High Risk Cases In Emergency

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Risky Choices

Hirschsprung’s
Tox Tunnel Vision
Atypical Chest Pain
“Eye” Would Hate to Miss This One
Rough “SEA’s”

Blood Cx Mayhem
Stroke: The Back of My Mind
Intussusception
Feeling the Pressure
Sepsis: Something’s Afoot
Medical Legal Case

- January 10, 2014
- 1250: EMS Called for 62 yo male with C.P.
  - BP 210/70, HR 100, RR 20, SpO2 97% RA
  - 6/10 0/10 after 2 NTG
- 1320: ED arrival in no distress
- Hx: 20 min of midsternal, dull CP radiating to the back. Similar symptoms 3 yrs ago.
- No other associated signs and symptoms
- Diagnostics: CBC, Troponin I, BMP: NL
- ECG & CXR ....

Lawsuit filed: August 2014
Dismissed Without Prejudice
ANEURYSMS - WHAT’S NEW


ASSOCIATIONS!
DISSECTIONS—WHAT’S CRITICAL

Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients With Suspected Acute Nontraumatic Thoracic Aortic Dissection

3.5/100,000/yr
Mortality Rate: 27%
CDIs?
D-dimer?
CTA = TEE & MRA

“Level C recommendations. In adult patients with acute nontraumatic thoracic aortic dissection, decrease blood pressure and pulse if elevated. However, there are no specific targets that have demonstrated a reduction in morbidity and mortality.”
DISSECTIONS—WHAT'S CRITICAL


- Neuro Sxs at Onset: 17%-40%
- Pain Free Dissection: 5%-15%


Type A
- 102 Consecutive Pts
- 29% had Neurological Sxs
- Only 2/3s had Chest Pain
• Radiation to the back is a critical symptom in CP
• CXR: An abnormal aorta in the context of chest pain is aortic pathology until proven otherwise
• Chest Pain + Neuro = Dissection
• Signal v. Noise (i.e. response to NTG)
• Atypical CP!

Medical Legal Case

• September 2, 2012: ED Visit #1
• 0500: 26 y/o female presented to ED
• CC: Vomiting for 1 hour
• HPI: “I took 5 Tylenol instead of 2.” Complained of a headache which has resolved (2015)
• BP: 106/58, HR: 72, RR: 16, T: 97.8
• PMHx: Former traumatic brain injury with 5 craniotomies, Seizure disorder (Tegretol)
• P.E.: Well appearing, benign abdominal examination
Management

• Diagnostics NL: CBC, BMP, UHCG, Urinalysis, Tegretol level
• Treatment: IV NS 500 ml/hr, Zofran 4 mg IVP
• Discharge: 87 minutes after arrival
• Dx: Viral syndrome, FU with primary care

Medical Legal Case

• September 4, 2012: ED visit #2
• BP: 106/72, HR: 84, RR: 18, T: 97.8
• CC: Nausea and Vomiting for 3 days
• P.E.: Well nourished, Alert, NAD
  – ABD: Benign, Normal BS, Non-tender
• AAS: Moderate stool
• Laboratory ...
• Treatment: IVF, MS, Ondansetron
• N-Acetyl Cysteine: 245 ml per hour

Outcome
Hepatorenal failure developed, but resolved weeks later.
Stages NAPQI Toxicity

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Nausea &amp; vomiting, abdominal pain, sweating, general discomfort, pale color</td>
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<tr>
<td>2</td>
<td>Liver injury develops</td>
</tr>
<tr>
<td>3</td>
<td>Hepatotoxicity peaks</td>
</tr>
<tr>
<td>4</td>
<td>Recovery stage for those who survive stage 3</td>
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</tbody>
</table>

- **Liver function tests** may be normal.
- **Liver injury** develops.
- **Hepatotoxicity peaks** with rapid & severe hepatic failure.
- **Encephalopathy & hypoglycemia** lead to coma & death.

**Acetaminophen Metabolism**

- Acetaminophen is metabolized through 3 different pathways:
  - 42% to 87% undergoes glucuronidation and is excreted in urine.
  - 28% to 36% undergoes sulfation and is excreted in urine.
  - 5% to 8% passes through the cytochrome P-450 pathway producing a potentially hepatotoxic metabolite, N-acetyl-p-benzoquinone imine (NAPQI).
• Don’t over-rely on levels
• Toxidrome + known ingestion = Cause and effect
• Think about cytochrome p450 inducers
• Consider chronic ingestions
• Histories, particularly in tox, can be unreliable

Medical Legal Case

• March 28, 2014: Initial ED Visit
• CC: Fever and sweating for 2 week
  – No other symptoms
  – He had been recently Tx with Azithromycin and was not improving
• PMHx: None
• P.E.: Thorough, but no abnormalities noted
Management

• CBC: NL (excluding WBC left shift)
• Two sets of blood Cxs were ordered
• Ceftriaxone 2gm IVPB administered
• Discharged: Rx for Doxycycline
• Follow up with PCP in 48 hours
• “You will be notified of positive results.”

Outcome

• First blood culture returned 2 days later
  – “Gram positive cocci”
  – Reported to the ED
  – EP determined it was a contaminant
  – Patient not notified
• Final: Staphylococcus aureus
  – Reported to the ED
  – Patient not notified
Outcome

- April 10, 2014: ED visit #2
- Patient presented to different ED
- CC: Fever, Chills, Rash
- Dx: Subacute Bacterial Endocarditis
  - Mitral Valve Replacement

- Outpatient blood cultures may create more risk than they are worth.
- 50% false positive rate
- Gram + cocci: Staph aureus, Viridans Strep
  - Two of the most common causes of SBE
- Staphylococcus epidermidis is also a Gram + cocci
- When looking for bad disease ...
- Most don’t need it and those that do may need admission
Medical Legal Case

- CC: “Rt eye blurred vision”
- HPI: 63 y/o female presented with a 2 day history of eye redness and blurred vision.
- Pain: 8/10
- PMHx: DM, HTN, Depression
- Meds: Metformin, Cardizem, Celexa
- VA: 20/70 (R); 20/30 (L)
- TX: Rx Blephamide gtts, 48 hour Ophtho F/U
  - (presented to ED on a Saturday)
- APP (physician co-signature)

Medical Legal Case

- Presented 18 hours later...
- Same complaint
- No change in vision or VA
- Tactile tension ok
- Physician only
- Rx: Pain meds, steroids and topical antibiotics
- 24 hour F/U

Dx: Allergic Conjunctivitis
Medical Legal Case

• Ophthalmology Follow Up
• Monday, Tuesday and Wednesday
• Eye Patch, Corneal specialist referral and a dilated eye exam
• “There was no evidence of increased intraocular pressure.”

Outcome

• 20/100 (R)
• Loss of peripheral vision
Acute Angle Closure
Glaucoma

- Red, painful eye
- “Steamy” hazy cornea
- Blurred vision / “halos”
- Nausea / headache
- Mid-dilated pupil, non-reactive

Jonathan Trobe, M.D. - The Eyes Have It
Acute Angle Closure Glaucoma

- Elevated intraocular pressure (40-70)
  - Normal range 10-21 mm Hg
- Mydriatics may precipitate it
- Dim light (dilated pupil) may precipitate it
- Risks: HTN, vascular disease, familial, ↑ IOP, diabetes
Glaucoma Treatment

• Treatment goal: ↓ IOP
• Decrease aqueous humor production
  – Topical beta-blocker (timolol)
  – Alpha agonists (apraclonidine)
  – Acetazolamide IV
• Mannitol IV: 1 gm per kg
  – Osmotically decompresses the eye

Glaucoma Treatment

• Topical miotic (pilocarpine)
  – Facilitates drainage of aqueous humor
  – Early in the attack the elevated IOP cause a pressure-induced ischemic paralysis of the iris and therefore pilocarpine is effective only AFTER the IOP is decreased
• Use miotics in unaffected eye
• Emergent ophthalmology consult
• Painful, red eyes all get IOP checked
• Tactile tension gives me tension

Hirschsprung’s
Case History

• HPI
  – 12 day old male patient
  – No BM for 2 days
  – “The mother is a very young mother”
  – “The child is on Enfamil with iron, which may be the culprit in this case.”
  – No fever
  – No anorexia
  – Suppository earlier produced “a small little poop ball”

Case History

• Physical Examination
  – HR: 180; RR: 32; T: 99.4
  – Current weight: 6# 12 oz
  – Birth weight: 6# 14 oz
    – Well appearing
  – Slight abdominal distension
    – Hyperactive B.S.
  – Consolable by the mother
Case History

• Diagnostics
  – Abd series: Mild distension and constipation
• ED Course
  – Suppository: “Fairly large defecation”
• Dx: Constipation
• Plan: Change formula and continue glycerin suppositories

Outcome

– Returned 9 days later
– CC: Swollen abdomen
– T: 101.4 and Irritable all day
– Subcostal retractions and distended abdomen with “tympani.”
– Full septic work up
– Abd series: “Mult dilated bowel loops”
– Radiologist: “Consistent with Intussusception”
Hirschsprung’s
Aganglionic Megacolon

- Absence of parasympathetic ganglia of Auerbach’s plexus between the circular and longitudinal muscle layers of the colon
- < 1cm to the entire colon and small bowel
- Spasm and abnormal motility
  - Chronic constipation (life long); or
  - Obstruction
- Always need assistance with BM
- Chronic abd distension and may be malnourished

**Failure to pass meconium**

Hirschsprung’s

- Vomiting uncommon
- Obstruction much more common in infancy
- Diagnostics
  - Plain radiography
  - Barium enema (no bowel prep)
  - Identification of the “transition zone”
    - Contracted aganglionic bowel and the dilated ganglionic segment
    - Retention of barium proximal to the transition point at 24 hours is very suggestive
  - Anorectal monometry (better for short segments, but not < 3weeks)
Hirschsprung's disease

- Chronic constipation may be more than the "formula"
- 4:1 M>F
- Nearly 100% Dx by age 2 years
- Meconium should pass within 48 hours of birth
Intussusception

Case History

• HPI
  – 15-yr-old male
  – Lower abdominal pain, cramps and vomiting for 3 hours

• Physical examination
  – BP: 120/64; HR: 122; RR: 24; T: 100.1
  – Abdominal: Soft, right mid abdominal tenderness, hyperactive bowel sounds
Case History

• Diagnostics
  – Laboratory: WBC 12.5, BMP, Lipase, UA all normal

• ED Course
  – IV fluids
  – Phenergan 12.5 mg IVP
  – Morphine sulfate 4 mg
  – Condition improved but not abd reassessment
  – Discharged after 4 hours
  – Dx: Gastroenteritis and Dehydration

Case History

• Outcome
  – Return visit at 1130 pm (approx 18 hours after discharge)
  – Cardiopulmonary arrest and pronounced at 1145
Intussusception

• Leading cause of intestinal obstruction in infants
  – 3 – 12 mo
• Ileocolic is most common
  – Small bowel: ileoileal via the ileocecal valve and continues into the colon (poss rectum)
  – Sausage shaped mass in Rt Abd 2/3
• Colocolic: Rare
• Infants: Hypertrophied Peyer’s Patches
  – Lead Point

Intussusception

• > 2 yrs: Alternative lead point
  – Meckel’s, Polyp, Duplication or Tumor
• Frequently preceded by days
  – Diarrheal illness
  – Viral Syndrome/URI
  – Henoch-Schönlein Purpura
• Classic triad (20%)
  – 1. Colicky abd pain
  – 2. Vomiting
  – 3. Rectal bleeding
Intussusception

- Colicky/Episodic abdominal pain
- Gradual irritability, anorexia and may vomit
- May appear well
- May be lethargic/listless
- Partial or complete SBO with gen distension
- Mass may be noted in RUQ
- 50%-75%: occult blood
- Lack of blood does not exclude the Dx
- Four classic x-ray findings / target sign, crescent sign, absent liver edge sign, bowel obstruction

Currant Jelly Stool 50%

- Mesenteric vein compression
- Arterial supply preserved
- Increased pressure = Currant jelly stool
  - Spontaneous; or
  - Rectal exam
- Increased pressure = Arterial compromise
- Bleeding reduces
- Bowel ischemia occurs
  - Perforation
Intussusception

CT Scan - Intussusception
US - Intussusception

Sensitivity for ileocolic intussusception = 98% / Specificity, 98%

Management

Diagnosis: plain x-ray, ultrasound, barium enema (“coiled spring” sign)
Treatment: air contrast enema, surgery
• All colic is not benign
• Intussusception is bimodal
• When in doubt: US or CT

Stroke: The Back of My Mind
Medical Legal Case

- Feb 10, 2012
- 62 y/o female presented to the ED via EMS @ 0110
- 23:00: Acutely dizzy with N/V
- VS: BP 160/78, HR 82, RR 16, T 98.8
- PMHx: HTN, Hyperlipidemia, DM, Vertigo
- Prior: Meclizine did not help
- Tx: ECG, Labs, CXR, Zofran, Ativan and Reglan
- 0500: Much improved and discharged
Outcome

- She returned < 48 hours later
- Awoke with:
  - Diplopia and right sided hemiplegia, slurred speech
- CT: ?

<table>
<thead>
<tr>
<th>Plaintiff</th>
<th>Defense</th>
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<tbody>
<tr>
<td>1. No neuro exam</td>
<td>1. Causation</td>
</tr>
<tr>
<td>2. No imaging</td>
<td>2. Awoke with Sxs</td>
</tr>
<tr>
<td>3. Lost chance (tPA)</td>
<td>3. Cerebellar stroke</td>
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RATE AND PREDICTORS OF SERIOUS NEUROLOGIC CAUSES OF DIZZINESS IN THE EMERGENCY DEPARTMENT


- 907 patients, UCSF ED 2007-2009
- Dizziness, Vertigo, Imbalance; Median duration: 1 day; 33% previous episodes
- Neuroimaging: 35%; Lab 72%; ECG 68%
- Serious Neurological disease: 5%
  Stroke (3%), TIA (1%), Neoplasm (1%), ICH (1%), Seizure (<1%), Demyelinating disease (<1%)
- CV: 4%, Other medical: 13%, 22%?

**Independent Predictors**

- Focal Neuro: OR 5.9
- 60 yrs: OR 5.7
- Imbalance: OR 5.9
- Isolated Dizziness: OR 0.20
For otherwise medically eligible patients ≥18 years of age, intravenous alteplase administration within 3 hours is equally recommended for patients <80 and >80 years of age. Older age is an adverse prognostic factor in stroke but does not modify the treatment effect of thrombolysis. Although older patients have poorer outcomes, higher mortality, and higher rates of sICH than those <80 years of age, compared with control subjects, intravenous alteplase provides a better chance of being independent at 3 months across all age groups (Class I; Level of Evidence A).

Severe Strokes

- For severe stroke symptoms, intravenous alteplase is indicated within 3 hours from symptom onset of ischemic stroke. Despite increased risk of hemorrhagic transformation, there is still proven clinical benefit for patients with severe stroke symptoms (Class I; Level of Evidence A).

**Mild Strokes-Disabling**

For patients with mild but disabling stroke symptoms, intravenous alteplase is indicated within 3 hours from symptom onset of ischemic stroke. There should be no exclusion for patients with mild but nonetheless disabling stroke symptoms in the opinion of the treating physician from treatment with intravenous alteplase because there is proven clinical benefit for those patients.

(Class I; Level of Evidence A)

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**Mild Strokes Non-Disabling**

Within 3 hours from symptom onset, treatment of patients with milder ischemic stroke symptoms that are judged as non-disabling may be considered. Treatment risks should be weighed against possible benefits; however, more study is needed to further define the risk-to-benefit ratio.

(Class IIb; Level of Evidence C)
Rapidly Improving Sxs

Intravenous alteplase treatment is reasonable for patients who present with moderate to severe ischemic stroke and demonstrate early improvement but remain moderately impaired and potentially disabled in the judgment of the examiner. (Class IIa; Level of Evidence A).

Because time from onset of symptoms to treatment has such a powerful impact on outcome, delaying treatment with intravenous alteplase to monitor for further improvement is not recommended. (Class III; Level of Evidence C)

Only 5% of the National Institute of Neurological Disorders and Stroke (NINDS) Study that led to U.S. Food and Drug Administration approval of alteplase for acute ischemic stroke had PC stroke (91) and data regarding PC strokes in the European Cooperative Acute Stroke Study III (ECASIII) was lacking.
• Informed consent or Informed refusal
• Document the discussion/Include S.O.s
• Thorough neurological exam on all potential neuro complaints
• Posterior circulation is tricky!
• Watch out for indication creep without new evidence
• Document your rationale for:
  – Imaging or not
  – tPA or not

Medical Legal Case

• 5/12/2013
• CC: “Left ankle and leg swelling?”
• HPI: 45 y/o old male presents to the ED 2 days following running a 5K. He suffered an inversion injury, but completed the race.
• PMHX: None
• Triage note: “Ambulates with a limp...”
  “Describes pain as tightness” 8/10
Medical Legal Case

• Tx
  – X-ray: Foot and Ankle Negative
  – Duplex US: Negative
  – Crutches
  – Jones Dressing
  – Rx: Percocet and Ibuprofen

• Follow up with orthopedist, “Call for an appt.”
Medical Legal Case

• Dx: Left ankle/foot sprain

Medical Legal Case

• 5/14/2013: 1045 am
• Evaluation by Orthopedist
• CC: Severe pain, swelling and redness
• Unable to sleep
• “significant swelling in his anterior and lateral compartments that could be consistent with compartment syndrome.”
• Referred to the ED for possible compartment syndrome or cellulitis
Medical Legal Case

• 11:49: Arrives at ED
• Triaged: 12:55
  – APN at Triage: Labs and US ordered
• 17:45: Physician evaluation
• Tx: Cefazolin 1gm IVPB, MS 4mg IVP
• Admit to hospitalist (telephone orders given)
  – 0800 ID: Agreed with cellulitis
  – 12:05 Ortho: Compartment pressures checked

Outcome

Left leg anterior and lateral compartment fasciotomies, decompression and muscular debridement.

Disability and disfigurement: Must wear a leg brace for the rest of his life and experiences daily pain
• Pain out of proportion: To exam and Hx
• Overreliance on presence of pulses
• Must address other providers DDx
• Know what your discharge instructions include
  – (Compartment syndrome?)


Double the mortality at 5 yrs!
5/4/17

40

750,000 Hospitalizations
570,000 ED visits
200,000 Deaths
$16.7 Billion

975 with Sepsis
Mortality Rates

Hospital: 8.9%
1 yr: 23% v. 1%
2 yr: 28.8% v. 2.6%
5 yr: 43.8% v. 8.3%

Endless Complications

• Death
• ARDS
• MODS
• Renal Failure
• Hepatic failure
• Encephalopathy
• DIC
• Purpura Fulminans
• Septic Emboli
• Endocarditis
• Cavernous sinus thrombosis
• Limb/Digital amputations
LIFE AFTER SEPSIS FACT SHEET
WHAT SEPSIS SURVIVORS NEED TO KNOW

ABOUT SEPSIS
What is sepsis?
Sepsis is a complication caused by the body's overwhelming and life-threatening response to infection, which can lead to tissue damage, organ failure, and death.

What causes sepsis?
Any type of infection that is anywhere in your body can cause sepsis. It's often associated with infections of the lungs (e.g., pneumonia), urinary tract (e.g., kidney), skin, and gut. An infection occurs when germs enter a person's body and multiply, causing illness and organ and tissue damage.

LIFE AFTER SEPSIS
What are the first steps in recovery?
After you have had sepsis, rehabilitation usually starts in the hospital by slowly helping you to move around and look after yourself by eating, bathing, dressing, walking, and going about your daily life. The purpose of rehabilitation is to give you the strength and skills you need to lead as normal a life as possible. This might involve hospital stays, home visits, or rehabilitation by telehealth or at your activity center, and not when you are tired.

How will I feel when I get home?
You may have been seriously ill, and not been fully well enough to get better. You may experience the following physical symptoms upon returning home:
- Generalized or extreme weakness and fatigue
- Headaches
- General body pain or aches
- Difficulty moving around
- Difficulty sleeping
- Weight loss, lack of appetite, food not tasting normal
- Dry and itchy skin that may peel
- Brittle nails
- Hair loss

• Decreased mental (cognitive) functioning
• Loss of self-esteem and self-belief
• Organ dysfunction (kidney failure, respiratory problems, etc.)
• Amputations (loss of limb(s))
The need for two or more SIRS criteria to define severe sepsis excluded one in eight otherwise similar patients with infection, organ failure, and substantial mortality and failed to define a transition point in the risk of death.

1,171,797 patients, a total of 109,663 had infection and organ failure.

Medical Legal Case

- September 9, 2013: ED visit #1
- 46 year old female CC: Right Flank Pain & Nausea
- PMHx: Renal Calculi, No Meds, No SocHx/FHx
Management

- **Treatment**
  - IVF NS 1,000 ml
  - Hydromorphone: 1, 1 and 2
  - Ketorolac: 30 IVP (105 min later) 30 IVP
  - Ondansetron: 4 IVP
    - Pain 2/10 (3.5 hours after arrival)

- **Diagnostics**
  - Labs: Urine, Labs, CT

References:

Disposition

- Discharged: Rx for Percocet & Zofran
- Discussed with urologist via telephone
- “Offered admission”

Outcome

- September 11, 2013
- CC: N, V, Not eating, Chills
- BP: 101/72 (92/54), HR: 126, RR: 24, T: 102.4
- P.E.: Moderate distress, Dry MM, BL CVA tenderness
- Treatment: Acet, Hydromorphone, Vancomycin, Ceftriaxone, IVF, Central line
- Diagnostics: WBC: 4.7 (36% bands), Dohle bodies, PLT: 54, CO2: 17, BUN/CR: 45/3.2, Lactate: 6.4
- Admission to ICU: Ureteral stent, Norepinephrine
Infection + Obstruction = Admission
Urinary pH is not a wasted test
“Offering” ≠ “Recommending”
Preliminary rad interp can be misleading
Patient education about sepsis
Informed discussion/consent for vasopressors
Rough “SEAs”

Medical Legal Case

• CC: Back pain, numbness and abdominal pain
• 26 y/o Male
• Rt lower back pain for 1wk
• Seen at different ED twice in past 24 hours
  – Dx: “Sciatica”
• Numbness from knees down 4 hours prior to arrival
• PMHx: IDDM, Schizophrenia, ADD
Medical Legal Case

• Physical Examination
• VS: T 101.6, HR 105, RR 20, BP 136/80
• Abdomen: Soft and Non tender
• T8-L1 paraspinal tenderness near ML
• Distal sensation NL
• “Can’t move legs secondary to severe pain”

Medical Legal Case

• Diagnostics
• WBC: 13.9 with 11% bands
• UA Neg
• Abd CT: Paravertebral ST swelling T7-L2 (no discitis)
• Chest XR: NAD
• Antibiotics: Vanco & Nafcillin
• Consult: NSGY: Stop antibiotics due to Cxs
Medical Legal Case

• Patient to be transferred
• Dx: Acute discitis
• “The patient is schizophrenic, not convinced that the patient can’t move his legs.”
• Transferred at 0010 (original arrival 1645)
• T-L MRI ordered: Canceled by radiology
  – Needs Plain Skull, Abd and Chest XR
• Performed at 0445
• 1247: Negative (but Thoracic portion not performed)
• Reordered: 1300
• Results: Posterior Epidural Collection T4-T12
• Taken to OR

Medical Legal Case

• Outcome
  – Paraplegic
  – Discharged to skilled nursing/rehabilitation
• Hospital Settlement (undisclosed)
• Initial EP

- Risk factor assessment
- ESR v. CRP
  - ESR outperformed CRP: 100%/67%
- Imaging
- Control period v. Study period
  - Delays 83.6% v. 9.7%
  - Deficits 81.8% v. 19.4%

- Incidence: Incr from 1/20,000 to 2/20,000 admissions
- 63 Pts with SEA
- 75% have delayed Dx
  - 51% have 2 or more ED visits
- Residual deficits: 41% in delayed Dx
- Classic Triad: Back pain Fever Neuro deficits: Sens/Spec: 7.9%/99.2%
- 98% ESR > 20


- Presenting chief complaint was site-specific pain (100%), subjective, fevers (50%), and weakness (47%).
- IV drug abuse (39.1%), diabetes mellitus (21.9%), and no risk factors (22.7%)
- 54.7% had lumbar, 39.1% thoracic, 35.9% cervical, and 23.4% sacral
- Methicillin-sensitive: 40%
- Methicillin-resistant: 30%

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“With an aging population, increasing use of spinal instrumentation and vascular access, and increased prevalence of injection drug use, current estimates of incidence range from 2 to 12.5 per 10,000 admissions.”

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