The Complexities of Shock

PCCM Review course

November 5, 2022

Case Presentation

- 45yo woman transferred to BWH for evaluation of septic shock
- Her recent history had been significant for left leg cellulitis 3 months PTA. This had been treated successfully and she was DC'd to home
- 1 wk PTA she noted right leg cellulitis; associated findings included fever to 101.7; treated with Tylenol. Assoc symptoms included poor PO intake.
- 1 day PTA patient noted by her mother to be confused; she did not want to go to the hospital however
- DOA patient had increased confusion and she was brought to OSH.

PMH/FH/SH

- PMH: obesity with BMI >80; recent cellulitis as above
- Meds: Tylenol
- Allergies: Oxacillin
- FH: negative for immunodeficiency syndromes
- SH: single, lives with her family (mother, sister, niece); additional family includes a brother
  - No history of tobacco, ethanol, vaping, or recreational drug use
  - No recent travel
  - Works from home at a desk job, no avocational exposures
  - Family pets include dog and multiple cats

OSH

- Initial evaluation showed jaundiced skin, hypotension with BP 80/40, HR 105, RR 39
- Initial labs showed VpH 7.02, WBC 38, lactate 6.4, Tot bili 19 w/direct 17; O2 sat on VBG 61%
- Patient intubated for airway protection
- Cultures drawn, broad spectrum antibiotics (vanco/cefepime) started
- CT of head, chest, abd unrevealing; leg with probable cellulitis but suboptimal study
- Patient given a volume challenge and started on norepinephrine

BWH Course

- Persistent shock noted
  - Vasopressin and then epinephrine added; additional volume added
  - Hydrocortisone added for persistent shock despite volume and triple pressors
- Empiric coverage for sepsis broadened
  - OSH cultures showed 4/4 bottles with GNR
- Severe oliguria despite diuretic challenge
  - CVVH started

Refractory Distributive Shock

- What is the differential?

Refractory Distributive Shock

- Sepsis
- Adrenal insufficiency
- Spinal shock
- Cytokine release syndrome
- Anaphylaxis

Pertinent Labs

- CBC WBC 40, HCT 28, plts 93
- Coags INR 1.5
- Lytes K 5.7, Na 134, BUN 114, create 8.12
- LFTs AST 53, ALT 17, Alk phos 371, Tbili 20 Dbili
- ABG 7.22/48/92 (100% FiO2)
- VBG 7.17, O2 sat 81%

Severe Septic Shock

- What is your differential?

Severe Septic Shock

- Normal Host
  - Staphlococcus aureus
    - Sepsis
    - Toxic Shock
  - Necrotizing fasciitis
  - Clostridial infections
  - GNR bacteremia
    - Intestinal perforation
    - Cholangitis
    - Infected necrotizing pancreatitis
- Immunocompromised Host - all of the above and add
  - Fungal sepsis
  - GNR due to typhlitis

Course, continued

- Call to OSH microbiology lab – GNR ID pending but initial testing suggesting Vibrio
  - Doxycycline added to regimen
- Repeat scan done
  - No findings suggestive of necrotizing fasciitis
  - Abdomen unrevealing
  - Head CT concerning for possible increased intracranial pressure

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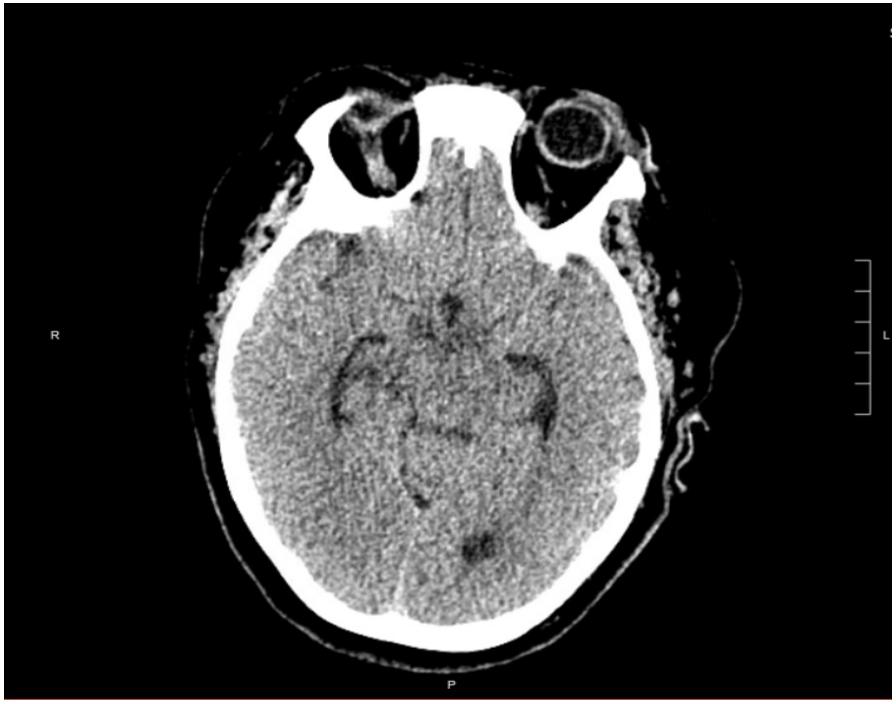

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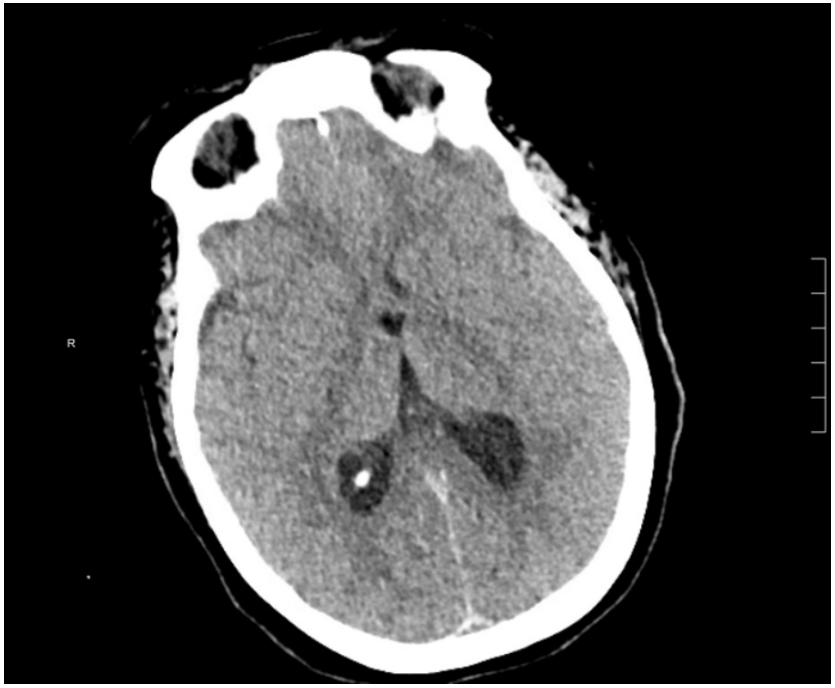

Course, continued

- Neurology and Neurosurgery consulted
  - Follow up scan stable but CTA with diffuse narrowing of vessels concerning for increased intracranial pressure
  - Bolt placed for monitoring – ICP satisfactory
- ID consulted to assist with evaluation
- PEEP adjusted using esophageal balloon
- Additional consults included General Surgery and GI

Course, continued

- GNR from blood ID pending for several days
- Tracheal aspirate from OSH showed GNR, ID'd as Pasteurella
  - GNR from blood later ID'd as Pasteurella
- Viral studies negative

Course, continued

- Complications included
  - Shock – normotensive off pressors as of 10/6
  - Renal failure – resolved; off HD since 10/30
  - Respiratory failure – extubated 10/4
  - “Shock liver” – resolved although later had transaminitis d/t unasyn
  - Severe weakness - ongoing
  - Altered mental status – resolved; MRI showed old lacunar CVA
  - GIB – EGD showed Dieulafoy lesion; clipped with resolution of bleeding

Pasteurella

- Family of aerobic Gram-negative coccobacilli
  - Several species
    - P multocida
    - P canis
    - P dagmatis
    - Precise ID can be difficult in the laboratory
  - Normal upper digestive flora in cats and dogs
    - Multiple other species including rats, pigs, and foxes
  - Transmission to humans
    - Bite or scratch
    - Shedding in urine

Human Disease

- Most Common
  - Skin/soft tissue
    - Local pain, swelling, erythema
    - Regional lymphadenopathy
    - Most commonly after a bite, may only be exposure to saliva
    - Sometimes only proximty to animals reported
  - Additional sites of localized infection
    - Arthritis
    - Osteitis
    - Epiglottitis
  - Different than “Cat scratch” fever, which is caused by Bartonella

Pasteurella and Systemic Disease

- Disseminated infections are rare (20 – 30 over 10 yrs in general hospitals)
  - Bacteremia
  - Pneumonia
  - Meningitis
  - Peritonitis
- Most common in immunocompromised hosts (2/3 of bacteremic patients)
  - Cirrhosis (24 – 77% patients with bacteremia)
  - Advanced age
  - COPD (higher risk of pneumonia)
  - DM
  - Cancer/Cancer therapy
  - HIV
  - Connective tissue disease

Management Considerations

- Treatment
  - Susceptible to penicillins (PCN), third or higher generation cephalosporins, carbepenems, fluroquinolones, trimethoprim-sulfamethoxazole
  - Avoid first and second generation cephalosporins and semi-synthetic PCN
  - Beta lactamase can be seen up to 16% of isolates
  - Chronic infections can be associated with antibiotic resistance
- Prognosis of disseminated disease
  - 50% required ICU admission
  - 40% had associated shock
  - High mortality – 14 – 37%
    - Higher mortality with presence of comorbidity
    - May reflect severe sepsis rather than Pasteurella

Risk Factors in Our Patient

- Cellulitis
- Presence of household dog
- Notably absent
  - DM
  - Cirrhosis (although NASH possible)

Bibliography

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