APPROACH TO HEME/ONC EMERGENCIES

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LEARNING OBJECTIVE

- Identify commonly encountered Hematological and Oncological emergencies
- Order appropriate labs/radiological tests
- Initiate timely treatment
- Early sub-specialty consultations

WHAT IS AN ONCOLOGICAL EMERGENCY

- *A clinical condition resulting from a metabolic, neurologic, cardiovascular, hematologic, and/or infectious change caused by cancer or its treatment that requires immediate intervention to prevent loss of life or quality of life.*

Classifications	Oncologic Emergencies
Metabolic	1. Hypercalcemia (most common) 2. Tumor Lysis Syndrome 3. SIADH (Syndrome of Inappropriate antidiuretic syndrome)
Neurologic	1. Spinal Cord Compression 2. Brain metatases/⇧ ICP
Cardiovascular	1. Malignant Pericardial Effusion 2. Superior Vena Cava Syndrome
Hematologic	1. Hyperviscosity due to Dysproteinemia 2. Hyperleukocytosis 3. DIC (disseminated intravascular coagulation)
Infectious	1. Neutropenic fever 2. Septic shock

CASE - 1

A 60 yo M with PMH of HTN, GERD, depression, who presents with 1 month history of progressively worsening generalized fatigue, weakness, and feeling unwell.

ROS: Positive for dry cough, night sweats, 20 lb unintentional wt loss in last 3 months

Vitals: HR 110/m, otherwise stable

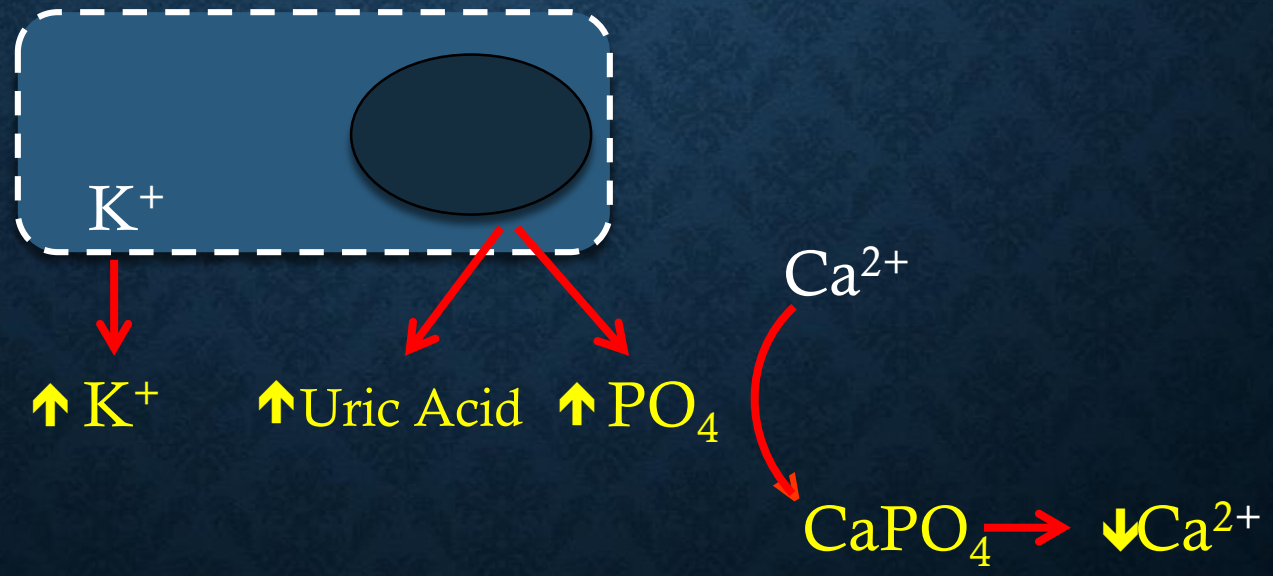
Being an excellent new intern, you perform a full physical and find bilateral cervical and supraclavicular lymphadenopathy and palpable hepatosplenomegaly. Remainder of the exam was unremarkable.

Labs:
CBC/diff: WBC 15k H/h 7.9/25 Plt 75k Diff: 85%L 10%N 5%M
RFP: Na138, K 5.6, Cl 105, Bicarb 22, BUN 35, Cr 1.9(baseline Cr 0.8)
LDH 1205, uric acid 12.6, calcium 7.0, phosphorus 6.5, albumin 3.2

TUMOR LYSIS SYNDROME

TUMOR LYSIS SYNDROME (TLS)

TLS is the result of a massive and abrupt release of cellular contents into the bloodstream after rapid lysis of malignant cells



TUMOR LYSIS SYNDROME (TLS)

- Seen in high grade liquid tumors like leukemia with leukocytosis, high grade lymphomas, and some solid tumors like small cell lung ca

- Clinical Features: weakness, arrhythmias, paralysis, acute renal failure, tetany, altered mental status, seizures

Diagnosis:

- Laboratory
  - ≥ 2 laboratory abnormalities OR
  - ≥ 25% change in 2 values from baseline value

- Clinical
  - Laboratory diagnosis + end organ damage

HyperKalemia
HyperUricemia
HyperPhosphatemia
HypoCalcemia

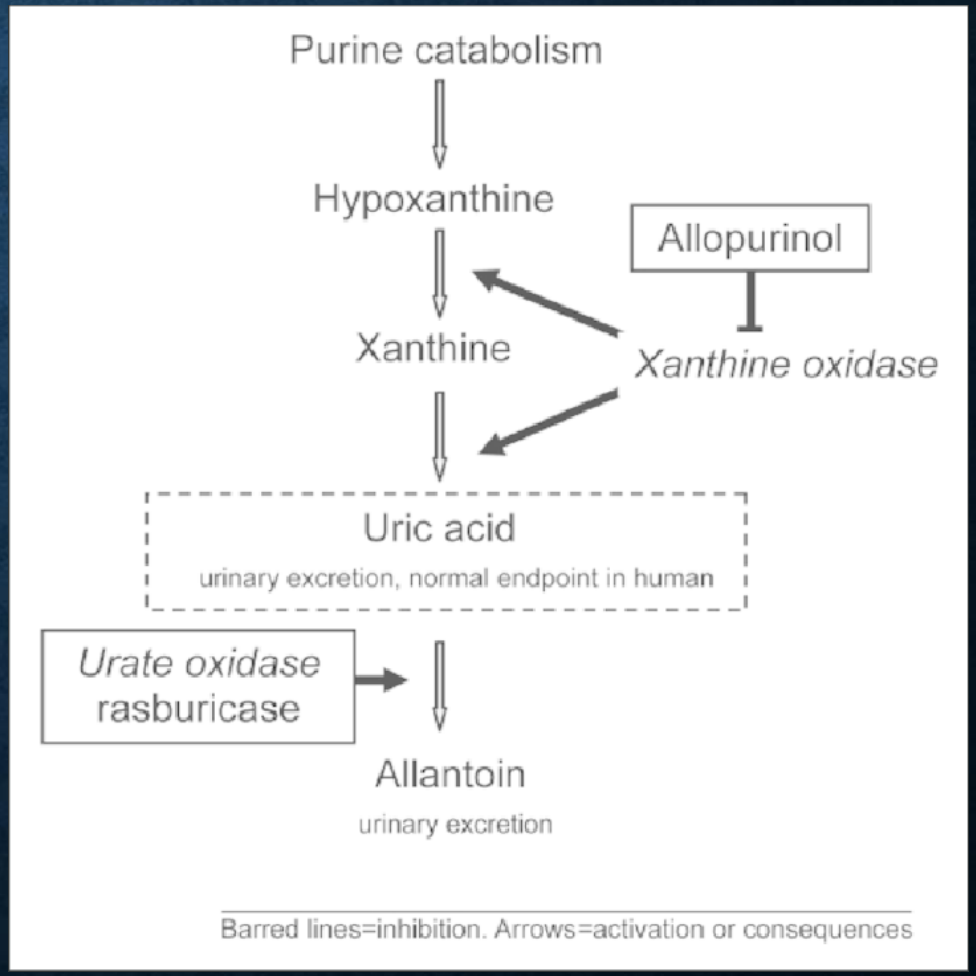
TUMOR LYSIS SYNDROME (TLS)

Treatment:

- **Aggressive IV Fluids &/or diuresis (Most important)**
- Manage electrolyte abnormalities
- Rasburicase (Check G-6PD before!)
- Allopurinol (Does not decrease uric acid)
- HD

Prevention:

Fluids, Allopurinol, Rasburicase



CASE - 2

A middle aged F with HTN, DM, metastatic breast ca, presents with worsening back pain x 2 weeks. Developed after lifting boxes while moving. More recently has been feeling some RLE numbness and worsening pain.

ROS: Denies fevers/chills, weakness, loss of sensation, bowel/bladder incontinence

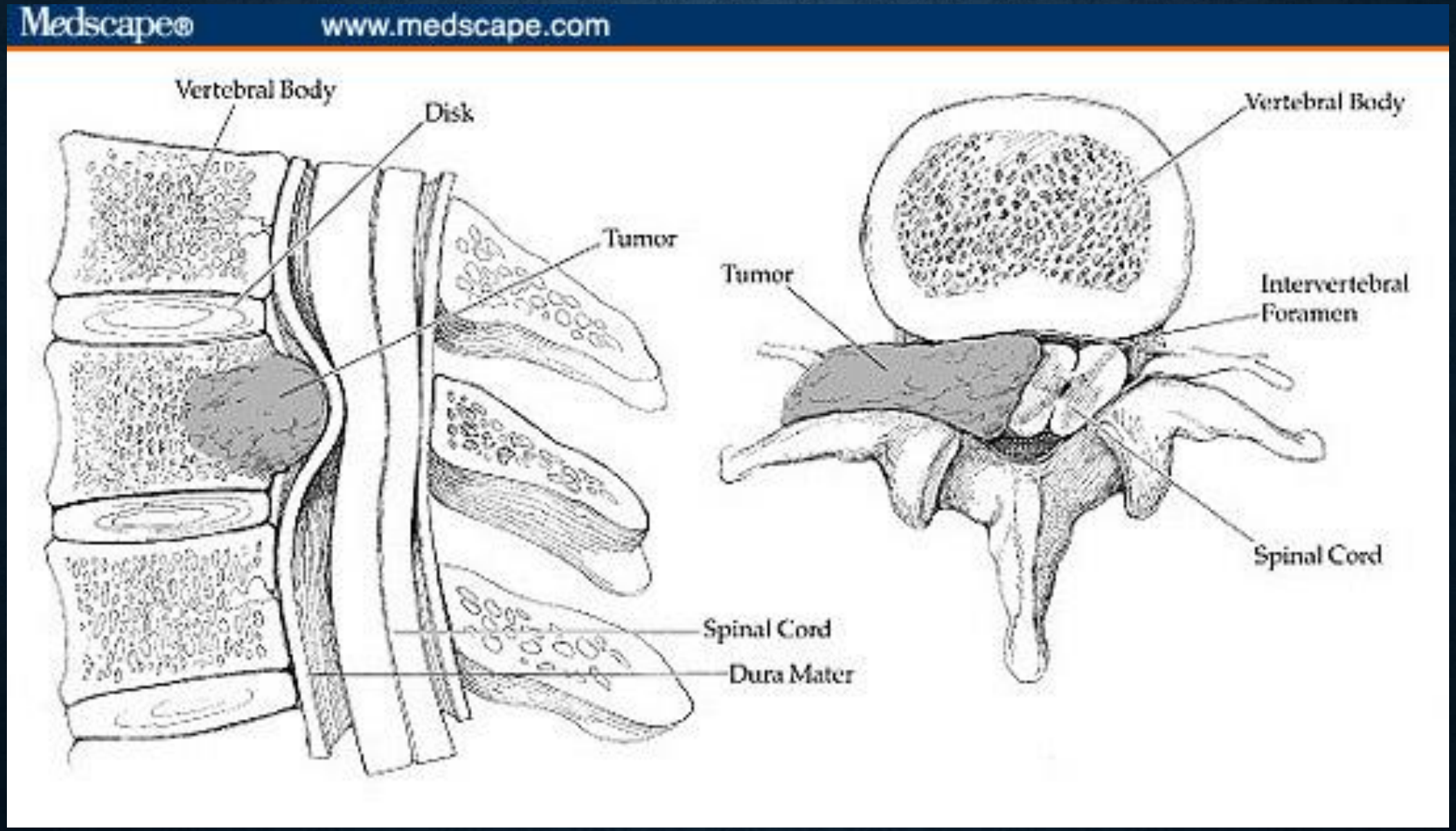
Oncologic history: diagnosed with metastatic breast ca 3 yrs ago, last PET-CT 2 months ago showed stable/shrinking osseous mets in L scapula, multiple ribs, thoracic spine (T8), and R femur.

O/E: severe pain on palpation of mid-thoracic spine, strength and sensation intact throughout, normal reflexes, no saddle anesthesia, normal rectal tone

Labs: Unremarkable

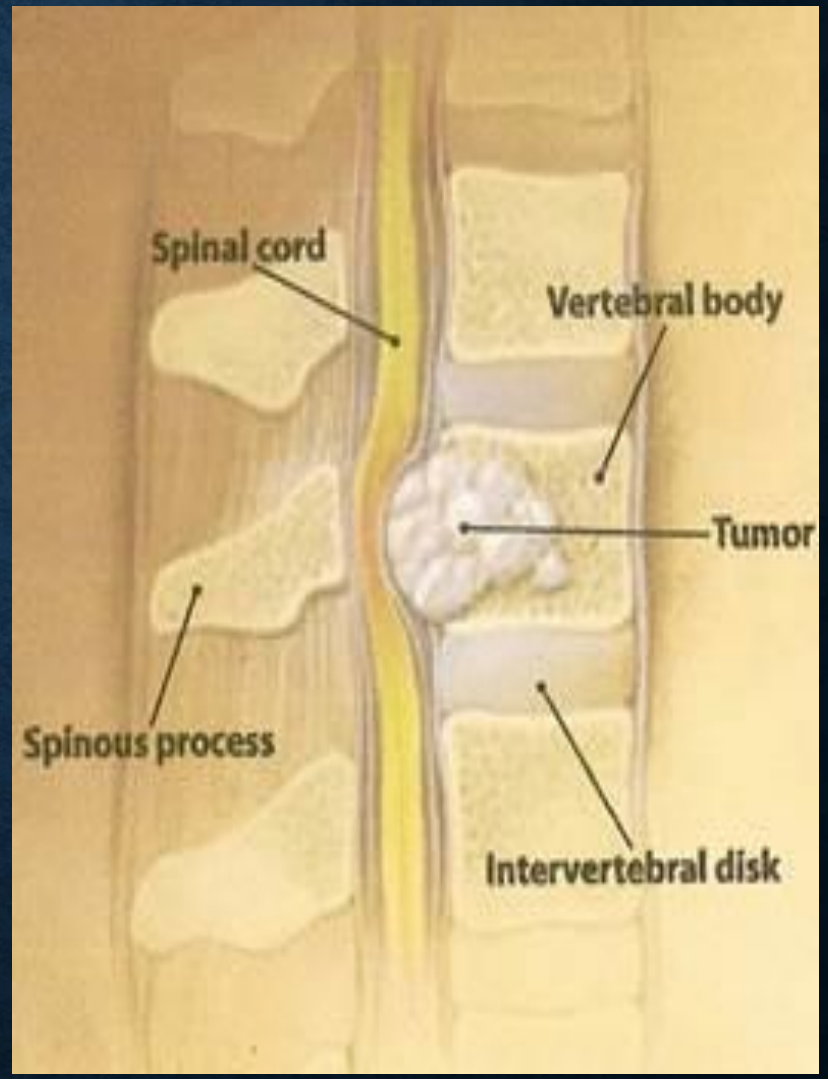
MALIGNANT SPINAL CORD COMPRESSION

SPINAL CORD COMPRESSION



SPINAL CORD COMPRESSION

- **Majority from:**
  - **Breast**
  - **Lung**
  - **Prostate**
  - **Lymphoma**
  - **Myeloma**
- About 6-10% of patients with cancer
- Thoracic spine (up to 70%)



SPINAL CORD COMPRESSION

Presentation

- Pain –may not always be present or may be underwhelming
- Weakness
- Sensory deficits: numbness, paresthesias
- Cauda equina syndrome: saddle anesthesia, bowel/ bladder dysfunction, hyporeflexia

SPINAL CORD COMPRESSION

- **Obtain a good history and neurologic exam**
- MRI (CT Myelography)
- Steroids: dexamethasone 10mg IV STAT then 4mg q6
- Time is money! ortho/ neurosurgery, radiation oncology
- Pain control
- Primary determinant of the efficacy of therapy is the patient's neurologic status at time treatment

CASE - 3

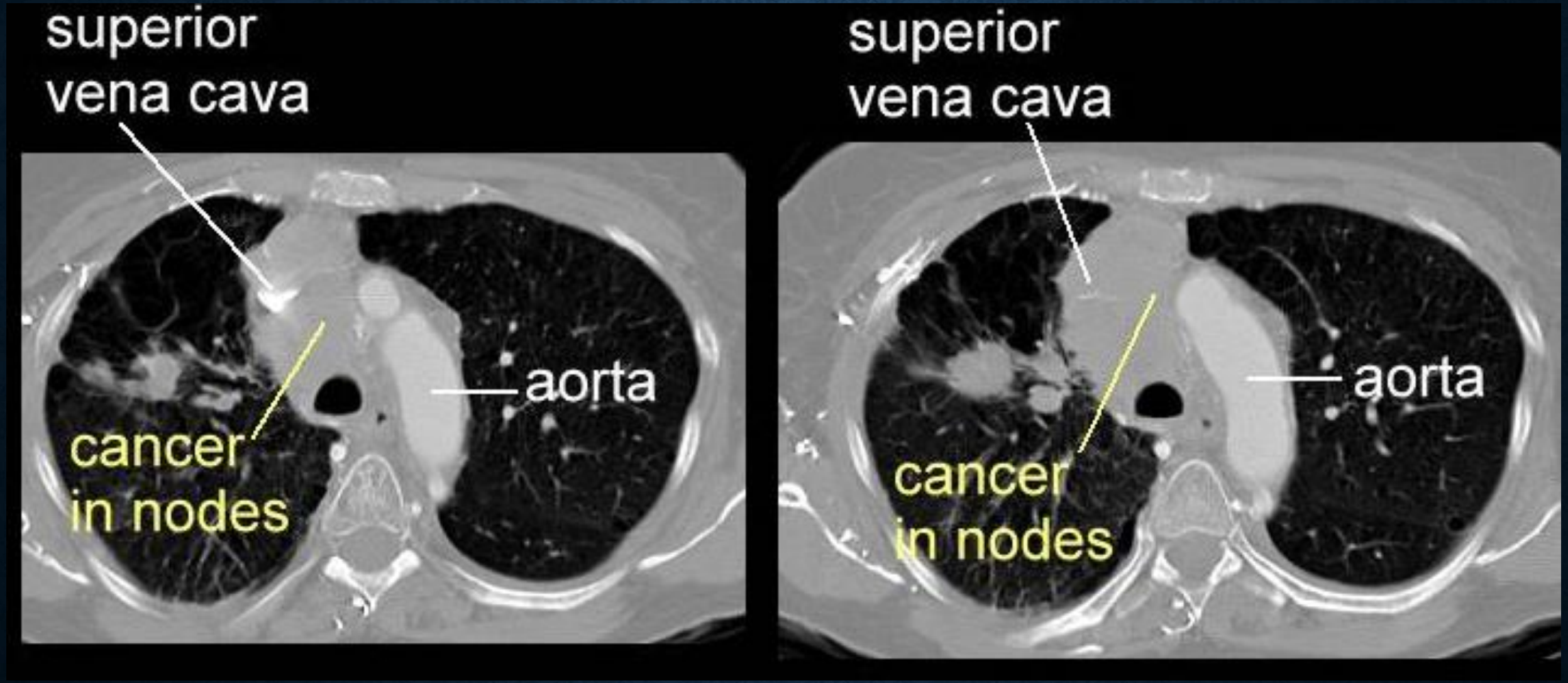
75 yo M, heavy smoker, presents with 4 weeks of SOB, worsening non-productive cough, and 20 lb weight loss. Developed neck swelling last week, which worsens on bending forwards. ROS - negative

Vitals: Stable

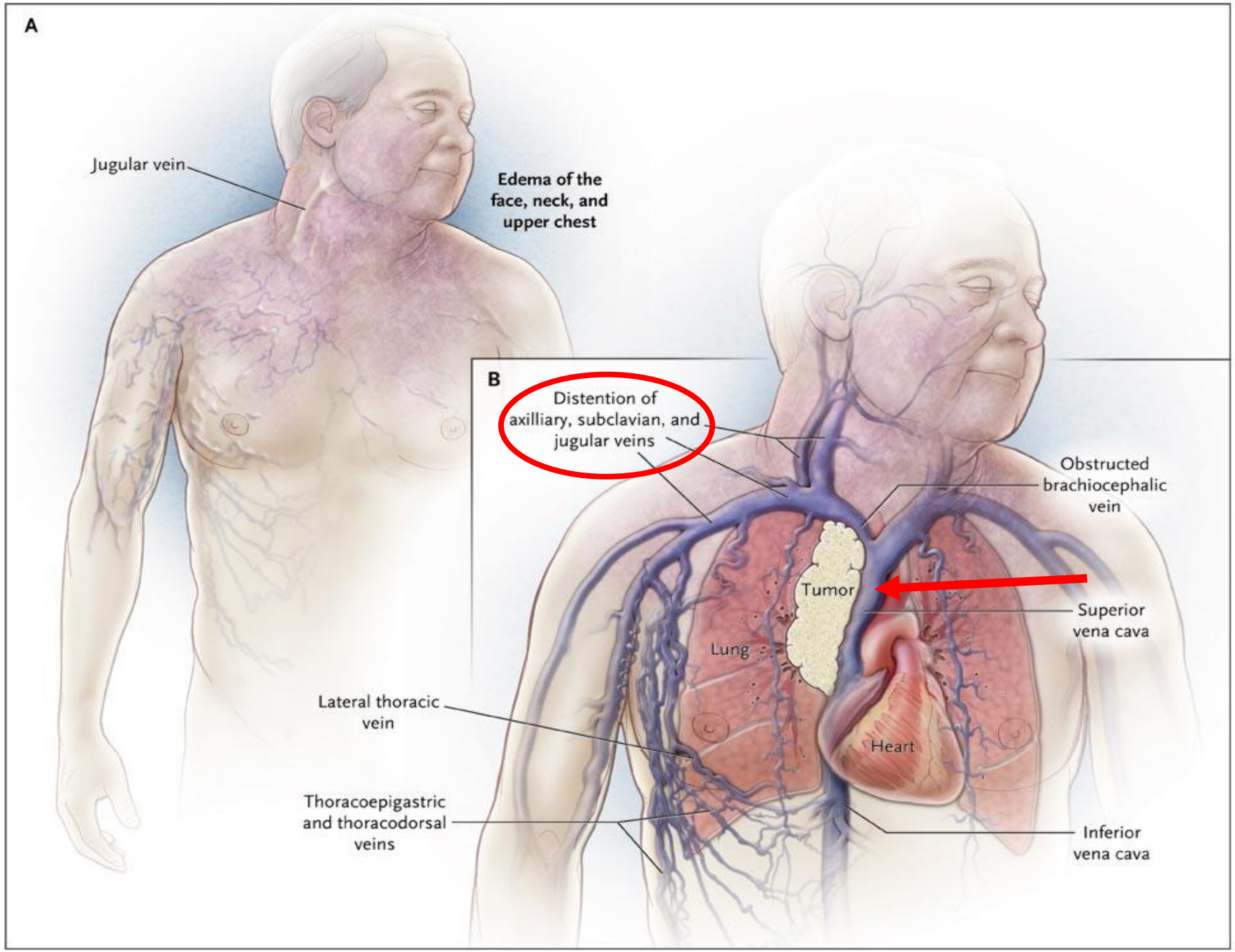
O/E: R mid-lung crackles, no wheezing/stridor, swelling of neck and right upper extremity, distension of superficial anterior chest and neck veins, no focal neuro deficits

Labs: unremarkable


A
B


superior
vena cava
aorta
cancer
in nodes
superior
vena cava
aorta
cancer
in nodes

SUPERIOR VENA CAVA SYNDROME


A
Jugular vein
Edema of the face, neck, and upper chest
B
Distention of axilliary, subclavian, and jugular veins
Obstructed brachiocephalic vein
Tumor
Superior vena cava
Lung
Lateral thoracic vein
Heart
Thoracoepigastric and thoracodorsal veins
Inferior vena cava

SUPERIOR VENA CAVA SYNDROME (SVC)

- Most cases are not a true emergency
- Majority of cases are due to Lung Ca or NHL (intrathoracic malignancies)
- Dyspnea (most common). Facial edema, arm edema, distended veins, facial plethora, cough, airway etc.
- **Diagnosis:**
  - CT/ MRI
  - **Histological Dx**

SUPERIOR VENA CAVA SYNDROME (SVC)

Treat underlying cancer!

Endovascular stents/ Radiotherapy

<u>Supportive care:</u>

- Head elevation, Diuretics
- Avoid high volume fluid infusion through upper extremities
- Anticoagulation
- Steroids
  - Severe Airway Obstruction
  - Lymphoma

CASE - 4

55Y F with AML presents with profound fatigue and 1 week of SOB. Accompanying family members report report she initially complained of a headache and dizziness, and since then has started acting confused and been more somnolent.

Vitals: T:100.6, PR: 115/m, BP: 110/76, RR: 26/m, 80%RA

Pertinent exam: A&Ox1 (wrong date and location), confused, strength and sensation intact, ataxic gait, bilateral lung crackles

Labs:
CBC: WBC 88K with 78% blasts, H/h 10/30 Plt 3k
RFP: 140 5.0 108 24 20 1.2 100

UPRT
MOBILE
258
0822 05
0255

LEUKOSTASIS

- Increased blood viscosity impedes blood flow, and local hypoxemia is worsened by high metabolic activity of cells and cytokine release

- **Symptoms: (CNS/Eyes/Lungs)**
  Pulmonary: hypoxia, interstitial/alveolar infiltrates
  Neurological: headache, dizziness, ataxia, confusion, somnolence, blurry vision

- **Management:**
  Rapid cytoreduction with chemotherapy
    Consider hydroxyurea or leukapheresis if unable to give chemo

LEUKOSTASIS

WBC counts (X 10^9/L) as indication for leukapheresis inhyperleukocytosis

	Symptomatic	Asymptomatic
AML	> 50 000	> 100 000
ALL	> 150 000	> 300 000
CML	> 150 000	No
CLL	> 500 000	No
APL	No	No

Piccirillo N, Laurenti L, Chiusolo P, et al. Reliability of leukostasis grading score to identify patients with high-risk hyperleukocytosis. *Am J Hematol.* 2009;84(6):381-382.

CASE - 5

A 70 yo M with metastatic colon ca (finished cycle #3 FOLFOX ten days ago), who presents with fevers for 2 days at home. He states he checked his temperature at home and it has ranged from 99 to 102 °F.

ROS: Unremarkable

Vitals: T: 38.7°C, PR: 105/m, BP: 115/75, RR: 16/m,SP02 97%RA

Exam: Mild oral mucositis, Mediport c/d/i, lungs clear, abdominal exam benign, otherwise no focal findings

Labs:
CBC/diff: WBC 2.0k H/h 8.5/28 Plt 85k Diff: 68%L **20%N** 9%M 3%E
RFP: WNL

FEBRILE NEUTROPENIA

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Infection in a neutropenic patient is an emergency

<u>Pathogenesis:</u>

- Breeches in host defenses (breakdown of mucosal barriers)
- Immune system suppression
- Majority of cases of neutropenic fever thought to be caused by bloodstream seeding from GI tract flora

Infectious source: 30%.

FEBRILE NEUTROPENIA

Diagnosis:

ANC<500 or ANC<1000 with expected nadir <500 over next 48 hours

+

T: 38°C for >1 hour or T>38.3°C once

Next Steps:

- Is patient HDS? Stable for floor?
- Examine patient: any localizing symptoms? Any role for imaging?
- Cultures STAT (2 sets bld cx peripheral, culture from lines or ports, sputum or stool cx/C Diff or wound cx as indicated), UA, UCx, CXR
- Antibiotics (30-60min)

FEBRILE NEUTROPENIA

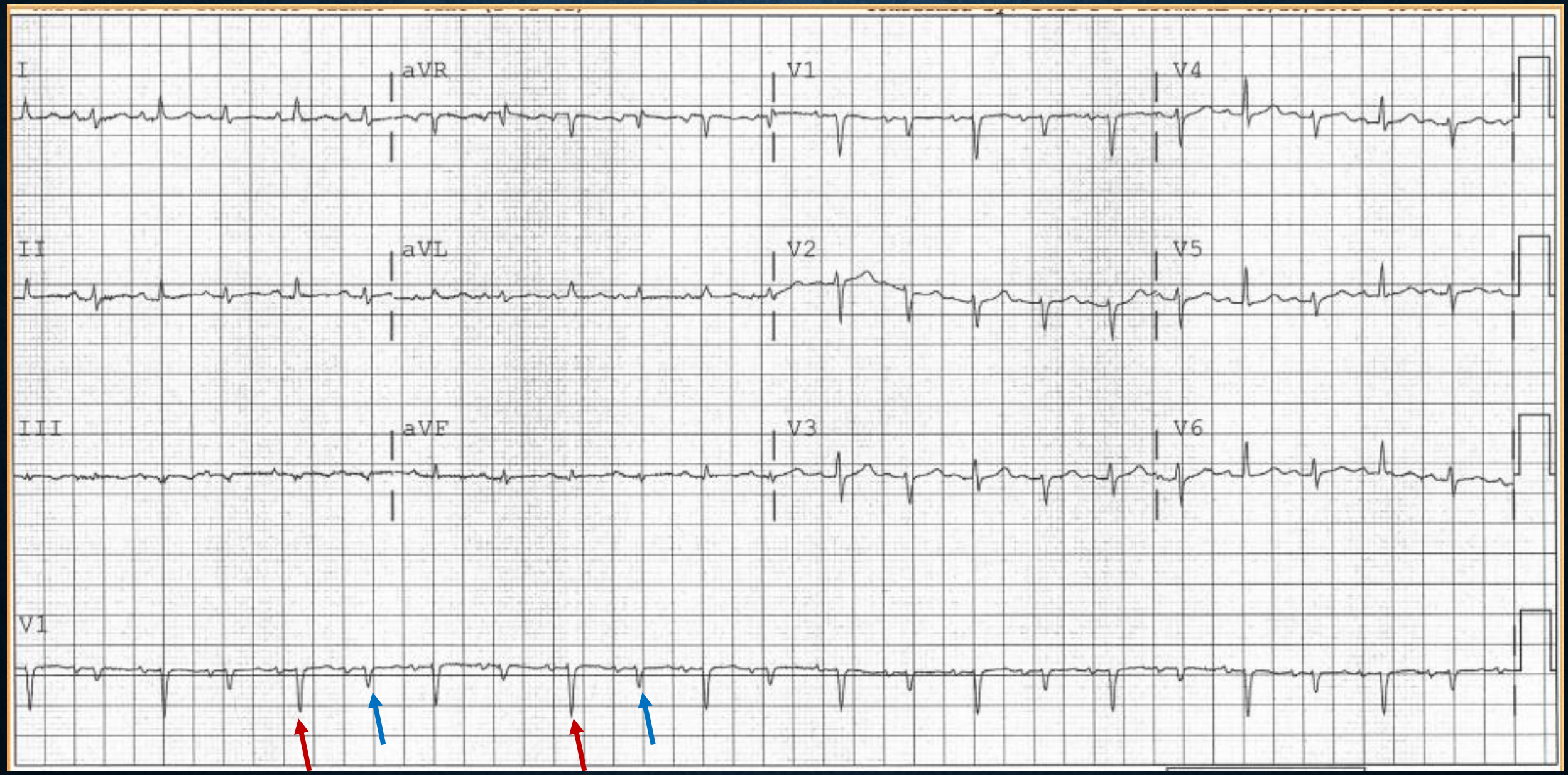
Clinical Scenario	Medication
Clinically Stable	Piperacillin/tazobactam 4.5gm Q6h
	Penicillin Allergy Aztreonam 2gm IV Q8 + Vanc
• Suspect cath-related infection OR • Suspected S&S infection OR • Colonization with MRSA or Penicillin R pneumococci OR • Hemodynamic instability OR • G+ve organism in Blood culture	Add Vancomycin for empiric regimen
• If G-ve resistance suspected	Add amikacin 15mg/kg once to empiric regimen

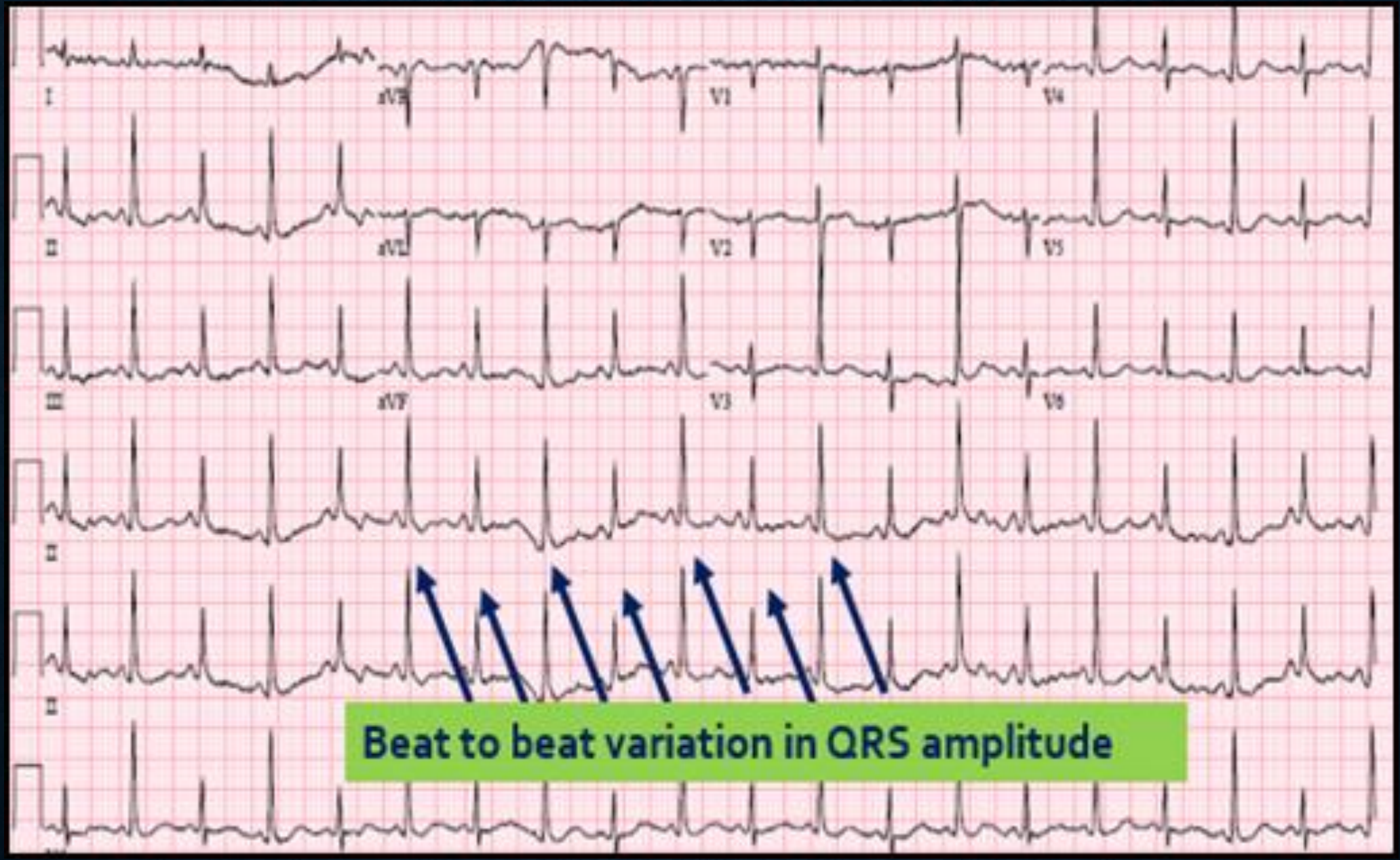
FEBRILE NEUTROPENIA – LOW RISK PATIENTS

- Certain low-risk patients can be treated at home with PO antibiotics (typically Ciprofloxacin + Augmentin) after initial IV dose and brief observation
- IDSA: anticipated neutropenia ≤ 7d, clinically stable, ANC > 100, and no medical comorbidities
- ASCO: MASCC score ≥ 21

CHARACTERISTIC	WEIGHT
Burden of febrile neutropenia with no or mild Symptoms[1]	5
No hypotension (systolic BP > 90 mm Hg)	5
No chronic obstructive pulmonary disease[2]	4
Solid tumor or hematological malignancy with no previous fungal infection[3]	4
No dehydration requiring parenteral fluids	3
Burden of febrile neutropenia with moderate Symptoms[4]	3
Outpatient status	3
Age <60 years	2

MALIGNANT PERICARDIAL EFFUSION


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1


Beat to beat variation in QRS amplitude

Beat to beat variation in QRS amplitude

MALIGNANT PERICARDIAL EFFUSION

- Can be related to cancer OR chemo/RT/infection/autoimmune

- Clinical manifestations

  Dyspnea, cough, Chest pain, orthopnea, palpitations.

  Exam findings: Beck's triad (JVD, hypotension, decreased heart sounds), narrow pulse pressure, pulsus paradoxus

Treatment:

- Small/moderate effusions are usually asymptomatic and do not require urgent treatment
- Acute management: drainage with pericardiocentesis
- Prevention of re-accumulation: drainage catheter, pericardial window
- Treat underlying cancer

ACUTE CHEST SYNDROME

ACUTE CHEST SYNDROME

- Vaso-occlusive crises of pulmonary vasculature in patients with sickle cell anemia.
- Leading cause of death in SCD.
- New radio-density on CXR **AND** any one (T >38.5 ^{O}C, >2% drop in SpO_2, CP, cough, wheezing, rales, tachypnea)
- Maintain high suspicion, as some may develop ACS within 48-72hours after initial pain episode!

ACUTE CHEST SYNDROME

Don’t Forget other D/D

Treatment:

- T&S, adequate pain control, IV access, fluids, oxygen, incentive spirometry, antibiotics, VTE prophylaxis, hematology consult.

- Consider simple Vs exchange transfusion & MICU transfer

- Can use simple transfusion to bridge to exchange transfusion while waiting for MICU bed (does not remove HgbS)

OTHER TIPS

- Primary Oncologist?
- Date of last chemo? (Check on EMR IV chemo)
- What was their last chemo? (know your acronyms)
- Did they get any medications with chemo? (G-CSF)
- What is their previous oncologic course?
- Access for Chemo? (mediport, PICC?)
- Sickle cell crises: check care path in portal and OARRS
- Inform primary oncologist of patient's admission

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THANK YOU