72 yo F with RUQ Pain, Pancytopenia, Splenomegaly, Nausea, and Vomiting

Ultrasound Scholarly Concentration

Case Conference Series

August 18, 2021

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I. Case
II. Clinical Question
III. Literature Review
IV. Key Points
Case Presentation

- 72 yo F, visiting from Ohio, with HTN, HLD, Hypothyroidism, Gout
  - Home Meds: Levothyroxine, Allopurinol, Diltiazem, Atenolol

Initial Presentation:
- **Subjective:** Several weeks of RUQ pain, non-bloody vomiting, fever, chills. No cough, no diarrhea
- **Objective:**
  - Initial CBC: WBC 7.4, Hgb 13.1, **Plt 57 | Lactate = 2.2**
  - HR 110, RR 17-33, T = 101 F, O2 90% RA
  - CXR:
  - RUQ U/S:
Case Presentation

Formal RUQ U/S
Formal RUQ U/S (continued)
Case Presentation

Formal RUQ U/S Findings
- Classic shadowing stone, no evidence of acute cholecystitis

Why start with RUQ U/S?
- GB is common source of RUQ pain and can be well-visualized with U/S
- Low cost
- Accessible
- Radiation-free
Case Presentation

• 72 yo F, visiting from Ohio, with HTN, HLD, Hypothyroidism, Gout
  – Home Meds: Levothyroxine, Allopurinol, Diltiazem, Atenolol

Initial Presentation:

• **Subjective:** 5 weeks of RUQ pain, non-bloody vomiting, fever, chills. No cough, no diarrhea

• **Objective:**
  – Initial CBC: WBC 7.4, Hgb 13.1, Plt 57 | Lactate = 2.2
  – HR 110, RR 17-33, T = 101 F, O2 90% RA
  – CXR: Unremarkable
  – RUQ U/S: 2.5 cm gallstone, no acute cholecystitis, 7 mm hypoechoic pancreatic focus (cyst vs mass)

• **Initial Plan:** O2, Blood Cultures X2 + Sepsis Rx w/ Fluid Bolus + IV Vanc, Cefepime, Flagyl
Case Presentation

Next Morning (Hospital Day #2)

- Weakness, Confusion, Persistent Fever, Less Vomiting, New Profuse Diarrhea
- Labs:
  - Pancytopenia (WBC 7.4 → 3.1, Hgb 13.1 → 10.4, Plt 57 → 34)
    - Dilutional?
  - A1c = 7.6 (Glucose = 185) | Creatinine = 0.63
  - Tbili 1.8, Dbili 1.3, AlkPhos 42, ALT 28, AST 31
  - Procalcitonin = 9.93 | Negative GI Panel (inc. – C.diff)
  - LDH 362 (H), Haptoglobin < 1 (L)
  - Smear = No Schistocytes, real thrombocytopenia
    - Why is the smear important?
Why is the smear important?

• Rule out TTP (life-threatening)
  – Pentad = *FAT RN* Mneumonic
    • Fever, Anemia (*esp. MIHA*), Thrombocytopenia, Renal + Neuro Impairment

• Dx:
  – Basic: Schistocytes + anemia/thrombocytopenia w/ increased retic count, signs of hemolysis (low haptoglobin, high LDH)
  – Confirm = ADAMTS13 Deficiency (up to weeks…don’t wait on this to treat)

• **TTP Basic Rx:** Plasma exchange Fluids, electrolytes + acid/base, RBC transfusion, steroids
Case Presentation

Further Hospital Day 2

Work-Up

• Lots of time with family and re-examining patient in afternoon:
  – Splenomegaly

POCUS of LLQ

First localized spleen in LUQ, which was visualized into LLQ with movement of probe
Case Presentation

CT Findings

- Marked splenomegaly (spleen persists into imaging at level of pelvis)
- “3.3 cm area of heterogenous hypoenhancement at lower pole of R kidney”
  → Rec for CT Renal Mass Protocol
Case Presentation

Hospital Day #3

- **Subjective:** Neuro improved, other symptoms improving but still weak w/ vomiting and diarrhea.
- **Further history:** Episode of unexplained urinary incontinence 1 week ago, 5 weeks RUQ pain w/ prior negative w/u, Hx nephrolithiasis + sepsis 8 months ago, 10 pounds unintentional weight loss (190 → 180 pounds) since, Chronic splenomegaly worsening from 18.4 cm to 20.3 cm length in last 2 years
- **Labs:**
  - Persistent Pancytopenia (WBC 3.1 → 3.7, Hgb 10.4 → 9.8, Plt 34 → 34)
  - Tbili 1.8 → 1.1, LFTs otherwise unchanged and WNL
  - Hepatitis Panel Negative | Iron Studies: TIBC 167 (L), Ferritin 546.5 (H), Iron 34 (L), 20% Fe Sat (LLN) | Coombs Negative
  - B12, Folate Normal | INR 1.27
- **Treatment Plan**
  - ID, Heme/Onc consults
  - CT Renal Protocol, Abx down to IV Cefepime per ID, maintenance fluids, cultures NGX1
  - Further heme w/u with flow cytometry; platelets if develops bleeding, likely close outpatient f/u
Case Presentation

CT Renal Mass Protocol

IMPRESSION:

AGAIN NOTED IS A MASS LIKE AREA OF HETEROGENEOUS ENHANCEMENT IN THE LOWER POLE RIGHT KIDNEY. IN A PATIENT WITH FEVER, THERE IS CONCERN FOR RENAL ABSCESS/FOCAL PYELONEPHRITIS. HOWEVER AT THIS POINT MALIGNANCY STILL CANNOT BE EXCLUDED AND REMAINS IN THE DIFFERENTIAL.

HIGH ATTENUATION IN THE RIGHT RENAL PELVIS SUGGEST DEBRIS OR DEGREE OF HEMORRHAGE WITHIN THE COLLECTING SYSTEM. NO OBSTRUCTION.

MARKED SPLENOMEGALY WITH THE SPLEEN MEASURING 20.3 CM.

➡️ Urology Consult
What do you think?
Hospital Day #4

- Subjective: Improved, requests discharge to get home to Ohio
- Unremarkable flow cytometry
- Unclear consensus on renal lesion: focal abscess/pyelo vs malignancy
- ID: IV Cefepime inpatient → Oral Ciprofloxacin outpatient
- Close outpatient f/u; interval renal imaging to r/o malignancy
- 2 Month Phone Check-In: Pneumonia soon after discharge, no other update
Final Diagnosis

• Most likely: Renal abscess/pyelo → sepsis

• Other considerations/possibilities:
  – Renal malignancy
  – Underlying heme disorder?
  – Abx → pancytopenia?
Clinical Question

What is the best way to evaluate a patient for sepsis?
SIRS Criteria vs Bacteremia vs Sepsis

SIRS
- 2/4 of HR > 90 | RR > 20 | WBC > 12K or < 4K | T > 38 C or < 36 C

Bacteremia
- Bacteria in blood

Sepsis
- ?

Sepsis Guidelines:
The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)
SIRS Criteria vs Bacteremia vs Sepsis

Sepsis

- Pathophys: Cytokines (bacteria induced) $\rightarrow$ vasodilation $\rightarrow$ Ischemia
  - Possible: Capillary Leak $\rightarrow$ Edema | Intravascular Hypovolemia $\rightarrow$ Coag $\rightarrow$ DIC
- Old Definition: Sepsis = SIRS Criteria + Suspected/Confirmed Infection
  - Severe Sepsis = Sepsis + One Organ System Dysfunction
- New Definition (Sepsis-3):
  - Sepsis = “Organ dysfunction caused by dysregulated response of host to infection”
  - SOFA (Sequential [sepsis-related] Organ Failure Assessment) Score > 2

Sepsis Guidelines:
The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)
Sepsis in Our Patient

Thrombocytopenia in Sepsis

- “Thrombocytopenia (TCP) is often found in patients diagnosed with severe sepsis in the critical care unit with incidence up to 55%. ”1 Possible: Capillary Leak → Edema | Intravascular Hypovolemia → Coag → DIC

qSOFA Score: 2/3 = High Risk
- SBP < 100 – No
- RR > 22 – Yes
- Altered Mental Status – Yes

Also had mildly elevated lactate at initial presentation

References:
Procalcitonin Value

Sensitivity = 77%
Specificity = 79%

Procalcitonin Value
Sensitivity = 77%
Specificity = 79%

Is it worth obtaining a procalcitonin?
- Sensitivity and specificity aren’t great
- Not worth obtaining in every patient; however, could be beneficial for r/o in some
  - Have seen increased utilization in COVID patients to r/o secondary bacterial pneumonia

Literature Review

Antibiotics and Thrombocytopenia?
Always consider
Not leading theory for our patient given thrombocytopenia on admission, prior to abx

Abstract

Thrombocytopenia is a condition characterized by a decreased number of platelets in peripheral blood, which can be caused by a myriad of both congenital and acquired disorders. Drug-induced thrombocytopenia (DIT) deserves a special focus since its cumulative incidence can be as high as 10 cases per million population per year, with a prevalence of approximately 25% in critically ill patients. This condition is usually suspected following identification of an acute and severe decrease in platelet count, with values usually ≤ 50 × 10⁹/L, thus potentially exposing patients to an increased risk of developing spontaneous hemorrhages. Conversely, however, some drug-related thrombocytopenias are instead (and perhaps counterintuitively) associated with increased thrombosis risk. Although a vast number of drugs have been implicated in DIT, the underlying pathogenetic mechanisms are essentially bifold, encompassing reduced platelet production due to bone marrow suppression (thus insufficient maturation or inefficient expansion of megakaryocytes, impaired release of platelets, or accelerated platelet apoptosis) or accelerated clearance of platelets from the circulation. This second form of DIT can be sustained by nonimmune, immune-mediated, or autoimmune mechanisms. An early and accurate diagnosis of DIT, which is crucial for reversing an otherwise unfavorable clinical outcome, is essentially based on the complete blood cell count, blood smear analysis, and performance of specific functional or immunochemical tests aimed at demonstrating the presence of antiplatelet antibodies.

Drug-Induced Thrombocytopenia: Mechanisms and Laboratory Diagnostics

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Text from:
Key Points

• Get comfortable with uncertainty!
• TTP is Heme Emergency – Have High Index of Suspicion
• Risk of Thrombocytopenia with Antibiotics
• Value of Procalcitonin
• SIRS vs Bacteremia vs Sepsis