comorbid conditions
 - No new/concerning findings on exam

CC: Headache – Physical Exam

- Blood pressure and heart rate
- Mental Status
- CN 2-12
- Fundoscopy / otoscopy
- Symmetry – motor, sensory, reflexes and coordination
- Gait
 - Seated to standing, walking tiptoes/heels, tandem gait, Romberg
- Psychiatric - agitation, irritability, AVH

CC: Headache – Differential Diagnosis

- Over 150 types of headache
- **Know your Primary versus Secondary**
 - Primary – lifetime prevalence of 90%
 - 90% fall into 3 main types
 - Migraine
 - Tension type
 - Cluster
 - Most common - *NO neurologic findings*
 - Secondary
 - Caused by underlying disorder – systemic > neuro (8:1)
 - Relatively rare – typically with abnormal neurologic or other findings
 - *Require EMERGENT EVALUATION and/or ED treatment*

Primary HA Pathology

- Migraine Headache
 - Episodic - 25% with aura
 - Unilateral > bilateral
 - Throbbing or pulsating quality
 - Progresses over one – several hours
 - Associated features:
 - Nausea / vomiting
 - Photophobia
 - Phonophobia
 - Osmophobia
 - Cutaneous allodynia
 - Often with an identifiable “trigger” prior to onset
 - Duration 4hrs – several days

(Wootton et al., 2020)

Primary HA Pathology

- Tension Type Headache
 - Bilateral
 - Pressing or tightening quality (non-throbbing)
 - Mild to moderate in severity
 - Associated features:
 - Generally none
 - Can have photophobia OR phonophobia
 - Not aggravated by routine physical activity
 - Duration 30 minutes – 7 days

(Wootton et al., 2020)

Primary HA Pathology

- Cluster Headache
 - Often severe with accompanying autonomic symptoms
 - Reach full intensity within minutes
 - Unilateral Pain
 - Orbital
 - Supraorbital
 - Temporal
 - Unilateral Autonomic Symptoms – ipsilateral to pain
 - Ptosis
 - Miosis
 - Lacrimation
 - Conjunctival injection
 - Rhinorrhea /congestion
 - Periorbital edema
 - Facial sweating
 - Duration of 15 – 180 minutes

- **S**ystemic symptoms
- **N**eoplasm history
- **N**eurologic deficits (including AMS)
- **O**nset is sudden or abrupt
- **O**lder age (>50 years old) – mass / arteritis
- **P**attern changes or recent onset of new headache
- **P**ositional HA
- **P**recipitated by sneezing, coughing, or exercise
- **P**apilledema
- **P**rogressive HA with atypical presentation
- **P**regnancy or peripartum
- **P**ainful eye with autonomic features
- **P**ost-traumatic onset of HA
- **P**athology of the immune system (i.e. HIV)
- **P**ainkiller overuse

(Wootton et al., 2020)

Secondary HA Pathology

“Danger
Signs” =
SNN OOP10

Secondary HA Pathology

- Head trauma- ***always*** consider underlying bleed
- Vascular- CVA, arteritis, subarachnoid hemorrhage, AV malformation
- Infection - Acute cephalic/non-cephalic infection-viral or bacterial
- Metabolic Dx- hyper/hypoglycemia, hypoxia/hypercapnia, dialysis
- Substance use- s/e of acute/chronic use or withdraw

CC: Headache – Differential Diagnosis

- Primary HA Etiology– done!
- Secondary – consider what may be serious or life threatening
 - Sudden onset “thunderclap” HA
 - Subarachnoid hemorrhage
 - Acute neck pain or HA w/ Horner Syndrome and/or neuro deficits
 - Cervical or vertebral artery dissection
 - HA with fever, AMS, w/or w/o nuchal rigidity
 - Meningitis / encephalitis
 - HA with global/focal neuro deficits or papilledema
 - Increased ICP
 - HA with orbital/periorbital sx – visual impairment, periorbital pain, or ophthalmoplegia
 - Acute closed angle glaucoma, ocular infection, inflammation, orbital tumor, or vascular congestion

CC: Headache “Red Flags”

- Presentation inconsistent with primary headache
- Pain that is disproportionate to common etiology
- Be highly suspicious of “First or Worst”
 - New onset- age >50yrs
 - CVD, immunocompromise, or cancer hx
 - Sudden onset- i.e. “thunderclap”
 - Likewise chronic HA with changes in frequency, duration or severity
- Systemic Symptoms
 - fever, weight loss, night sweats, stiff neck, rash, etc.
- Ophthalmologic Emergencies
 - Frank pain in the eye, vision loss, and/or red eye require *EMERGENT* evaluation





CC: Cough

CC: Cough

#1 Rule out Acute Cardiopulmonary Pathology

OR acute on chronic pathology (i.e. COPD/CHF/etc.)

- Congestive heart failure
- Pulmonary embolism
- Pneumonia
- Pulmonary CA or metastasis
- Acute exacerbation of asthma / COPD
- Acute pericarditis
- Inhalation injuries

CC: Cough – PMHx

- h/o chronic conditions with associated cough
 - Asthma, COPD, CHF, seasonal allergies, or GERD
 - Also consider h/o CVA, dementia, etc.
- Tobacco use, marijuana use, or occupational exposure
 - Suspicious regarding dx of asthma late in life
- Medications
 - ACE inhibitors, beta blockers, statins, nasal fluticasone, Ca⁺ metabolism
- Geriatric Concerns
 - Multiple medical comorbidities may make diagnosis a challenge
 - Chronic cough may mask underlying dx such as malignancy - 70% of lung CA >65yo
 - Age increases risk for atypical pathology - silent aspiration, arrhythmia, neurogenic

CC: Cough – HPI / ROS

- Establish acute, subacute, or chronic
 - Acute < 3wks
 - Subacute 3-8 wks
 - Chronic > 8 wks
- What brings you in to see me now?
- Changes- i.e. frequency, sputum production, SOB
 - Does this feel like your typical asthma exacerbation?
 - If we took a walk, how many blocks could you make it?
- New onset
 - Chest pain, upper abdominal pain, recurrent vomiting, palpitations, hemoptysis, etc.

CC: Cough – Physical Exam

- Mental status
 - Swallow evaluation
- HEENT
- Pulmonary
 - Symmetric expansion
 - Breath sounds
 - Wheezing
- Cardiac
 - Rate, rhythm, murmur
 - EKG – “PVC induced cough”
- GI
 - Particularly with upper abdominal symptoms and/or reflux complaints

CC: Cough –Differential Diagnosis

- Acute pathology:
 - URI,
 - Pneumonia*
 - Aspiration*
 - Pulmonary emboli
 - Acute exacerbation of chronic dx (CHF/COPD)*
 - Malignancy – lung /pancreatic
- Chronic pathology:
 - COPD
 - CHF
 - GERD
 - Allergic rhinitis,
 - Tobacco / marijuana use
 - Autoimmune dx (lupus/sarcoidosis/rheumatoid arthritis)

CC: Cough – “Red Flags”

- Acute changes in quality, frequency, or sx associated with chronic cough
- Lack of relief with bronchodilators / inhaled corticosteroids
- Associated Symptoms –
 - AMS
 - Fever
 - SOB/DOE
 - Chest pain
 - Hemoptysis
- Lower threshold to workup in older adults
- Family history of malignancy





CC: Back Pain

CC: Back Pain

#1 r/o Acute Pathology w/associated morbidity & mortality

-Acute issues requiring surgical intervention

-High risk for infectious or malignant etiology

- Traumatic or atraumatic fracture
- Spinal cord injury
- Cauda equina
- Spinal epidural abscess
- Vertebral osteomyelitis
- Metastatic cancer

CC: Back Pain – PMHx

- Prior history of acute or chronic back pain
- Risk factors for pain:
 - Female gender
 - Obesity
 - Smoking
 - Physical and/or psychologically strenuous work
 - Anxiety / depression / somatic disorder
- Risk factors for infection
 - Current immunosuppression, hemodialysis, IV drug use, invasive epidural/spinal procedures, or other issues associated with endocarditis / bacteremia
- Risk factors for malignancy
 - No current clear guidelines

CC: Back Pain – HPI / ROS

- OLDCARTS
- Non-traumatic
 - Dermatomal / radicular distribution
 - Other impacted joints – which came first?
 - General ROS r/o non-spinal etiology
 - Pancreatitis, nephrolithiasis, pyelonephritis, AAA, herpes zoster
- Traumatic
 - MVC – seat belt, speed, air bag deployment, passenger ejection, fatalities
 - Falls – mechanism of fall, landing position, ability to ambulate
 - Heavy lifting and/or repeated lifting/movement

CC: Back Pain – Physical Exam

- Inspection of back and posture
- Palpation of the spine – vertebral / soft tissue tenderness
- Neuro exam
 - CN 2-12 grossly intact
 - Reflexes, strength, sensation and gait
 - Straight leg raise
- Gait and functional movement - back / hip pain
 - New onset inability to ambulate ALWAYS requires expedient work up
- Abdominal, pelvic, or additional MS exam
- Note: consider offering explanation of exam as you go

CC: Back Pain – Differential Diagnosis

- American College of Physicians and the American Pain Society
 - No indication for imaging in acute non-specific low back pain
 - Severe / progressive neurological deficits and/or serious underlying pathology
- “Red Flags” (limited evidence)
 - Advanced age
 - h/o cancer
 - Prolonged use of steroids
 - Severe trauma
 - Presence of contusions / abrasions

(Wheeler, 2021)

CC: Back Pain – “Red Flags”

- Acute changes in neurological status
- Pain in combination with systemic symptoms
- Trauma with any abnormal findings on exam
- Older adults – bone pathology / spontaneous fx
- Changes in functional status





Clinical Case Studies

Chief Complaint #1: “my chest feels heavy and it’s starting to make my left arm hurt”

Chief Complaint #1: Presentation

- 52 yo male with substernal CP approximately 24 hours
- VS: BP elevated 156/92, otherwise as expected for age
- PMHx: DM w/peripheral neuropathy, b/l BKA, HTN, HLD, ESRD on hemodialysis, MI x 2 with unstable angina, and depression
- HPI-
 - Pt reports intermittent non-exertional substernal chest pain with radiation to left arm
 - Lasting 30+min at a time, with last episode of pain approx. 12hrs
 - Pain resolves spontaneously, worse with stress, denies associated symptoms
 - Reports medication compliance, no nitroglycerin since onset, last dialysis yesterday
- ROS-
 - Denies f/c/n/v/d/c, diaphoresis, palpitations, diaphoresis, syncope
 - +DOE – but “no worse than normal”
- PE –
 - Appears markedly uncomfortable, leaning forward on exam table
 - RRR, S1/S1 w/o murmur, lungs are clear to auscultation throughout, no peripheral edema
 - EKG unremarkable w/no ST elevation

Chief Complaint #1: Work Up

- Refused transportation to ED
- EKG w/o acute ST elevation
- Labs in outpatient office
 - CBC, CMP, BNP, d-dimer, and troponin
- Discuss with patient risk for acute CV event given history
 - Inability to r/o ACS
 - Review potential complications "up to and including death"
- Signed AMA paperwork

Chief Complaint #1: Diagnosis

- Unstable Angina
- Steal Syndrome
- Considerations –
 - Though patient is not of advanced age, he has multiple medical and cardiovascular risk factors
 - Known “vasculopath”, prior h/o angina and lack of nitroglycerine use
 - Currently reports chest pain (<24hrs of duration) w/o other current explication

Chief Complaint #1: Lessons Learned

- ✓ Ultimately treatment is the patient's decision
- ✓ We have a duty to educate on potential consequences
- ✓ Vascular disease in one location is vascular disease everywhere
- ✓ Consider reaching out to cardiology
 - ✓ Care coordination is a game of telephone
 - ✓ Cardiology, vascular and nephrology

Chief Complaint #2: “my muscles hurt so bad!”

Case Study #2: Presentation

- 92 yo AA female with a 2 day h/o fever
- VS: T-max 101.5 and responsive to Tylenol, VS otherwise as expected for age
- PMHx: HTN, HLD and OA
- HPI –
 - Sudden onset of “flu like” symptoms
 - With associated decreased appetite and PO fluid intake
 - Reports she has “not gotten out of bed” since onset of illness due to myalgia
- ROS:
 - +malaise, chills, nasal congestion, productive cough, sore throat, generalized HA
 - Progressively worsening SOB x 24 hours
- PE-
 - Diminished breath sounds in the b/l bases, diffuse myalgia, otherwise unremarkable

Case Study #2: Work Up

- CBC, CMP, lipase, serial troponin x 3, d-dimer
- EKG
- Chest XR
- CT angiogram of the chest

Case Study #2: Diagnosis

- Influenza A
 - Saddle Pulmonary Embolism
- Considerations-
 - Advanced age, though relatively healthy prior acute illness limited mobility
 - Elevated temperature w/o improvement despite treatment
 - Changes from baseline - no prior h/o SOB
 - No audible crackles or evidence of pneumonia

Case Study #2: Lessons Learned

- ✓ Consider how acute illness impacts chronic disease
- ✓ Complications can develop quickly with advanced age
- ✓ Relationship building with patients can be life saving
 - ✓ Reported to office when not improving
- ✓ Psychosocial support impacts safety

Chief Complaint #3: “my head is just killing me, just make it stop”

Case Study #3: “Presentation”

- 39yo female with c/o sore throat and HA x 4 days
- VS- all within normal limits for age
- PMHx/PSHx – MDD, recently dx with bipolar depression per psychiatry and in the process of switching from citalopram to lamotrigine
- HPI-
 - Illness started with “flu like symptoms”- fatigue, malaise, f/c/n/v, myalgias, or sore throat
 - Most prominently with diffuse HA
- ROS-
 - Illness started with “flu like symptoms”- fatigue, malaise, f/c/n/v, myalgias, or sore throat
 - Most prominently with diffuse HA
- PE- neuro intact, normal HEENT, otherwise completely unremarkable
 - Normal labs
 - Normal head/neck CT
 - Down titrating citalopram while up titrating lamotrigine

Case Study #3: Work Up -ED 3x within 72 hours

- 1st Visit –
 - negative strep / negative flu
 - Presumed acute viral infection
- 2nd Visit
 - Normal labs – CBC, CMP, ESR, CRP,
 - CT scan of the brain and soft tissue neck with contrast – unremarkable
 - Provided reassurance and meds for symptom management
- 3rd Visit
 - Review of data above
 - No improvement with IV fluids + Toradol/Tylenol + viscous lidocaine

Case Study #3: Diagnosis

- Medication reaction
 - Effects of down titrating SSRI
 - Effects of up titrating lamotrigine
 - r/o aseptic meningitis
- Considerations
 - Serious mental illness
 - Pain disproportionate to complaint despite negative workup x 3
 - Ask yourself – what are we missing?
 - Recent medication changes - new onset with Rx for 1st antipsychotic



Case Study #3: Lessons Learned

- ✓ Always work up the medical FIRST
 - ✓ Then determine if psychiatric symptoms predominate
- ✓ When a patient comes back
 - ✓ Opportunity rethink diagnosis
- ✓ Must know your "life threatening" psychiatric med side effects
 - ✓ QT prolongation
 - ✓ Serotonin syndrome
 - ✓ Neuroleptic malignant syndrome
 - ✓ Steven Johnsons Syndrome
 - ✓ Anticholinergic toxidrome

Chief Complaint #4: “I just can’t quit coughing, I’ve tried everything!”

Case Study #4: Presentation

- 37 yo female with c/o cough x 7 days
 - VS: all within normal limits for age
 - PMHx/PSHx: GERD and mild intermittent asthma
 - HPI-
 - Household exposure to viral URI with frequent coughing over the last week
 - Remainder of sx have improved but cough persists
 - ROS -
 - Nasal congestion, dry cough with multiple episodes of post-tussive emesis (10+/day)
 - Last two of which have been accompanied by a few drops of blood
 - 48hrs of Intermittent substernal pain w/o radiation which is precipitated by cough
 - PE -
 - Nasal mucosal erythema, frequent dry cough, moderate epigastric/LUQ tenderness

Case Study #4: Work Up

- Labs – CBC, CMP, lipase, troponin
- EKG
- Imaging
 - Chest XR
 - CT of the abdomen/pelvis w/contrast
 - CT of the chest

Case Study #4: Diagnosis

- Pneumomediastinum
 - r/o esophageal perforation
- Considerations
 - Continued cough despite improving URI symptoms
 - Asthma w/o wheezing
 - Not consistent with prior sx – does this feel like your prior asthma exacerbations?
 - New onset hemoptysis
 - Inability to tolerate PO intake
 - Elevated lipase- elevated but not 3x upper limit of normal

Case Study #4: Lessons Learned

- ✓ Chest / upper abdominal pathology go hand in hand
- ✓ Find the source of symptoms
 - ✓ Most accurately accounts for clinical picture
 - ✓ History and pathology should be congruent
 - ✓ Don't fit most common pathology
- ✓ Engage colleagues in differential diagnosis
 - ✓ Paint a picture for radiology

Chief Complaint #5: “my back just won’t quit”

Case Study #5: Presentation

- 63yo female with c/o new onset low back pain x 2 months
- VS: all within normal limits for age
- PMHx/PSHx
 - h/o HTN (Losartan), HLD (atorvastatin), RA (methotrexate)
- HPI:
 - Reports a h/o fall down “ a few stairs” at onset of pain with negative XR at that time
 - Pain had “almost” resolved with rest, acetaminophen, and physical therapy
 - Spontaneous worsening of pain x 7 days, significantly in last 48hrs
- ROS:
 - Denies f/c/n/v/d, abdominal pain, changes in bowel habits or urinary sx
 - Denies numbness, tingling, immobility, bowel/bladder incontinence, or saddle anesthesia
- PE:
 - Diffuse pain throughout the lumbar spine & surrounding musculature
 - Neuro, sensory and motor intact throughout
 - Significant gait impairment – stooped over

Case Study #5: Work Up

- Imaging
 - Lumbar spinal XR
 - CT w/o contrast
 - Consider MRI



Case Study #5: Diagnosis

- Vertebral artery infarction
 - Avascular necrosis of the lumbar vertebrae
 - Collapse of lumbar vertebrae
- Considerations
 - Pain disproportionate to reported history - new functional limitation
 - Pt's age / medical conditions increase fracture risk
 - RA with long term corticosteroid use

Case Study #5: Lessons Learned

- ✓ Consider the guidelines BUT trust your assessment
 - ✓ Change in functional status, particularly weight bearing, warrants imaging
 - ✓ Consider CT even with negative XR s/p trauma or high index of suspicion
- ✓ Abnormal spinal imaging warrants expedient specialty consultation
- ✓ Treat the patient - not the imaging
 - ✓ Discharged home w/walker
 - ✓ Narcotics + gabapentin
 - ✓ f/u with neurosurgery w/in 72hrs

Take Home Message

- In the ED – horses are great! But, you want to consider your Zebra's first!
- Know your guidelines and appropriate clinical decision support tools
- Healthcare is a team sport – when in doubt, talk it out.
- Patients who return are an opportunity – dx / education
- Trust your clinical skills and treat the patient NOT the results

Thank you!

Questions?