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.

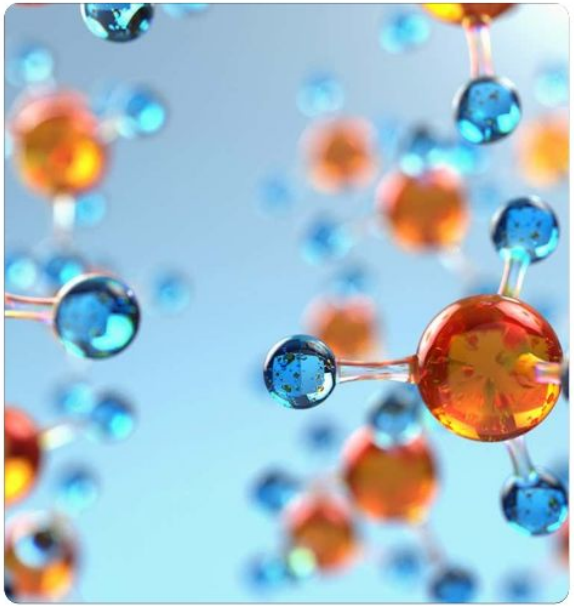
Objectives

The objective of this lecture is to equip non-oncology healthcare providers with the essential knowledge and skills required to identify, assess, and manage oncologic emergencies effectively. Attendees will learn about the most common oncologic emergencies, including their pathophysiology, clinical manifestations, and the immediate interventions needed to mitigate these life-threatening conditions, thus ensuring timely and appropriate care for patients with cancer-related complications.

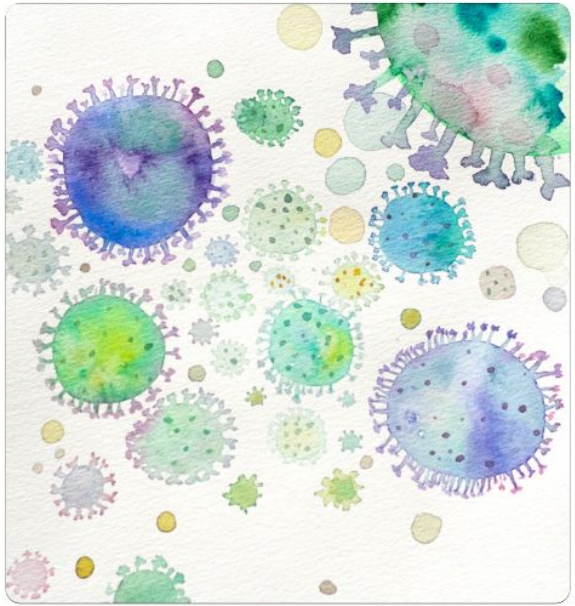
At the conclusion of this session, participants should be able to:

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

Oncologic Emergencies



Metabolic



Infectious

Structural

A 55-year-old man with a recent diagnosis of high-grade non-Hodgkin lymphoma 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.

His vital signs upon presentation are: BP 135/85 mmHg, HR 98 bpm, RR 18 breaths/min, and Temperature 37.1°C (98.8°F).

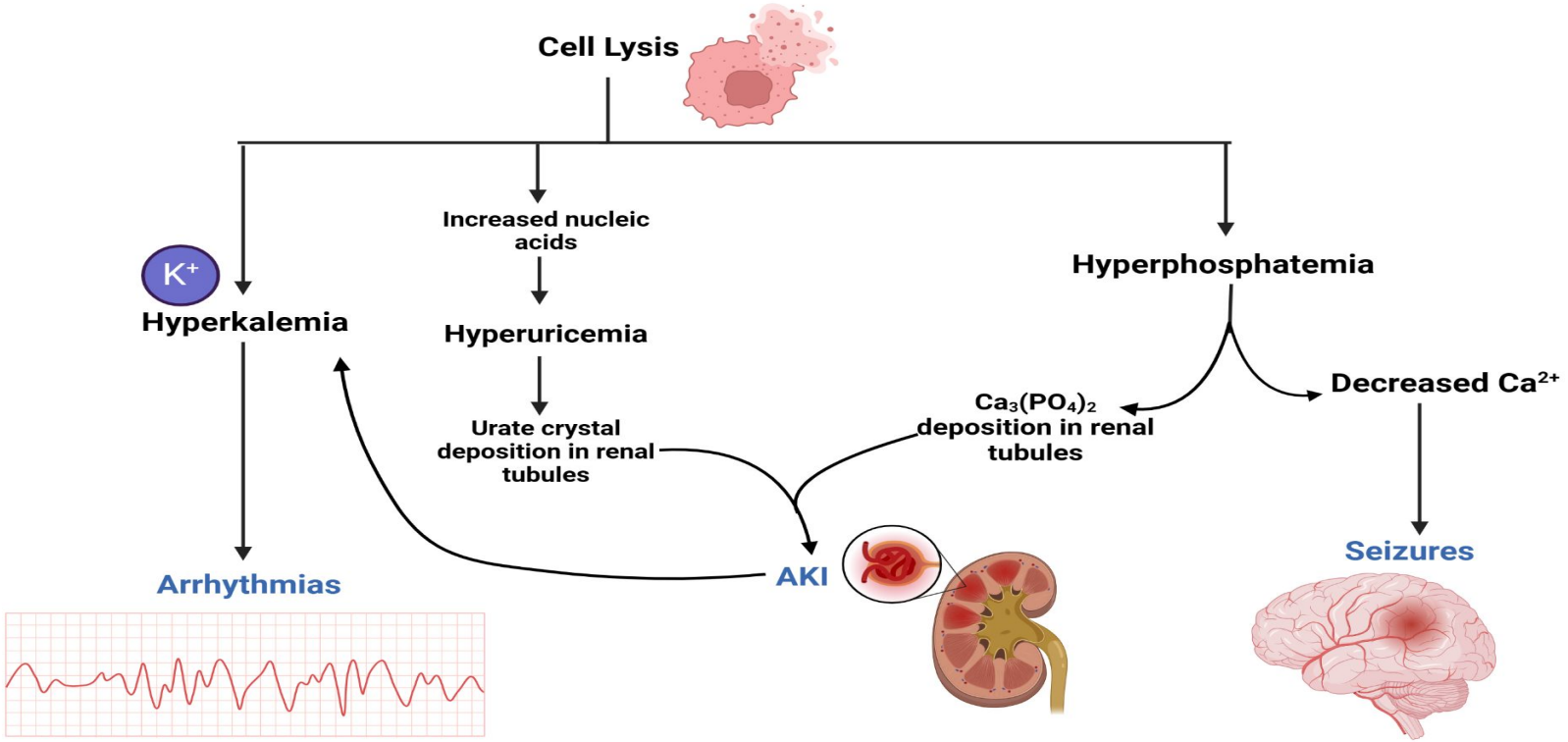
Physical examination is notable for mild edema in the lower extremities and decreased skin turgor.
Initial laboratory tests are as follows:

Sodium: 140	Glucose: 140
Potassium: 5.5	Mg: 2.0
BUN: 15	Phosphorus: 6.1
Cr: 1.57	Uric acid: 8.5

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)



Prevention and Treatment TLS

Primary prevention= **<u>Hydration, Hydration, Hydration!</u>**

Hyperkalemia → Calcium gluconate, Dextrose/insulin to push potassium back into cell

Hyperuricemia

Allopurinol decreases uric acid production

Rasburicase breaks down uric acid (utilize for uric acid > 6.5)

Hyperphosphatemia → Phosphate binders (Renagel, Sevelamer)

i.

A 62-year-old woman presents to the emergency room with complaints of severe fatigue, confusion, and abdominal pain. She has a history of breast cancer diagnosed 2 years ago, for which she underwent surgery followed by chemotherapy and radiation therapy. She is currently on hormonal therapy.

On examination, her vital signs are stable, but she is noted to be mildly dehydrated and disoriented to time and place. Her abdomen is soft, non-distended, with no palpable masses, but she reports tenderness in the lumbar region.

Initial laboratory tests show a serum calcium level of 13.2 mg/dL (normal range: 8.6-10.2 mg/dL), serum creatinine of 1.4 mg/dL, and normal serum albumin.

An ECG shows a shortened QT interval.

What is the most appropriate intervention for the patient?

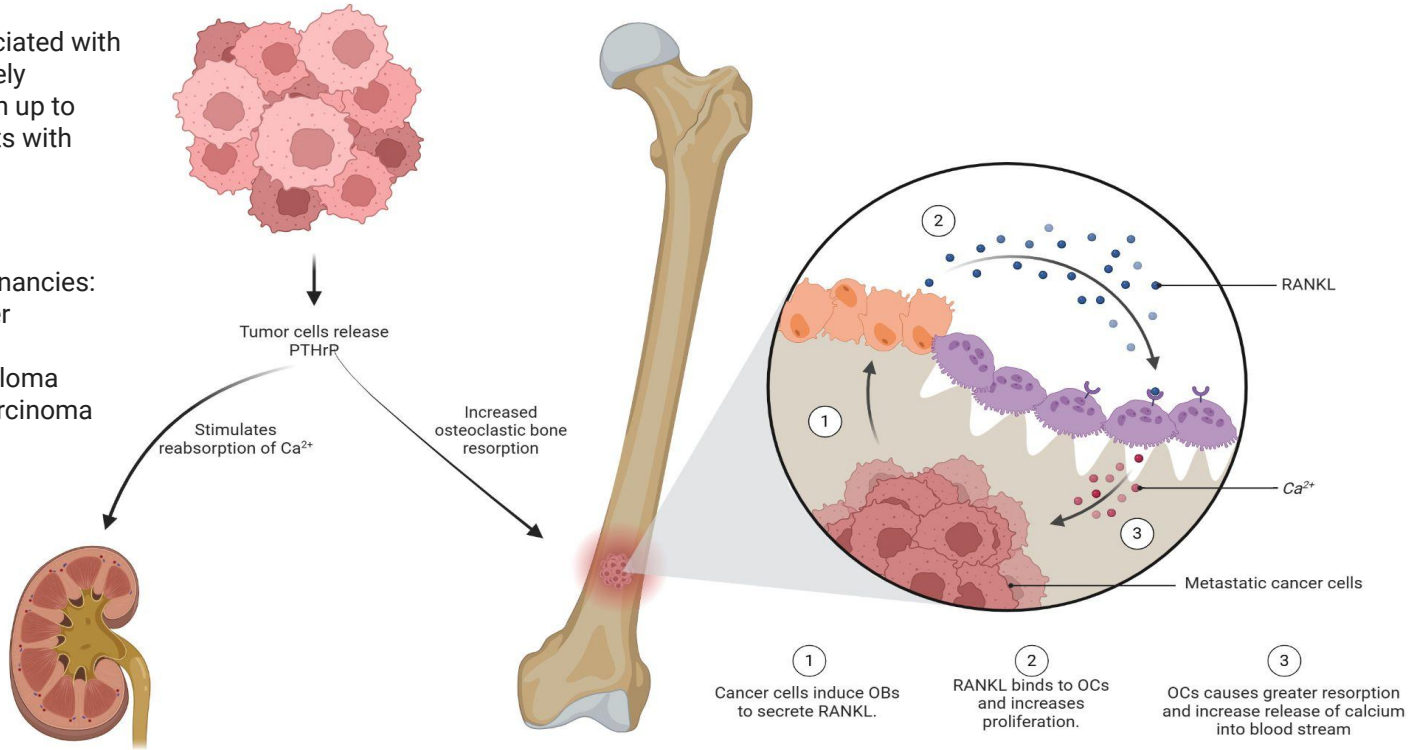
A. Administer IV bisphosphonates
B. Initiate chemotherapy for recurrent breast cancer
C. STAT Head CT w/out contrast
D. Start aggressive IV hydration with NS

Hypercalcemia of Malignancy

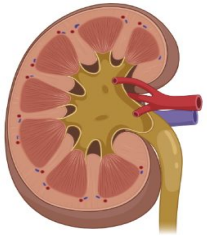
Hypercalcemia associated with malignancy is relatively common, occurring in up to 20-30% of the patients with cancer

Most common malignancies:

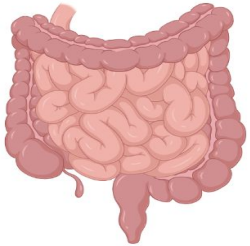
- Breast cancer
- Lung cancer
- Multiple myeloma
- Renal cell carcinoma



Signs/Symptoms of Hypercalcemia

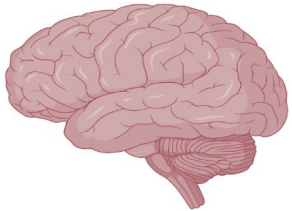


‘Stones’



‘Groans’

‘Bones’



‘Moans’

Oncology patients with symptoms should always have serum calcium measured. The calcium levels can be classified as mild (2.6-2.9 mmol/L), moderate (3.0-3.4 mmol/L), and severe (≥ 3.5 mmol/L)
The formula to correct calcium for the albumin level: measured calcium (mmol/L) + ([40 – albumin (g/L)] x 0.02)

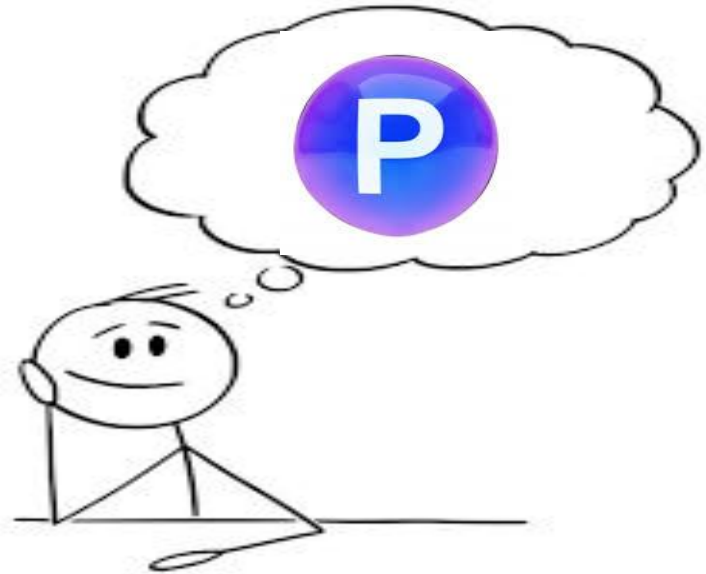
Treatment of Hypercalcemia

No symptoms + mild hypercalcemia → focus on underlying cause, no immediate intervention warranted

- Educate on importance of hydration/avoidance of dehydration

Symptoms + moderate/severe hypercalcemia → NS @ 200-300mL/hr +/- calcitonin and bisphosphonates

- Calcitonin onset of action 4-6 hrs with 2 day duration of action
- Bisphosphonates onset of action 2-3 days with 2-3 weeks duration of action



A 48-year-old male with a history of acute myeloid leukemia (AML) undergoing chemotherapy presents to the emergency department with a fever of 38.9°C (102°F) and chills. He reports feeling generally unwell with a sore throat and mild cough that began earlier in the day. His last chemotherapy session was 1 week ago. On examination, he appears ill and fatigued. Vital signs reveal a blood pressure of 110/70 mmHg, heart rate of 102 bpm, respiratory rate of 20 breaths/min, and temperature of 38.9°C (102°F). Laboratory tests are ordered, revealing a white blood cell count of 1,000/uL with an absolute neutrophil count (ANC) of 100/uL.

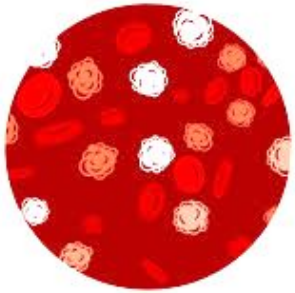
What is the most appropriate intervention for the patient?

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

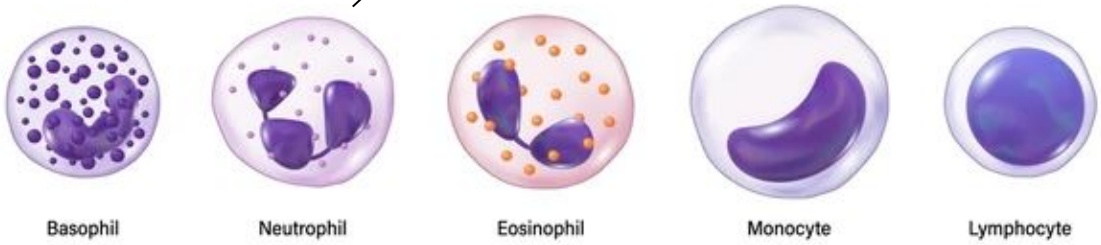
Neutropenia

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



Febrile Neutropenia

Diagnosis

Temperature > 38.1

ANC < 1000

Management

Empiric broad spectrum antibiotics (ASAP)

-Cover Gram Negative and Gram Positive

Specific organism is identified in < 50% of cases

Most common= GNR (e coli, Klebsiella), coagulase negative staph (staph epi), staph aureus, and pseudomonas

Ability to fight infection with > 1500 neutrophils

Ability to fight infection with < 1500 neutrophils

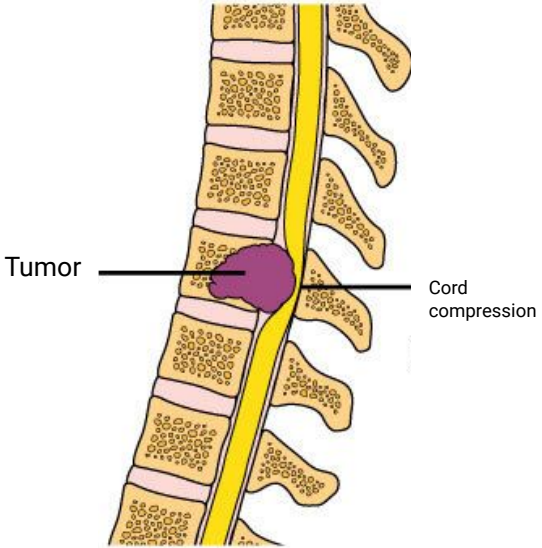
A 70-year-old woman with a history of lung cancer presents to the emergency room with sudden onset of lower back pain and progressive weakness in both legs over the past week. She reports difficulty walking, a sensation of numbness below her knees, and a recent loss of bladder control. Her past medical history is significant for lung cancer diagnosed 6 months ago, currently being treated with chemotherapy. 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. An urgent MRI of the spine shows a mass compressing the thoracic spinal cord at the T7 level.

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)

MSCC can happen when cancer grows in the bones of the spine or in the tissues around the spinal cord, or results from hematogenous spread of malignant cells to a vertebral body. Over time, an enlarging mass can compress the spinal vasculature, thecal sac, and spinal cord resulting in pain and neurologic deficits.



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

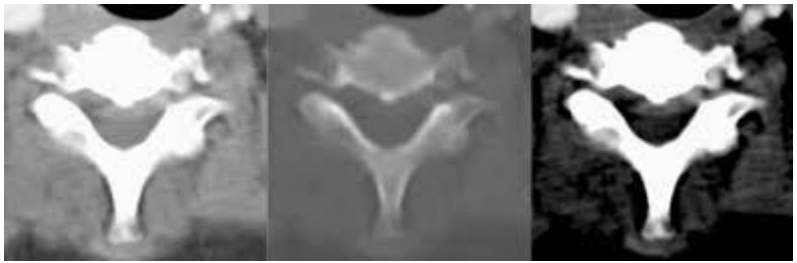
Any type of cancer can lead to malignant spinal cord compression, but it is more common in people with breast cancer, lung cancer and prostate cancer, lymphoma and myeloma

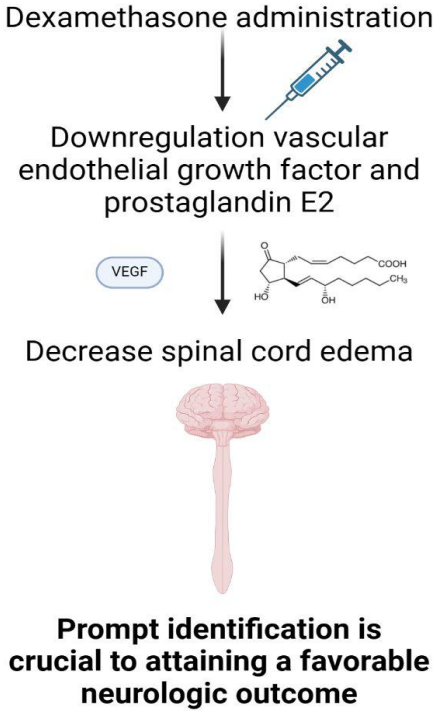
MSCC Dx/Treatment

Gadolinium contrast-enhanced MR imaging is the gold standard for diagnosis of MSCC (sensitivity 93%, specificity 97%), and imaging of the entire spine is advised in the evaluation of this condition

CT myelography is only recommended when MRI is contraindicated

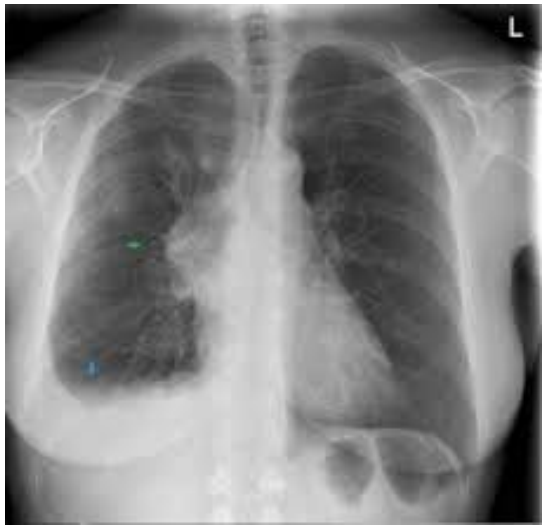
X-ray is inadequately sensitive for metastatic disease and does not adequately characterize soft tissue detail.





A 45-year-old woman with a history of recently diagnosed non-small cell lung cancer presents to the emergency room with a 3-week history of progressive swelling of her face and upper limbs, along with a feeling of pressure in her head, particularly upon bending over. She also complains of difficulty swallowing and shortness of breath, especially when lying flat. On examination, she has pronounced facial edema, cyanosis, and visible distention of the veins on her neck and upper chest. Her vital signs are stable, but she appears dyspneic while speaking and has an oxygen saturation of 90% on room air.

CXR as below:



What is the most appropriate intervention for the patient?

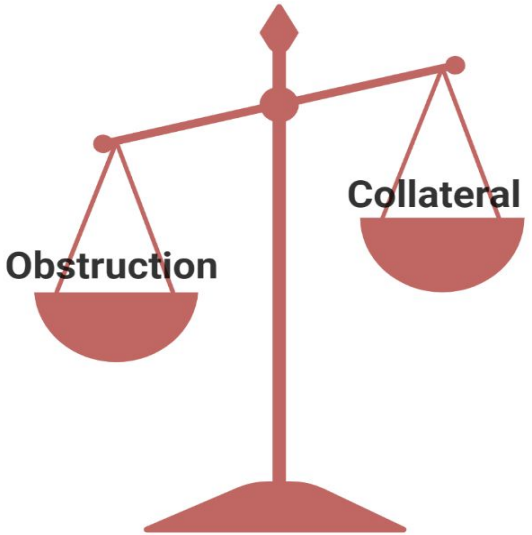
A. Administer cytotoxic chemotherapy
B. Elevated head of bed and emergent radiation
C. Initiate antifibrinolytic therapy
D. Elevate head of bed and immediate surgical resection of mass

Superior Vena Cava Syndrome

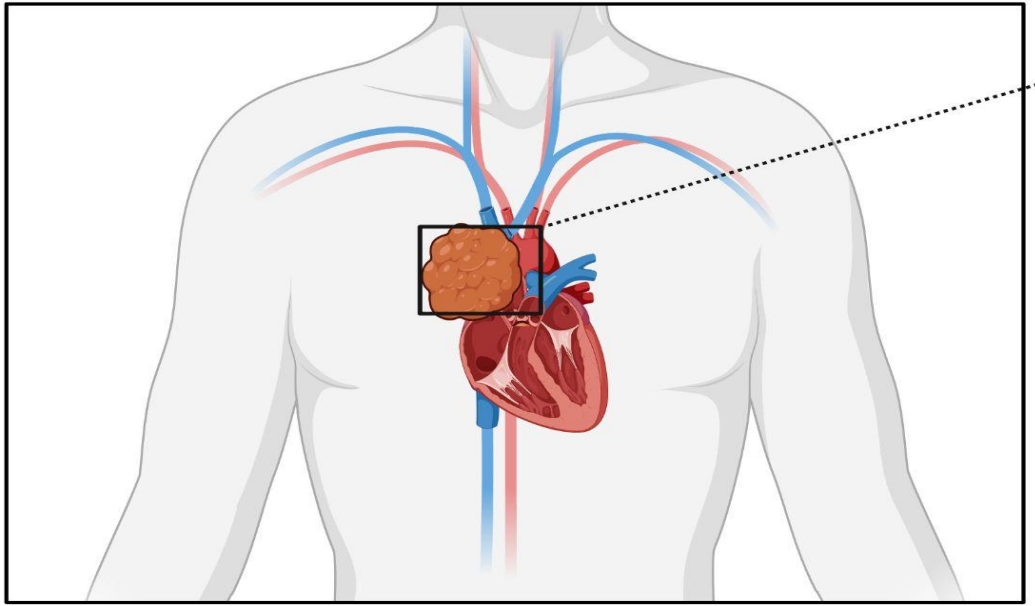
Superior vena cava (SVC) syndrome is a collection of clinical signs and symptoms resulting from either partial or complete obstruction of blood flow through the SVC → The resulting venous congestion produces a clinical scenario relating to increased upper body venous pressures

<u>Most common malignancies associated with SVC:</u>

1. Mediastinal
2. NHL
3. Metastatic



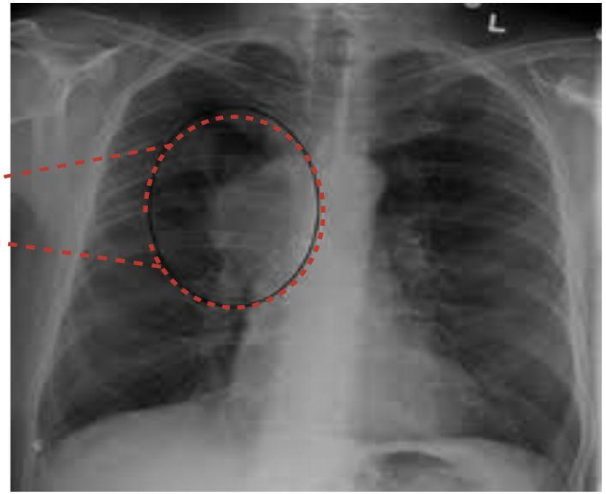
Signs/Symptoms SVC Syndrome

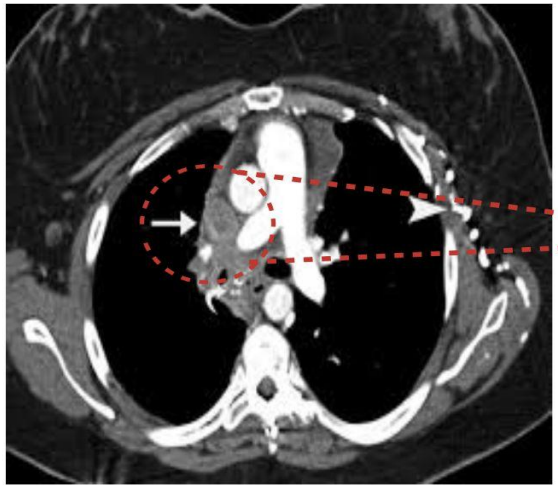


Signs/Symptoms

- Dyspnea
- Face/neck swelling
- Distention of chest wall veins
- Cough

Chest radiography (CXR) can show indirect signs such as mediastinal widening, pleural effusion, lung masses, and right hilar lymphadenopathy.



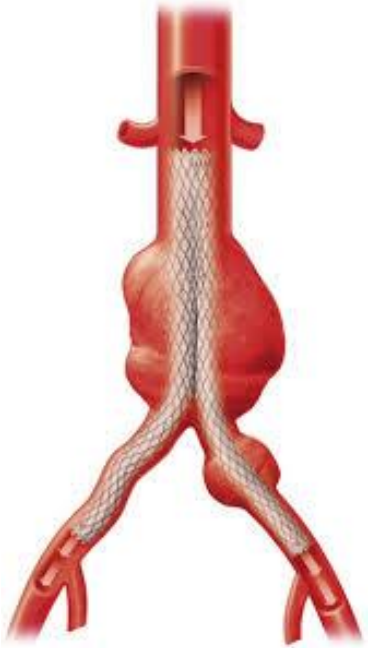


Contrast-enhanced computed tomography (CECT) is the most helpful imaging modality since it can define the extent of venous blockage, illustrate collateral venous pathways

Treatment SVC Syndrome

Severe symptoms → Urgent Treatment

- Endovenous stent
- Corticosteroids
- XRT



Non-Severe Symptoms → Histological diagnosis

- Chemo sensitive
  - Lymphoma
  - Small cell lung cancer
- Chemo insensitive → tx with stent +/- XRT
  - Non-small cell lung cancer

Take Home Points

1. Electrolyte abnormalities in oncology patients warrant aggressive hydration
2. Do not wait for bloodwork to result to administer antibiotics to febrile, oncology patient
3. Prompt identification of spinal cord compression is key to restoring neurologic function

References

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