

# **Oncologic Emergencies for the Non-Oncology Provider**

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# Disclosures

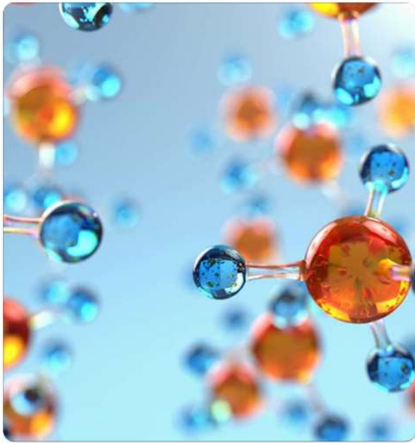
I have no relevant relationships with ineligible companies to disclose within the past 24 months.

# Objectives

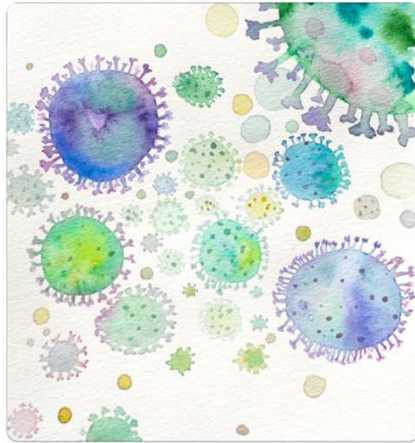
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- Define 3 types of oncologic emergencies
- Interpret lab signs of tumor lysis syndrome
- Describe importance of antibiotic timing in neutropenic patients
- Manage critical interventions for spinal cord compression

## Oncologic Emergencies



**Metabolic**



**Infectious**



**Structural**

## Case Study #1

Phillip is a 55-year-old man with a recent diagnosis of **high-grade non-Hodgkin lymphoma** who presents to the emergency room complaining of **nausea, vomiting, and decreased urination** over the last 24 hours. He mentions that he **started chemotherapy 2 days ago**. He also reports feelings of **weakness and tingling in his hands and feet**.

Physical examination is notable for decreased skin turgor. Vitals and labs are as documented:

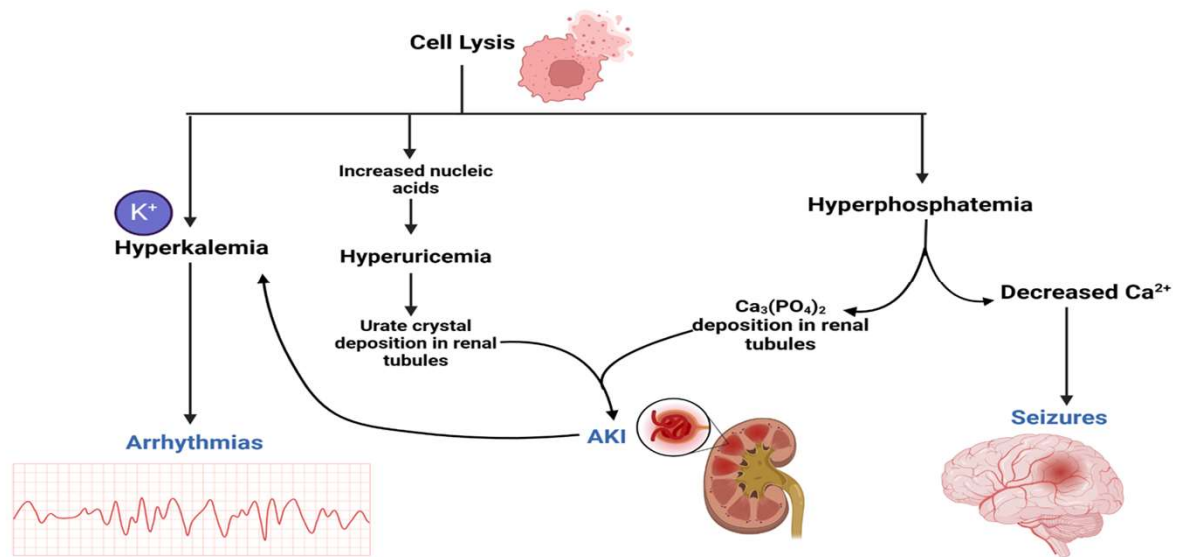
Temperature (degrees F)	99.6
Pulse	101
BP (mmHg)	120/89
Respirations	22
SpO2	96%

WBC	9.0 K/uL	Chloride	107 mmol/L
Hgb	10.1 g/dL	CO2	23 mmol/L
Platelet count	180 K/uL	BUN	18 mg/dL
Neutrophil Abs	2.72 K/uL	Creatinine	1.79 mg/dL
Lymphocyte Abs	3.90 K/uL	Phosphorus	7.0 mg/dL
Sodium	134 mmol/L	Magnesium	2.0 mg/dL
Potassium	5.5 mmol/L	Uric acid	8.9 mg/dL
Calcium	7 mg/dL		

***What is the most appropriate intervention for the patient?***

- A. Initiate hemodialysis immediately
- B. Start aggressive hydration and give rasburicase
- C. Administer broad spectrum antibiotics and order blood culture
- D. Give calcium gluconate bolus

# Tumor Lysis Syndrome (TLS)



## Diagnosis of TLS

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### **Laboratory:**

Requires 2 or more of the following:

- Uric acid 25% increase from baseline **OR**  $> 8$  mg/dL
- Potassium 25% increase from baseline **OR**  $> 6$  mg/dL
- Phosphorus 25% increase from baseline **OR**  $> 4.5$  mg/dL (6 mg/dL in children)
- Calcium 25% decrease from baseline **OR**  $< 7$  mg/dL

### **Clinical:**

Requires 1 of the following **and** 1 laboratory finding within the same 24 hour period:

- Cardiac arrhythmia
- Cr  $> 1.5x$  the upper limit
- Seizure

Adejinka A, Bashir K. Tumor Lysis Syndrome. [Updated 2022 Oct 31]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK518985/>



## Prevention of TLS

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- Intravenous fluid should be initiated 48 hours before the start of chemotherapy and should be continued for 48 hours after chemotherapy
- Crystalloids 3 to 3.5 liters/m<sup>2</sup> per day
- Allopurinol 300 mg/m<sup>2</sup>/day in 3 divided doses (max 800 mg daily)



## Management of TLS

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- **Admission to floor + Oncology consult**
- **Trend TLL (tumor lysis labs) Q6-Q12**
  - Potassium, Cr, Phos, Ca, uric acid
- **Elevated uric acid (> 8)**
  - Rasburicase 0.2mg/kg once
    - Max 6mg
- **Hyperkalemia (> 6)**
  - IV insulin-glucose
  - Telemetry
- **Hyperphosphatemia**
  - Phosphate binder therapy
    - Renagel 800-1600 mg daily-TID with meals
  - Telemetry
- **Hypocalcemia**
  - Treat hyperphosphatemia first and trend labs
  - DO NOT TREAT UNLESS SYMPTOMATIC

## Case Study #2

Cameron is a 48-year-old female with a history of **acute myeloid leukemia** (AML) undergoing chemotherapy presents to the emergency department feeling generally unwell with a **sore throat** and **mild cough** that began earlier in the day. Her last chemotherapy session was 1 week ago.

On examination, she **appears ill and fatigued**.

Vital signs and labs are as follows:

Temperature (degrees F)	101.9
Pulse	129
BP (mmHg)	99/69
Respirations	22
SpO2	96%

WBC	1.2 K/uL
Hgb	8.9 g/dL
Platelet count	80 K/uL
Neutrophil Abs	0.12 K/uL
Lymphocyte Abs	0.90 K/uL

***What is the most appropriate intervention for the patient?***

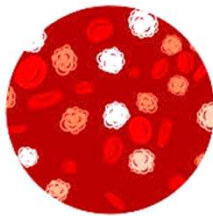
- A. Obtain blood cultures and admit patient to oncology ward
- B. Give antipyretics and consult oncology for follow up within 24 hours
- C. Initiate antiviral therapy immediately
- D. Obtain blood cultures and administer broad spectrum antibiotics

# Neutropenia

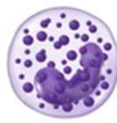
1 Direct infiltration secondary to cancer cells

2 Myelosuppression secondary to chemotherapy

Specific type of white blood cell (immune cell) that plays an important role as the body's first line of defense. The neutrophils usually make up about half to two-thirds of all white blood cells and protect against bacterial infections



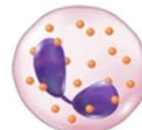
LEUKEMIA



Basophil



Neutrophil



Eosinophil



Monocyte



Lymphocyte

## Febrile Neutropenia

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National Comprehensive Cancer Network (NCCN) Guidelines (2022):  
Single oral temperature  $> 38.3\text{ C}$  **AND** ANC  $< 500$



Ability to fight infection  
with  $> 500$  neutrophils



Ability to fight infection with  
 $< 500$  neutrophils

## Risk Stratification of Febrile Neutropenia

### **Multinational Association for Supportive Care in Cancer (MASCC) scoring index:**

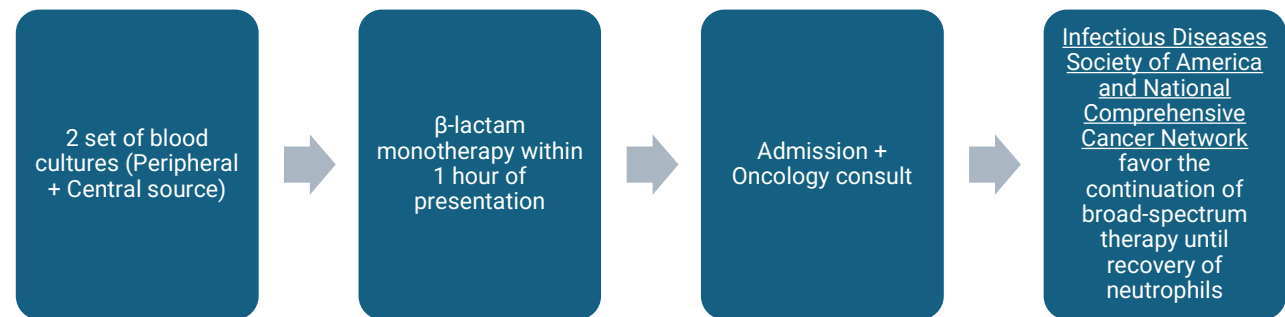
- Burden of illness:
  - No sx/mild= 5
  - Moderate= 3
  - Severe= 0
- No hypotension= 5
- No COPD= 5
- Solid tumor= 4
- Lymphoma with previous fungal infection= 4
- Hematologic with previous fungal infection= 4
- No dehydration= 4
- Outpatient at onset of fever= 3
- Age less than 60 years old= 2

### **Clinical Index of Stable Febrile Neutropenia (CISNE)**

- ECOG performance status > 2= 2
- COPD= 1
- Steroid induced hyperglycemia= 2
- Cardiovascular disease= 1
- Monocytes < 200/mcL= 1
- Grade 2 or greater mucositis= 1

## Management of High Risk of Febrile Neutropenia

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## **Management of Low-Risk Febrile Neutropenia**

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Outpatient management:

Ciprofloxacin 500-750 mg orally every 12 hours **and**  
amoxicillin/clavulanate 500 mg orally every 8 hours

*Clindamycin can be used for those with penicillin allergies.*

**If the patient remains febrile for 48 hours, the patient  
will require admission**

## Case Study #3

Betty is a 70-year-old woman with a **history of lung cancer** presents to the emergency room with **sudden onset of lower back pain** and **progressive weakness in both legs** over the past week. She reports **difficulty walking**, a sensation of **numbness below her knees**, and a **recent loss of bladder control**.

On examination, she has **decreased sensation to light touch and pinprick below the level of the umbilicus**, **reduced strength in the lower extremities**, and **hyperreflexia in both knees and ankles**.

Vitals and MRI are as follows:

Temperature (degrees F)	99.9
Pulse	126
BP (mmHg)	139/99
Respirations	22
SpO2	96%



<https://www.rcpe.ac.uk/college/journal/malignant-spinal-cord-compression>

***What is the most appropriate intervention for the patient?***

- A. High dose intravenous corticosteroids
- B. Immediate initiation of chemotherapy
- C. Initiate antiviral therapy immediately
- D. Schedule patient for emergent radiation next day

# Malignant Spinal Cord Compression (MSCC)

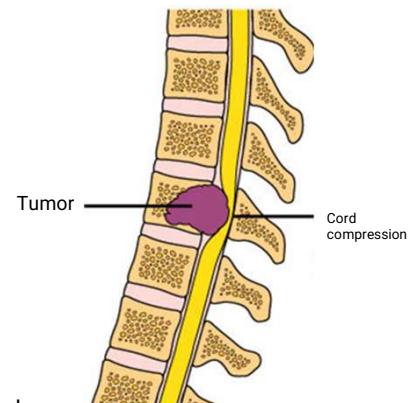
## Pathophysiology:

- Cancer grows in the bones of the spine or tissues surrounding spinal cord leading to compression of spinal vasculature, thecal sac, and spinal cord

## Signs/Symptoms:

- Back pain (80-90% patients)
  - Constant, aching, classically worse at night, worse with Valsalva maneuver
- Neurologic deficit (35-75% patients)
  - Bilateral LLE weakness, sensory deficits in dermatomal distribution, urinary and/or retention/incontinence

Any type of cancer can lead to malignant spinal cord compression, but it is more common in people with breast cancer, lung cancer and prostate cancer, lymphoma and myeloma



# MSCC Management

**MRI= gold standard, CT if MRI not immediately available**

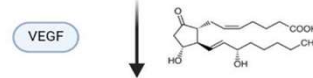
**National Institute for Health and Care Excellence rec:**

- Whole spine MRI within 24 hours
- IV Dexamethasone 16 mg daily (with PPI)
- Oncology consult for initiation of urgent XRT

Dexamethasone administration



Downregulation vascular endothelial growth factor and prostaglandin E2



Decrease spinal cord edema



**Prompt identification is crucial to attaining a favorable neurologic outcome**

## Take Home Points



**Electrolyte abnormalities in oncology patients warrant aggressive hydration**



**Do not wait for bloodwork to result to administer antibiotics to febrile, oncology patient**



**Prompt identification of spinal cord compression is key to restoring neurologic function**

Questions?

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