

**Academic Half Day – Heme Onc Emergencies
Learner Guide**

Case 1

You are on the night float intern and you get a page from a nurse saying that a patient on the 7Wollman team has a fever. You glance at your sign out and see:

Ms. A Ensee is a 62-year-old woman admitted for chemo induced nausea and vomiting. She completed her third cycle of adjuvant epirubicin and cyclophosphamide chemotherapy for breast cancer 8 days ago.

Vitals are: T 38.8 °C (100.8 °F), BP 110/60 mm Hg, HR 90/min, RR 16/min, SpO2 98%. You ask them to get a rectal temperature and it is 101.4.

- 1. How do you triage this call? What information do you want to know?**

- 2. What is neutropenia? What is a fever?**

- 3. Should we have checked a rectal temp?**

- 4. What are your next steps in the management of a pt with neutropenia and fever?**

- 5. How would your antibiotic selection change if your assessment revealed the following?**
 - a. Dyspnea, cough, right basilar crackles + consolidation on CXR?**
 - b. Purulent drainage at site of central venous catheter?**
 - c. Skin erythema and tenderness?**
 - d. Oral mucositis?**

- 6. How would you adjust anti-microbials in the following scenarios?**
 - a. 3 days later, remains hemodynamically stable, afebrile, all cultures are negative.**

 - b. 5 days later, hemodynamically stable, febrile to 101F despite broad spectrum antibiotics, all cultures remain negative.**

 - c. 2 days later, the patient remains febrile at 101, HR 103, becomes hypotensive to 82/51 despite 2L IVF boluses, RR 22, 90% on RA. Repeat lactic acid has gone from 2.0 to 3.6 and they are becoming more confused. What is the diagnosis now? What is their qSOFA score?**

TABLE 11. Indications for the Addition of a Gram-Positive Antibiotic in the Empirical Management of Febrile Neutropenia

Hypotension or hemodynamic instability
Sepsis syndrome
Radiographically documented or strongly suggested pneumonia
Known colonization with methicillin-resistant <i>Staphylococcus aureus</i> , vancomycin-resistant enterococcus, or penicillin-resistant streptococci
Blood cultures positive for gram-positive bacteria
Skin or soft tissue infections
Severe mucositis
Previous use of fluoroquinolones as prophylactic therapy
Suspected catheter-related infection

Case #2

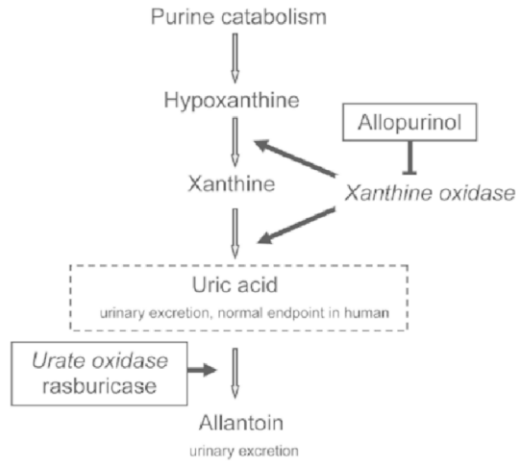


While on night float in the MSD when the nurse notifies you that one of the patients is having episodes non-sustained V-tach. You glance at your sign out and see:

Mr. Eurik is a 23 yo male who has been diagnosed with ALL. He started induction chemotherapy this morning.

Vitals are: 98.8 °F, BP 120/72 mm Hg, HR 100/min, RR 20/min, SpO2 98%

- 1. How do you manage this call?**
- 2. What lab abnormalities do you expect to see in tumor lysis syndrome?**
- 3. Does this patient have tumor lysis syndrome? How do you diagnose TLS?**
- 4. How do you acutely manage Mr. Eurik's TLS? Which problem is going to kill him first?**
- 5. Who is at risk of TLS and how can tumor lysis syndrome be prevented?**



Laboratory tumor lysis syndrome

- Uric acid ≥ 8 mg/dL (≥ 476 $\mu\text{mol/L}$) or 25% increase from baseline
- Potassium ≥ 6.0 mEq/L (≥ 6.0 mmol/L) or 25% increase from baseline
- Phosphorus ≥ 4.5 mg/dL (≥ 1.45 mmol/L) or 25% increase from baseline
- Calcium ≤ 7 mg/dL (≤ 1.75 mmol/L) or 25% decrease from baseline

Clinical tumor lysis syndrome

- Presence of laboratory tumor lysis syndrome and one or more of the following criteria
- Creatinine ≥ 1.5 times the upper limit of normal
- Cardiac arrhythmia
- Seizure
- Sudden death

Risk category	Malignant disease	Prophylaxis
Low-risk disease	Solid tumor ^c Multiple myeloma CML CLL ^d Indolent NHL Hodgkin lymphoma AML (WBC $< 25,000/\mu\text{L}$ and LDH $< 2 \times \text{ULN}$)	Monitoring (daily laboratory tests) Intravenous hydration (3 L/m ² daily) Consider allopurinol
Intermediate-risk disease	AML (WBC 25,000-100,000/ μL) AML (WBC $< 25,000/\mu\text{L}$ and LDH $\geq 2 \times \text{ULN}$) Intermediate-grade NHL (LDH $\geq 2 \times \text{ULN}$) ALL (WBC $< 100,000/\mu\text{L}$ and LDH $< 2 \times \text{ULN}$) Burkitt lymphoma (LDH $< 2 \times \text{ULN}$) Lymphoblastic NHL (LDH $< 2 \times \text{ULN}$)	Monitoring (laboratory tests every 8-12 h) Intravenous hydration (3 L/m ² daily) Allopurinol for up to 7 d
High-risk disease	ALL (WBC $\geq 100,000/\mu\text{L}$ and/or LDH $\geq 2 \times \text{ULN}$) Burkitt lymphoma (stages III/IV and/or LDH $\geq 2 \times \text{ULN}$) Lymphoblastic NHL (stages III/IV and/or LDH $\geq 2 \times \text{ULN}$) IRD with renal dysfunction and/or renal involvement IRD with elevated uric acid, potassium, and/or phosphate	Monitoring (laboratory tests every 6-8 h) Intravenous hydration (3 L/m ² daily) Rasburicase (consider 3 mg fixed dose)

----- BREAK -----

Case #3

Mr. Roids is a 75yo male who presented to the ER complaining of shortness of breath and cough for 2 months. His symptoms have been worsening. He is now dyspneic with ambulation and his cough is productive of blood-tinged sputum. On review of systems, the patient reports fatigue, 20lb unintentional weight loss over the last 2 months, back pain, weakness, and falls. His back pain is worsened by movement. He has a 70 pack-year history of smoking and does not take any medications.

In the ED the patient is unable to urinate. A foley catheter is placed and > 400 cc of urine is obtained within the first 15 minutes.

Vitals: T 97.9, BP 135/77, HR 95, RR 18, SpO2 95% on 2 L O2

Additional details if they ask:

- Exam
 - Clothes are ill-fitting and appear too large
 - He can lift his legs off the bed, but he is unable to oppose any force
 - Hyperreflexia of patellar and achilles reflexes
 - Increased tone in lower extremities
 - Lower extremity sensation of light touch is diminished bilaterally up to his umbilicus
 - Toes are upgoing bilaterally

- 1. What do you think of this presentation? What are you worried about and what orders will you be placing?**

- 2. MRI reveals thoracic vertebral lesions at T11 and T12, concerning for metastatic disease, with tumor extension into the spinal canal with compression of the thecal sac and mild signal change and cord edema. There is >50% collapse of these vertebral bodies. What do you do next?**

- 3. Prior to ordering MRI, you order some routine labs which show he has an elevated Cr of 1.4 from 1.0 and his calcium is measured at 13.2. What clinical signs/symptoms can you expect with hypercalcemia?**

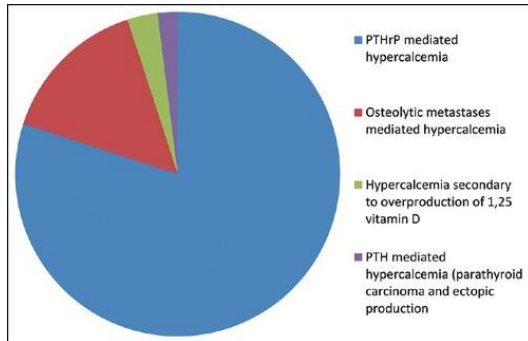
- 4. What other lab do we need to determine his true calcium and why do we correct it?**

- 5. If his albumin is measured at 2.6, calculate his true calcium.**

- 6. What is the mechanism of his hypercalcemia?**

7. What do you expect his PTH and 1,25 hydroxy Vitamin D levels to be?

8. How do you manage hypercalcemia?



Case #4

A 37 yo male with no PMH presents 2 weeks after a viral illness with fatigue, malaise, poor appetite and yellowing of the eyes. ROS notable for easy bruising. Vitals are all within normal limits. Exam shows scattered bruises throughout, but otherwise unremarkable. Initial work-up in the ED notable for Hb of 7.8, platelet count of 7k, Cr elevated to 1.4. Transaminases are normal, he has an indirect bilirubin of 4.8 and a total bilirubin of 6.2.

1. What is on your differential at this point and what would you like to order?
2. His LDH returns >200 with undetectable haptoglobin. You page your friendly hem/onc fellow to review the slide with you and see numerous (>3 schistocytes per HPF). What is the diagnosis and where does this patient go in the hospital? What do you do while the ADAMTS is pending?
3. What is happening at the cellular level?
4. Why does PLEX work to treat this condition?