Medical Legal Case Studies

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Case # 1: History

- 55 y/o male
- Chief complaint: R-sided HA for 1 week
- In addition:
  - 3 weeks of R-ear pain
  - Prescribed amoxicillin then Augmentin
  - Subjective fevers
  - 3 episodes of vomiting last 2 days
- Wife: Earlier in the day was “not acting right”

Case # 1: History

- PMHx: Diabetes & hypertension
- Meds: Meds for above
- Allergies: None
- Admits to smoking & alcohol use
- Denies drug use
- ROS: Denies neck pain & photophobia
  - Otherwise unremarkable

Case # 1: Physical Examination

- Vitals on arrival:
  - **BP** 168/90 **P** 98 **R** 22 **T** 37.8ºC (100.0ºF)
  - **O_2 Sat** 98% RA **Pain** 10/10
- General: In moderate distress
- HEENT:
  - PERRLA; EOMI; moist mucous membranes
  - L-TM neg; R-TM hazy; no erythema
- Neck: Supple
- Neuro: WNL; unable to assess gait due to pain

Case # 1: ED Course

- Orders:
  - IVF 1 liter NS
  - Tylenol 650 mg PO
- Labs: BMP & CBC
  - Glucose 315; WBC 12 (normal differential)
- Reassessment:
  - No change in mental status; likely tension HA
- Diagnosis:
  - 1) Headache; 2) Chronic ear pain
- Plan: D/C home with pain meds; F/U in 1-2 weeks

Case # 1: Follow up

- Returns in 3 days with AMS
- Had an episode of seizure prior to arrival
- Has had fevers last 2 days
- Head CT: Intracranial abscess with shift
- Developed signs of herniation in ED
- Cardiopulmonary arrest
- Unable to resuscitate

Brain Abscess
Predisposing Factors

- Underlying disease:
  - HIV, neutropenia, transplant
  - Immunosuppressive therapy
- Disruption of natural protective barriers (50%)
  - Operation, trauma
  - Mastoiditis, sinusitis, dental infection
- Systemic sources (~35%)
  - Bacteremia, endocarditis

Brouwer MC, et al. *N Engl J Med*. 2014;371:447-56.

Brain Abscess
Common Microbial Causes

- HIV: *Toxoplasma gondii*
- Neutropenia: Gram-negative bacilli
- Transplantation: Aspergillus, nocardia
- Trauma, surgery
- Otitis media, mastoiditis
- Sinusitis, dental infection
- Endocarditis: *S. aureus*, streptococci

Polymicrobial

Brouwer MC, et al. *N Engl J Med*. 2014;371:447-56.

Brain Abscess

- Clinical manifestations:
  - Headache (most common)
  - Fever, AMS (often absent)
  - Neurologic signs (depends on size & site)
  - Seizures (25%)
- Diagnosis:
  - CT with contrast
  - MRI (helps to differentiate from tumor)
- Blood & CSF cultures (25%)

Brouwer MC, et al. *N Engl J Med*. 2014;371:447-56.

Brain Abscess

- Neurosurgical consultation
- Antimicrobial therapy:
  - Vancomycin ***plus*** metronidazole ***plus***
  - 3rd (ceftriaxone, cefotaxime) ***or***
  - 4th (cefepime) cephalosporin
- Alternative: Meropenem ***plus*** vancomycin
- For transplant patients add:
  - Voriconazole (aspergillus)
  - TMP/SMX (nocardia)

Brouwer MC, et al. *N Engl J Med*. 2014;371:447-56.

Brain Abscess

- Steroids
  - May reduce antibiotic penetration into CNS
  - Use only if there is profound edema
- Anticonvulsant therapy:
  - Not routinely recommended
- Complications:
  - Ventriculitis (high mortality)
  - Hydrocephalus
  - Herniation

Brouwer MC, et al. *N Engl J Med*. 2014;371:447-56.

Case # 2: History

- 38 y/o female c/o L flank pain x 2 days
- Sudden onset of pain, severe & intermittent
- Multiple episodes of non-bloody vomiting
- Reports chills & subjective fever
- Admits to dysuria but no hematuria
- Has had hesitancy & urgency
- No diarrhea, CP or SOB

Case # 2: History

- PMHx: HIV
  - Unknown last CD4 count or viral load
  - Unknown if has AIDS-defining illness
- Meds: None (has not taken for 1 year)
- Allergies: None
- Denies smoking, alcohol or drug use
- ROS: Unremarkable

Case # 2: Physical Examination

- Vitals on arrival:
  - **BP** 170/90 **P** 110 **R** 24 **T** 38.5ºC (101.3ºF)
  - **O_2 Sat** 98% RA **Pain** 10/10
- General: Alert & in severe distress
- HEENT & neck: PERRLA, supple
- Lungs & heart: CTA; tachycardia, no murmur
- Abdomen: Diffusely tender, guarding
- Rectal: Refused
- Neuro: A&O x4; grossly non-focal neuro exam

Case # 2: ED Course

- Orders:
  - IVF 1 liter NS
  - Zofran
  - Morphine
  - Tylenol
  - BMP, CBC
  - UA & culture
  - CT-KUB

130	108	20	108
3.4	17	1.8	

4.9	12.3	91
	36.9	

Lymphocyte: 8%

CT: 6 mm KS in left UPJ with hydroureteronephrosis

UA: + nitrites & LE
32 WBC, 52 RBC

Case # 2: ED Course

- Urology consultation & recommendation:
  - Discharge with antibiotics & pain meds
- Reassessment note:
  - Patient still nauseous but feels better
- Repeat vitals:
  - **BP** 148/82 **P** 98 **R** 22 **T** 37.9ºC (100.2ºF)
- Discharge instructions:
  - F/U with urologist & return for worsening Sxs

Case # 2: Follow up

- Patient returns in less 48 hours
- Hypotension, AMS
- Requiring intubation
- Severe sepsis, develops DIC
- Extremity ischemia
- Requiring amputations

Ureteral Calculus

- Indications for urgent intervention:
  - Obstructed, infected upper urinary tract
  - Impending renal deterioration
  - Intractable pain & vomiting
  - Anuria
  - High-grade obstruction of a solitary or transplanted kidney

Teichman JMH. *N Engl J Med*. 2004;350:684-93.

Ureteral Calculus

Upper urinary tract obstruction

↓

Increases renal pelvic pressure

↓

Reduces glomerular filtration & renal blood flow

↓

Impairs entry of antibiotics into collecting system

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Need for emergency decompression

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Percutaneous nephrostomy or ureteral stenting

Teichman JMH. *N Engl J Med*. 2004;350:684-93.

Acute Nephrolithiasis & Pyuria

- 360 patients; 8% had UTI
- 50% of patients with UTI were afebrile
- Higher likelihood of infection:
  - Clinical features of UTI
  - Greater degree of pyuria
  - Female gender

Abrahamian FM, et al. *Ann Emerg Med*. 2013;62:526-33.

Acute Nephrolithiasis & Pyuria

	All Patients		Without Fever	
WBCs (/hpf)	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
>5	86	79	79	81
>10	79	87	71	89
>15	75	91	64	93
>20	68	93	57	94

Abrahamian FM, et al. *Ann Emerg Med*. 2013;62:526-33.

Case # 3: History

- 42 y/o male c/o low back pain for 3 weeks
- Can not recall how it all started
- Pain described as severe & constant
- Admits to chills & subjective fever
- Denies abdominal pain & urinary complaints
- Treated for UTI x 2 within last 3 weeks

Case # 3: History

- PMHx:
  - DM, schizophrenia & bipolar disease
- Meds: DM meds
- Allergies: None
- Admits to smoking; occasional alcohol use
- Denies drug use
- ROS: Unremarkable

Case # 3: Physical Examination

- Vitals on arrival:
  - **BP** 138/84 **P** 82 **R** 18 **T** 37.1ºC (98.8ºF)
  - **O_2 Sat** 100% RA **Pain** 10/10
- General: In moderate distress
- HEENT, neck, lungs & heart: Unremarkable
- Abdomen: Soft, non-tender
- Refuses rectal examination
- Back: Diffusely tender
- Neuro: Moves all extremities; sensation intact

Case # 3: ED Course

- Glucose (fingerstick): 315
- UA: 6 WBC, 0 RBC, trace LE, no nitrite
- 1 Vicodin & Ibuprofen 800 mg
- Reassessment note:
  - Feels better; doubt UTI
  - Likely musculoskeletal back pain
  - Maybe due to psychiatric disorders
- F/U with PCP if pain not improved

Case # 3: Follow up

- Returns in 4 days with worsening pain
- Now with radiation to the left flank area
- Lumbar CT:
  - L3 & L4 osteomyelitis
  - Psoas abscess
- Underwent surgical drainage
- Developed *C. difficile*-associated diarrhea

Vertebral Osteomyelitis

- Results from:
  - Hematogenous seeding
  - Spinal surgery
  - Spread from adjacent structures
- Primary focus of infection (50%):
  - Urinary tract
  - Skin & soft-tissue / vascular access site
  - Endocarditis, bursitis, septic arthritis
- Microbiology: *S. aureus*, *E. coli*

Zimmerli W. *N Engl J Med*. 2010;362:1022-9.

Vertebral Osteomyelitis

- Complications:
  - Neurologic (higher with cervical spine)
  - Paravertebral & disk-space abscess
  - Epidural abscess (C > T > L)
  - Psoas abscess
  - Relapse
  - Death

Zimmerli W. *N Engl J Med*. 2010;362:1022-9.

Vertebral Osteomyelitis

- Clinical features:
  - Back pain (L > T > C); fever (35%-60%)
  - Neurologic complaints (33%)
  - Spine tenderness (20%)
- Diagnosis often delayed
- Elevated WBC or neutrophils not sensitive
- Blood cultures (~60%)

Zimmerli W. *N Engl J Med*. 2010;362:1022-9.

Vertebral Osteomyelitis

- Imaging:
  - Plain radiography
  - CT
  - MRI (r/o epidural abscess, herniated disk)
- Antimicrobial therapy:
  - Best if started after blood & bone cultures
  - Start if critically ill or abscess
  - Vancomycin ***plus*** ceftriaxone ***or*** levofloxacin

Zimmerli W. *N Engl J Med*. 2010;362:1022-9.

Take Home Points

- Brain abscess
  - HA with chronic ear infection think brain abscess
  - Consult neurosurgery, start antibiotics in ED
- Ureteral calculus
  - Obstructed, infected urinary tract = Surgery
  - High-grade obstructed solitary kidney = Surgery
- Vertebral osteomyelitis
  - Vertebral osteomyelitis think endocarditis
  - Vertebral osteomyelitis think epidural abscess

Take Home Points

- Documentation:
  - It is the quality (“key words”), not the quantity
  - Re-evaluation: Improved, unchanged, worsened
  - Repeat vitals
- Address abnormal labs
- Document refusal of care with risks
- Document discussions with consultants
- Avoid attributing physical findings to psychiatric illness