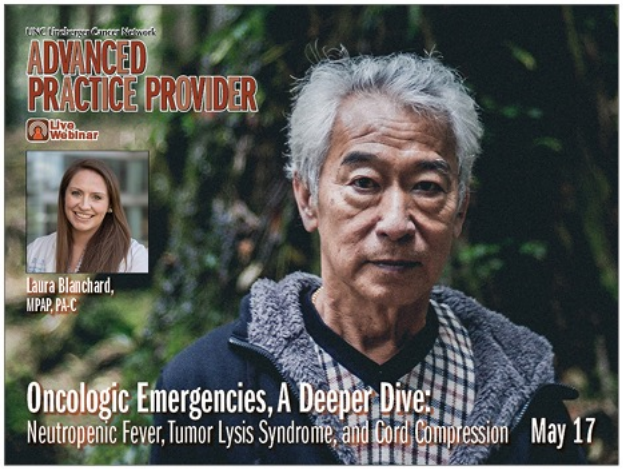

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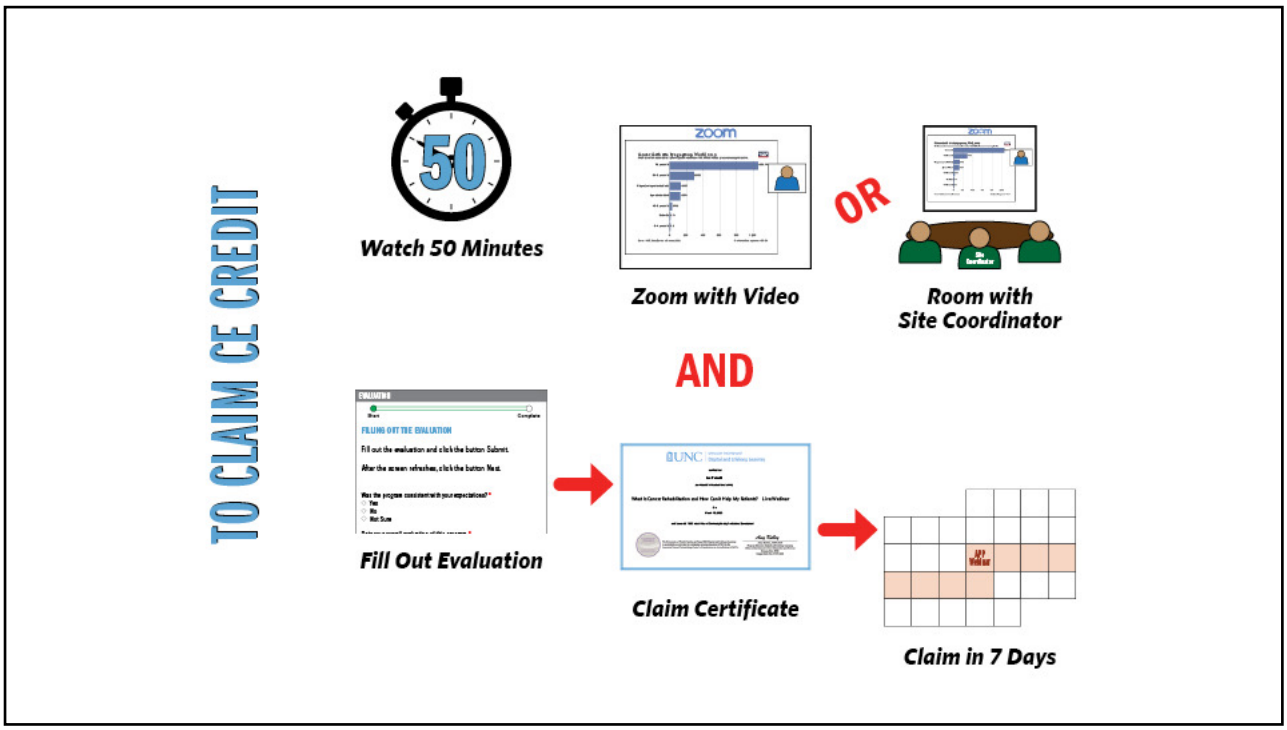
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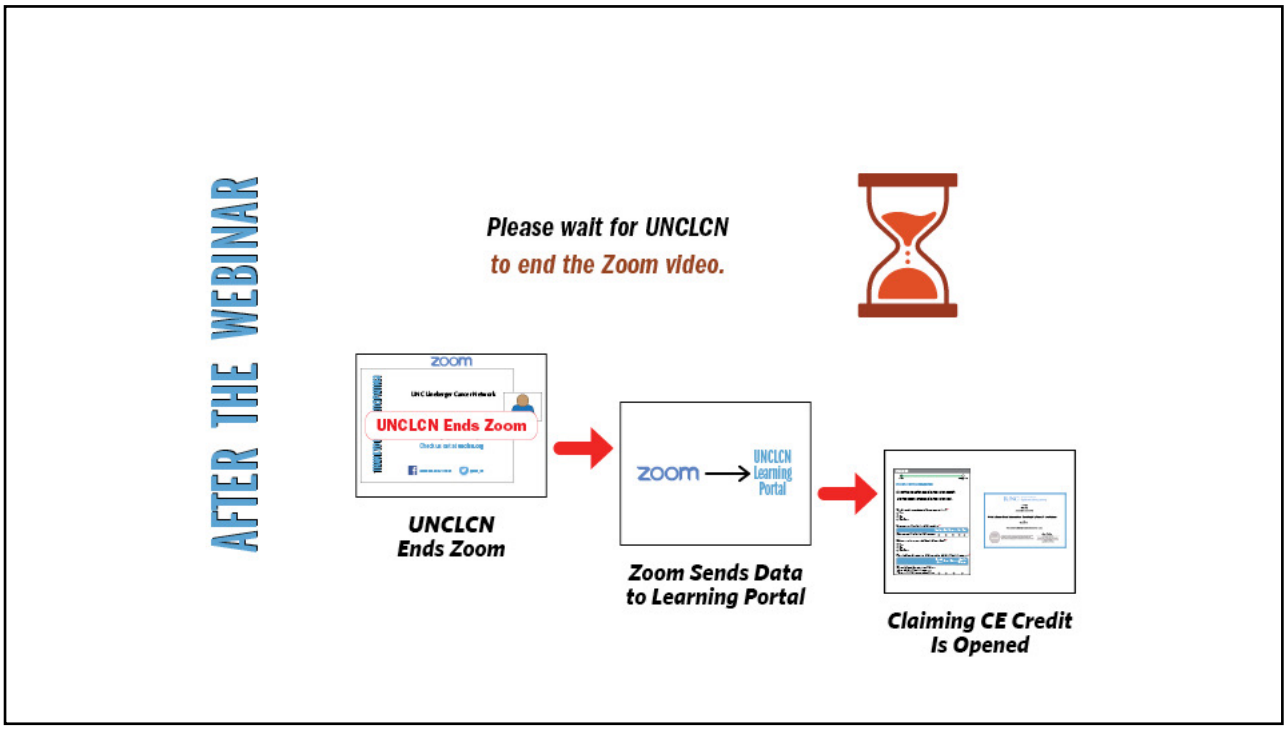
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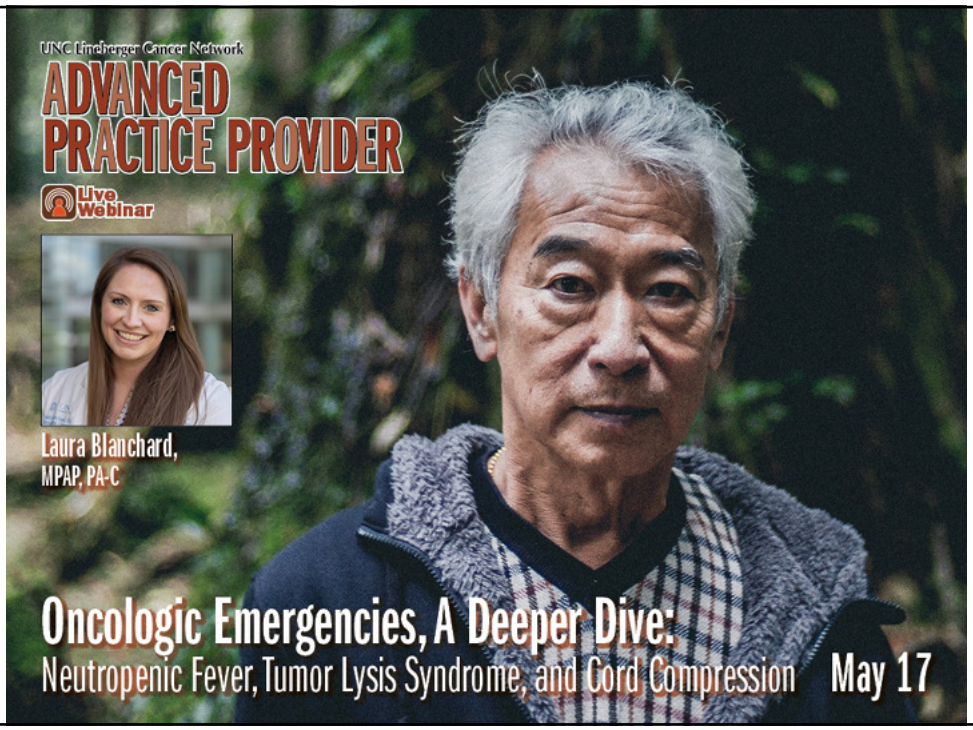

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OUR PRESENTER

Laura Blanchard,
MPAP, PA-C

Laura Blanchard, MPAP, PA-C, is a graduate of Campbell University, where she received her Master's in Physician Assistant Practice. She is a graduate of the Charter Class of Campbell University's Physician Assistant program, graduating in 2013 as a member of the Pi Alpha National Honor Society.

Since graduating, she has spent her career at UNC Medical Center in malignant hematology where she currently serves as the lead inpatient malignant hematology APP.

She also serves as adjunct faculty for Campbell University's PA program and recently received their Emerging Leader Award. In 2019 she was named the Leukemia and Lymphoma Society's Triangle Woman of the Year and has served on their executive leadership board since 2021.

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5. Laura Blanchard, MPAP, PA-C, received her Master's in Physician Assistant Practice Campbell University in 2013

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What one word comes to mind when you hear the phrase "Oncologic Emergencies"?

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What one word comes to mind when you hear the phrase "Oncologic Emergencies"?

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Oncologic Emergencies: A deeper dive -- Neutropenic fever, Tumor lysis syndrome and Cord compression

Laura Blanchard, PA-C
Laura.Blanchard@unchealth.unc.edu

18

Oncologic Emergencies

Mechanical	Metabolic	Hematologic
Pulmonary Embolism	Tumor Lysis	Cytopenia
Spinal Cord Compression	Hypercalcemia	Febrile Neutropenia
SVC Syndrome	Hyperuricemia	Hyperviscosity
Small bowel obstruction	SIADH	Hyperleukocytosis
Urinary obstruction	Adrenal insufficiency	Bleeding
CNS tumor	Hypokalemia	Clotting
Carcinomatous meningitis		
Malignant effusion		

19

Case 1

70 y.o male

PMHx of CKD, HTN, and IgG-Kappa smoldering Myeloma presents to the ER with uncontrolled back pain, confusion, and weakness. Patient was seen in the infusion center 1 day prior and received IVF and Zoledronic acid (Zometa) for elevated Calcium and also received an increase in pain regimen.

Exam:

Paraspinal TTP surrounding L4/L5 bilaterally, otherwise no focal neurological findings and no midline spinal TTP, step off or deformity

Initial Work up:

CHEM:

Na 132
K 4.2
Cl 106
Co2 21.9
Cr 2.69
Gluc 109
Ca 11.4

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Which of the following diagnoses are you most concerned about?

Hypercalcemia
Cord compression
Altered mental status
Renal Dysfunction

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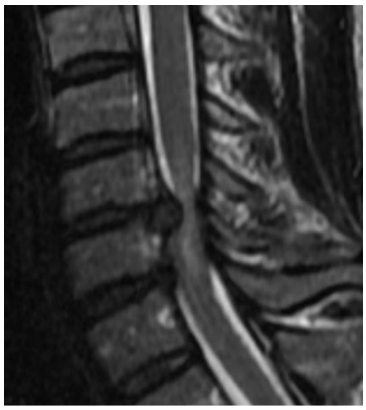
Spinal Cord Compression

- What is spinal cord compression
  - Radiologic compression of the thecal sac
    - With or without neurological symptoms
  - Tumor invasion of the epidural space[2]
    - Encircling the thecal sac
    - As tumor compresses, edema develops
- Location[2]
  - Thoracic spine (65%) followed by lumbar then cervical



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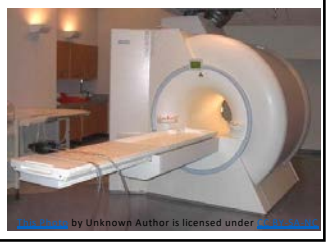
Spinal Cord Compression

- Most common cancer types[1]
  - Lung (25%)
  - Prostate (16%)
  - Multiple Myeloma (11%)
  - Breast (7%)
  - Children: Sarcomas, Neuroblastoma, and Hodgkin Lymphoma (Children)
- Arterial seeding of bone
  - ~85-90% of cases by metastatic spread
- Diagnostic MRI[6]
  - Early detection is KEY



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You are waiting on MRI to confirm your suspicion of Spinal Cord compression. Which of the following is the typical progression of symptoms for patients with cord compression?

- Motor, Sensory, Bowel/bladder, Pain
- Pain, Sensory, Motor, Bowel/bladder
- Sensory, Motor, Pain, Bowel/bladder
- Pain, Bowel/bladder, Sensory, Motor

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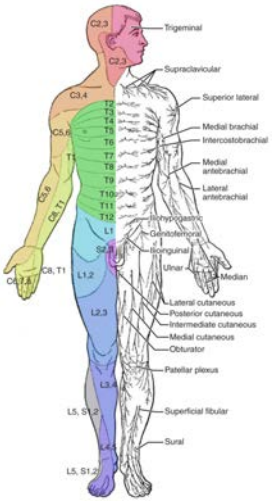
Spinal Cord Compression

Symptoms are progressive[2,6]

- Pain
  - Proceeds neurologic symptoms by ~7 weeks
  - Located at the level of the tumor (Can have referred pain)
  - Worse at night
- Sensory dysfunction
  - Ascending numbness
  - Sensory change often 1-5 levels below level of compression
  - Cauda equina lesions present with "saddle anesthesia"
  - Loss of reflexes
- Motor Dysfunction
  - Weakness in nerve pattern at level of tumor
  - Progresses to gait dysfunction
- Bladder/bowel dysfunction
  - Late finding
  - Urinary retention most common finding



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You have confirmed cord compression on MRI. What is the best treatment for this patient?

- IV Steroids
- Consult Neurosurgery
- Consult Radiation Oncology
- All of the above

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Spinal Cord Compression

- Treatment
  - High dose steroids immediately[1,6]
    - Used as a bridge to definitive therapy
    - Decreases associated edema
    - Increases probability of ambulation post treatment
  - Surgical Consult [5]
    - Decompression
    - Unstable spine (SINS score >7 = surgical consult)
    - Interventional radiology (Kyphoplasty)
  - Radiation Consult [1]
    - Radiation sensitive tumors

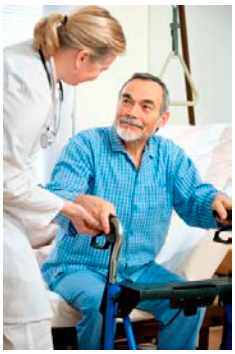
*Surgery + Radiation have better outcomes for post treatment ambulation than radiation alone [5]

27

Spinal Cord Compression

Outcomes

- Most important prognostic factor for ambulation is pretreatment neurologic status
  - Ability to ambulate after treatment based on presentation
    - 75% if ambulating at presentation
    - 30-50% if weakness at presentation
    - 10% of those with paralysis at presentation



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Case 1 Resolution

- Summary:
  - MRI revealed Myeloma involvement of L5 with pathologic fracture
    - Compression grade: 1c (thecal sac deformation with nerve root contact)
  - Given Dexamethasone 10 mg IV once, followed by 4 mg PO every 6 hours
  - Consulted Neurosurgery and Radiation Oncology
  - Neurosurgery with no emergent intervention, but did recommend Kyphoplasty for pain control
  - Radiation oncology proceeded following Kyphoplasty
  - Patient able to fully ambulate post treatment

29

Case 2

36 y.o male

PMHx of nephrolithiasis presents with L flank pain x 1 week. He endorses hematuria, easy bruising on legs and gum bleeding while brushing teeth. Denies fevers or chills.

Initial Work up:

Exam:

Left side CVA tenderness

CBC:

WBC 42.8

Hgb 14.8

Plt 33K

Smear with abnormal lymphoid cells

CHEM:

Na 136

K 5.1

Cl 110

Co2 20

Cr 2.9

Gluc 109

Ca 9.9

Urinalysis:

WBC 7

RBC >182

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Which of the following is the most likely diagnosis?

Pyelonephritis

Urinary Tract Infection

Tumor Lysis Syndrome

Nephrolithiasis

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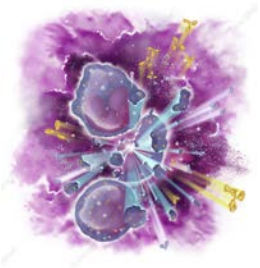
Tumor Lysis Syndrome (TLS)

What is TLS…

- Massive release of intracellular ions as malignant cells die[3]
  - Can occur spontaneously or due to cytotoxic chemotherapy
- Laboratory diagnosis [3,7]

Labs	Normal Values	TLS values
LDH	120-246 U/L	▲ >1000 U/L
Potassium	3.5-4.8 mmol/L	▲ >6 mmol/L or 25% from baseline
Uric acid	3.7-9.2 mg/dL	▲ >8 mg/dL or 25% increase from baseline
Phosphorus	2.4-5.1 mg/dL	▲ > 4.5 mg/dL or 25% increase from baseline
Calcium	8.7-10.4 mg/dL	▼ <7 mg/dL or 25% decrease from baseline



32

Case 2

You ordered appropriate TLS labs to complete the work…

- CHEM:
  - K 6.1, Cr 3.9, Ca 8.6, Phos 7.3, Uric acid 26.4, LDH 10,053

33

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What is your next step?

Run and Hide

Bone Marrow Biopsy

IV fluids and correct electrolytes

PET Scan

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Tumor Lysis Syndrome (TLS)

At risk populations:[2,7]

- ALL with WBC >100K
- AML with WBC >50K
- High tumor burden (Burkitt or high grade lymphomas)
- High proliferative diseases (LDH >1000)
- Less frequent in solid tumors (metastatic tumors)
- Pre-existing renal disease or dehydration

- Monitoring
  - Q6 hour TLS labs in high risk patients
  - Solid tumors – consider baseline TLS labs [3]
    - Prior to treatment in metastatic disease

35

Tumor Lysis Syndrome (TLS)

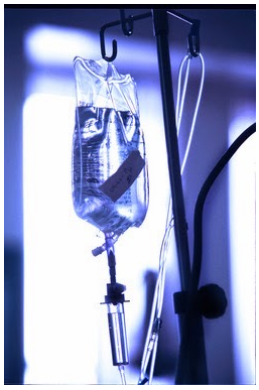
Goal is to prevent renal injury [3]

- Build up of uric acid crystals and/or deposits of phosphate in renal tubules

Prevention is KEY

- Aggressive IVF hyper-hydration [3]
  - Saline IVF at 150-200 ml/hr
- Allopurinol [7]
  - Reduces uric acid production
- Sevelamer
  - phosphate binder
- Rasburicase if very high risk $$$[7]
  - Increases urine excretion of uric acid
  - Use with caution in G6PD deficiency – hemolysis

Risk decreases ~72 hours of initiation of chemotherapy



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Tumor Lysis Syndrome (TLS)

Treatment the underlying electrolyte abnormality

- Hyperkalemia
  - Kayexalate, calcium gluconate, insulin, dialysis
- Hyperphosphatemia
  - Sevelamer, dialysis
- Hyperuricemia
  - Allopurinol, Rasburicase, dialysis
- Hypocalcemia - only if symptomatic
  - Calcium gluconate

37

Case 2

- Summary
  - Flow cytometry revealed high grade B cell lymphoma
  - CT abdomen with retroperitoneal lymphadenopathy
  - Started on IVF at 200 ml/hr, given Rasburicase x3, allopurinol 300 mg daily (renal dose) and Sevelamer 2400 mg TID
  - Emergent dialysis x 4 days
  - Lymph node biopsy revealed Stage IV Burkitt Lymphoma
  - Received full treatment course
  - Now in remission and doing well!

38

Case 3

69 y.o male
PMHx of COPD, atrial fibrillation, T2DM, and AML on Azacitidine/Venetoclax who presents to the ER with cough, SOB, progressive AMS. Once in the ER, patient found to have a temperature of 39.1 C.

Exam:

- Irregular rate and rhythm
- Breathing labored with CPAP on

Initial Work up:

CBC:

- WBC 1.5
- ANC 0.1
- Hgb 8.9
- Plt 24K

CHEM:

- Na 145
- K 3.7
- Cl 104
- Co2 34
- Cr 0.83
- Gluc 15
- Ca 9.1

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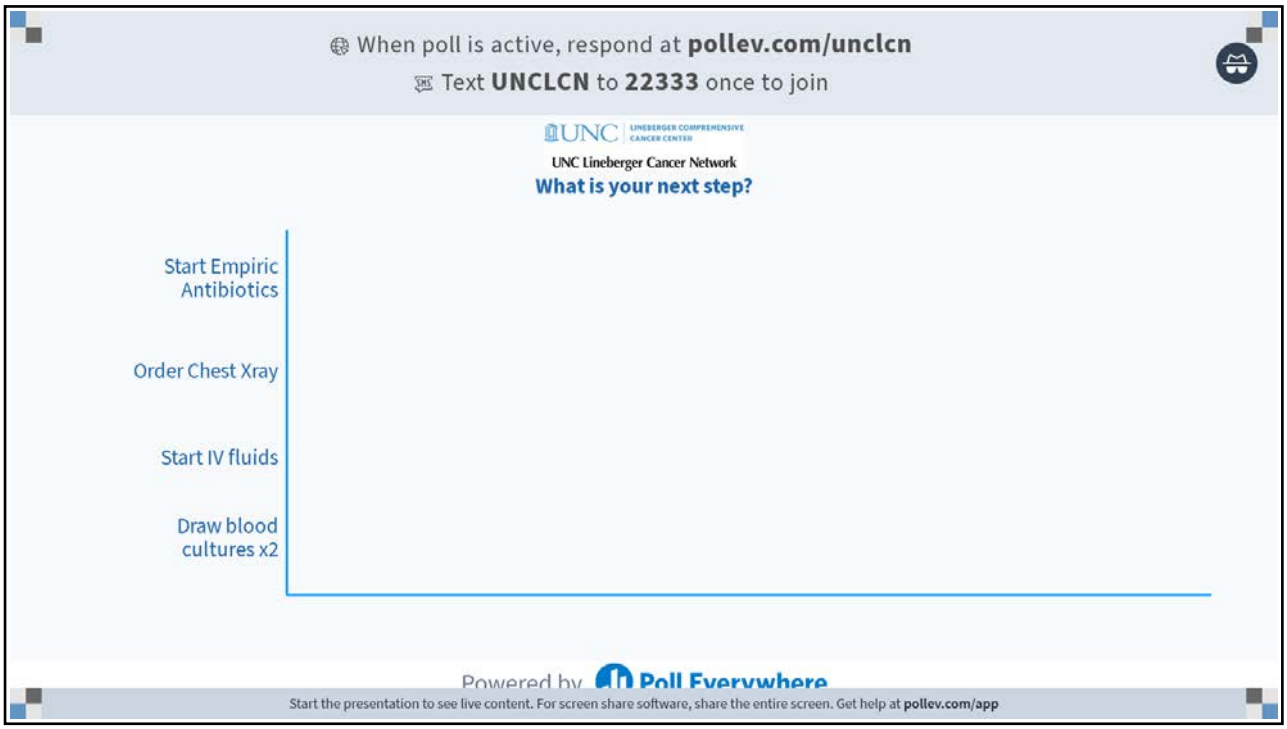

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Neutropenic Fever

- Definition: [8]
  - >38.3 C once or >38.0 C sustained over 1 hour
  - ANC < 500 or within next 48 hours
- Risk factors[8]
  - depth and duration of neutropenia
  - Sepsis/death can develop within first 4 hours of fever
- Source:
  - Bacterial, viral or fungal from any location
  - Most common sites: GI tract, lungs, skin
  - Do NOT forget to examine
    - Sinuses, perianal (avoid DRE), mucosal membranes

41

Neutropenic Fever

- At risk populations:
  - Induction chemotherapy for acute leukemia
  - Outpatients receiving chemotherapy
  - Chronic neutropenia: Myelodysplastic syndrome, myelofibrosis, or aplastic anemia

All patients with ANC <500 are placed on prophylaxis antimicrobials

- Presentation
  - Fever is often the only presenting symptoms
    - No neutrophils to amount response (abscess, consolidation, etc)
    - ~70% of patient will not have an identified source [4]

42

Neutropenic Fever

- Work up: [4]
  - Prior to Antibiotics:
    - Blood cultures x2
      - 1 peripheral, 1 central line (or 2 peripheral)
    - +/- urine culture
  - Before or After Antibiotics
    - Consider CT chest NONContrast if stable and respiratory symptoms
    - Inspect skin for central line site, wounds or ulcerations
    - Focused physical based on other symptoms if present

Clinically documented infections occur only 20-30% of the time

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You have collected blood cultures and ready to start antibiotics. Which antibiotic would you choose to start for empiric coverage?

Aztreonam

Meropenem

Cefepime

Vancomycin

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Neutropenic Fever

- Treatment[4,8]
  - Initiate empiric antibiotics immediately – within 4 hours
    - Cefepime 2g every 8 hours
      - Zosyn is an alternative
    - +/- Vancomycin if considered for MRSA
      - line/skin/mucositis, hx of MRSA or hemodynamically unstable
- Special considerations:
  - VRE – Daptomycin
  - ESBLs – Meropenem
  - Penicillin allergy – Aztreonam + Vancomycin

45

Neutropenic Fever

Special areas of concern

- Meningitis:
  - if receiving frequent LPs/IT Chemo; also must consider CNS involvement
- Pneumonia:
  - consider fungal and mycobacterium
- Sinus infections:
  - Invasive fungal infections
- Typhlitis:
  - neutropenic enteritis from GI translocation (break down of mucosal barrier lining)
- Rectal fissures/perirectal abscess
  - If pain, obtain CT

46

Case 3 Resolution

- **Summary:**
  - Cefepime x 10 days
  - No infectious sources identified
    - Cultures/CT chest negative
  - Afebrile after 48 hours of antibiotics
  - Discharged back on Levaquin prophylaxis given ongoing neutropenia

47

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Radiation Oncology Management of Lung Cancer in NC: Update on Small-Cell Lung Cancer

Ashley Weiner, MD, PhD

PATIENT CENTERED CARE — *June 14* — *12:00 PM*

Mental Health Therapy Services

Melissa Holt, DNP, PMHNP-BC, MSW

Lisa Stewart, Psy.D.

ADVANCED PRACTICE PROVIDER — *June 21* — *4:00 PM*

Evaluation and Treatment of Extravasation Injuries from Chemotherapeutic Agents

Robyn Tolley, MPAP, PA-C

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