Theory of Everything

- Carlos D’Assumpcao MD
  ID Fellow
- Arash Heidari MD
- KMC, Bakersfield, CA
- IDAC November 6, 2021
No disclosures
CC: Low BP sent by PCP to ED

- 57-year-old male with DM2 and HTN
- Sent to ED from his PCP office due to 103F and BP of 77/38
- Sick for 4 weeks:
  - Four weeks ago
    - Two days of fever, vomiting, night sweats, loss of appetite, diarrhea. Self resolved.
  - Three weeks ago
    - During trip to San Francisco, fever, diarrhea, vomiting. Presumed GERD by family.
CC: Low BP sent to ED

• One weeks ago
  • LLQ pain. Urgent care diagnosed UTI Rx nitrofurantoin
  Three days later, developed urinary retention. Went to OSH ER.
  • CT: Enlarged prostate, “stable 8 mm liver lesions"
  • Ceftriaxone IV to TMP/SMX, foley and PCP follow up

• One day ago
  • wife (RN) removed foley at home
• PMH
  • DM2
  • Neuropathy
  • HTN
• Hospitalizations
  • “sepsis” 3 years ago
  • Incidental 8 mm liver lesion
    • Biopsy 2 years ago:
      • Necrosis and acute inflammatory cells
      • Negative fungal and mycobacterial cultures
• PSH
  • Colonoscopy last year
    • 6mm sigmoid tubular adenoma polyp
    • 5mm descending colon polyp with hyperplastic change
  • Jaw surgery
  • Leg surgery
• Allergies
  • Penicillin – rash, swelling of throat
• Medications
  • Aloglipitin 25mg po daily
  • Amlodipine 5mg po daily
  • TMP/SMX 800/160mg bid
  • Duloxetine 60mg daily
  • Tamsulosin 0.4mg daily
  • Gabapentin 900 mg AM, 900mg noon, 1200mg qhs
  • Glipizide 5mg po daily
  • Empagliflozin 25mg po daily
  • Atorvastatin 80mg po qhs
  • Loratidine 10mg po daily
  • Losartain 100mg po daily
  • Metformin 1000mg po BID
  • Omeprazole 20mg daily
• FH
  • Maternal aunt: gastric cancer
  • Maternal first cousin: breast cancer
Social History

- Tobacco/ETOH/IDU: denies
- Recreational drugs: denies
- Homelessness: denies
- Travel: San Francisco for 4 days 3 weeks ago
- Animals: denies
- Insects: mosquitos
- Dairy: sour cream about 1 month ago
- Occupation: Unemployed but worked as IT
- Hobbies: watching sports
- Sick contacts: denies
- Sexual history: MSW but not currently sexually active
- Antibiotic exposure: TMP/SMX, ceftriaxone, nitrofurantoin
Tc 36.5C, BP 87/55, HR 109, RR 16, O2 97% on RA

- General: alert, no acute distress.
- Skin: warm, dry.
- Head: no trauma, normocephalic.
- Neck: trachea midline, no adenopathy, no tenderness.
- Eye: normal conjunctiva, sclera clear.
- Cardiovascular: **tachycardia** at 109 with regular rhythm, normal peripheral perfusion.
- Respiratory: lungs CTA, respirations non-labored.
- Chest wall: no deformity.
- Gastrointestinal: soft, non distended, **mild suprapubic tenderness**, no guarding.
- Extremities: no deformity, no trauma.
- Neurological: oriented x 4, LOC appropriate for age, CN II-XII intact, motor strength equal & normal bilaterally, sensation equal & normal bilaterally, speech normal.
Labs

- CBC: 40.2/11.7/34.9/165, 21% bands
- BMP: 124/4.3/89/25/30/1.66/335
  - Hgb A1c 7.3% (2 months prior to presentation)
- LFT: 1.1/326/295/454/7.1/1.6
- Lactic acid 3.9 mmol/L
- Procalcitonin 115 ng/ml
- PSA 5.1 ng/ml
- Beta-hydroxybutyrate 3.6 mmol/L
- UA Glu 1000, Nitrate negative, Leuk Esterase large, WBC >50
Initial Management

• 30 cc/kg IV fluids
  • Lactic acid 1.6
• Urine indwelling foley placed
• Blood and catheterized urine cultures collected
• Vancomycin, Ceftriaxone 2g IV daily, Metronidazole
• Cr 1.03 from 1.66
  • Contrast enhanced imaging obtained
Pause
Microbiology

- Urine: *Klebsiella pneumoniae*
  - Intermediate to Nitrofurantoin MIC 64
- Blood: *K. pneumoniae*
  - 2 of 4 bottles
- Prostate abscess: *K. pneumoniae*
- Pararenal abscess: *K. pneumoniae*
- Hepatic abscess: *K. pneumoniae*
- TURP fluid: *K. pneumoniae*

<table>
<thead>
<tr>
<th>Drug</th>
<th>MIC Interp</th>
<th>MIC Dilutn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin/Clavulanate</td>
<td>S</td>
<td>&lt;2</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>R</td>
<td>&gt;=32</td>
</tr>
<tr>
<td>Ampicillin/Sulbactam</td>
<td>S</td>
<td>4</td>
</tr>
<tr>
<td>Cefepime</td>
<td>S</td>
<td>&lt;=1</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>S</td>
<td>&lt;=1</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>S</td>
<td>&lt;=0.25</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>S</td>
<td>&lt;=1</td>
</tr>
<tr>
<td>Piperacillin/Tazobactam</td>
<td>S</td>
<td>&lt;=4</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>S</td>
<td>&lt;=1</td>
</tr>
<tr>
<td>Trimethoprim/Sulfa</td>
<td>S</td>
<td>&lt;=20</td>
</tr>
</tbody>
</table>
Further Travel History

• Wife is from Philippines
  • Visited Philippines three years prior
Stroke Alert HD 10

• New onset left extremity weakness
  • Unable to lift left arm
  • Full strength right arm
  • Right leg drift
  • Full strength left leg

• Double vision
  • Right eye: Horizontal gaze palsy when looking right and left
  • Left eye: Horizontal gaze palsy less when looking medially with left eye
  • Bilateral vertical nystagmus when looking up
1 and ½ syndrome

- Conjugate horizontal gaze palsy in one direction plus an internuclear ophthalmoplegia in the other
- Single unilateral lesion of the paramedian pontine reticular formation, or
- Abducens nucleus on the one side (causing the conjugate gaze palsy to the side of the lesion)
- DDX: MS, brain stem stroke, brain stem tumors, AV malformations, brain stem abscess

Joseph Kanasz BFA. Cleveland Clinic Center for Medical Art and Photography 2015
Further management

- Ceftriaxone 2g IV q12h + Ciprofloxacin 500mg IV q8h
  - Goal of 8-12 weeks
- Transferred to higher level of care for stereotactic brain abscess drainage
Hypervirulent *K. pneumoniae*

- Community > nosocomial
- Clinical labs unable to distinguish from classic
- Asian Pacific Rim but now global
- Multiple sites of infection:
  - Liver abscess (without biliary disease)
  - Endophthalmitis
  - CNS abscess
- Hypermucoviscousity:
  - Positive string test > 5 mm
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Finding for pathotype</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>hvKp</td>
</tr>
<tr>
<td>Location for the development</td>
<td>More commonly the community</td>
</tr>
<tr>
<td>of infection</td>
<td></td>
</tr>
<tr>
<td>Host</td>
<td>All ages; often otherwise healthy</td>
</tr>
<tr>
<td>Ethnic background</td>
<td>Often Asian, Pacific Islander, Hispanic</td>
</tr>
<tr>
<td>Hepatic abscess</td>
<td>Usually occurs in the absence of biliary disease</td>
</tr>
<tr>
<td>Number of sites of infection</td>
<td>Often multiple</td>
</tr>
<tr>
<td>Unusual infectious syndromes for</td>
<td>Endophthalmitis, meningitis,(^c) brain abscess,</td>
</tr>
<tr>
<td>K. pneumoniae</td>
<td>necrotizing fasciitis, splenic abscess,</td>
</tr>
<tr>
<td></td>
<td>epidural abscess</td>
</tr>
<tr>
<td>Copathogens at the site of</td>
<td>Rare, usually monomicrobial</td>
</tr>
<tr>
<td>infection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cKp</td>
</tr>
<tr>
<td></td>
<td>More commonly a health care setting</td>
</tr>
<tr>
<td></td>
<td>Older, with some form of compromise</td>
</tr>
<tr>
<td></td>
<td>No ethnic predilection</td>
</tr>
<tr>
<td></td>
<td>Usually occurs in the presence of biliary disease</td>
</tr>
<tr>
<td></td>
<td>Usually single</td>
</tr>
<tr>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Not uncommon, especially with abdominal, soft tissue, or</td>
</tr>
<tr>
<td></td>
<td>urinary catheter infection</td>
</tr>
</tbody>
</table>
Hypervirulent *K. pneumoniae*

- Large virulence plasmids
- Chromosomal mobile genetic elements
- Up to 4 siderophore systems for iron acquisition
- Increased capsule production
- K1 and K2 capsule types
- + Colibactin toxin.

Post-transfer update

• Higher level of care for 2 weeks
  • Ceftriaxone 2g IV q12h
  • Repeat MRI Brain showed shrinking brain lesions
    • No surgical intervention needed. Risk > Benefit
  • Complications: acute cholecystitis
    • Percutaneous cholecystostomy drainage
    • Metronidazole 500mg q8h
  • Discharged to Acute Rehab

• Acute rehab 11/5/2021
  • Walking without assistance
  • No more double vision
  • Potential discharge home next week
  • PCP follow up soon
    • MRI brain w/wo contrast pending
    • CT abdomen w/wo contrast pending

• Ciprofloxacin 500mg q8h
• Metronidazole 500mg q8h
String Theory:
Theory of Everything