It’s Not A Tumor!
Oncologic Emergencies

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Oncologic Emergencies

Increasing incidence of cancer
Improved survival
Patients with malignancies may present to EDs and general medical offices
Oncologic emergencies
Those resulting from the disease itself
Those resulting from cancer therapy

Oncologic Emergencies: General Categories

Metabolic Emergencies
- Hypercalcemia
- Tumor Lysis Syndrome

Neurologic Emergencies
- Malignant spinal cord compression
- Brain metastases and increased ICP

Infectious Complications
- Neutropenic fever

Cardiovascular Emergencies
- Malignant pericardial effusion
- Superior vena cava syndrome

Hematologic Emergencies
- Hyperviscosity due to dysproteinemia
- Hyperleukocytosis and leukostasis
Neutropenic Fever

- **Fever**
  - Single oral temperature > 38.3°C (101.3°F)
  - Sustained temperature > 38°C (100.4°F) for > 1 hour
- **Neutropenia**
  - Absolute neutrophil count < 1,000
  - Severe neutropenia
    - Absolute neutrophil count < 500

- Most commonly seen after chemotherapy
- Also seen in myelogenous cancers
- Risk of infection depends on...
  - Depth of neutropenia
  - Duration of neutropenia
  - Comorbid conditions (e.g. mucositis)
- Nadir usually 5-10 days after last chemo dose
- Recovers 5 days after nadir (usually)

- **Organisms**
  - Multiple organisms implicated
    - Enteric gram negatives
    - Gram positives
  - Frequently no organism recovered

- Presentation
  - Fever usually only symptom
  - May range from fever only to severe sepsis
  - Neutropenia leads to atypical presentation with common infections
    - E.g. pneumonia patients may have no infiltrate; UTI patients may have no pyuria
**Oncologic Emergencies**

**Neutropenic Fever**

- **Presentation**
  - Careful physical examination crucial
  - Particular attention to skin, oral cavity, sites of indwelling catheters, perianal area
  - Rectal examination discouraged

- **Evaluation**
  - Blood cultures
    - Peripheral vein AND any indwelling catheters
    - Urine cultures
    - Sputum cultures
    - Stool, CSF cultures if indicated
  - CXR may be normal
    - Consider CT for higher resolution

- **Treatment**
  - All febrile neutropenic patients should receive antibiotics ASAP
  - Afebrile neutropenic patients with high suspicion of infection also should get rx
  - Broad spectrum to start; narrow later
Oncologic Emergencies
Neutropenic Fever

Treatment
- Most patients should be admitted
- Highly selected patients MAY be treated as outpatients
  - Very close follow-up necessary
  - Must have ready access to health care
  - Assess personal / social situation

Multinational Association Scoring System
- No or mild symptoms 5
- No hypotension 5
- No COPD 4
- Solid tumor or no previous fungal infxn 4
- No dehydration 3
- Moderate symptoms 3
- Outpatient status 3
- Age < 60 years 2
Score • 21 low risk for serious medical complications

Neutropenic Fever
Antibiotic Strategies
- Broad empiric coverage + coverage for any suspected/ known infections
  - Gram-negative coverage for all patients
  - Gram-positive coverage for selected patients per IDSA recommendations
- Use bactericidal antibiotics administered through alternate ports to indwelling lines

Neutropenic Fever Treatment
- Clinical Practice Guidelines
- Clinical Infectious Diseases CID 2011:52 (15 February)
**IDSA Management Algorithm**

**IDSA Recommendations**

**Outpatient Treatment**

- **Suggested Antibiotic Regimen:**
  - Ciprofloxacin 500mg PO q8h  **PLUS**
  - Amoxicillin/Clavulanate 500mg PO q8h

- **Penicillin-allergic Patients:**
  - Ciprofloxacin 500mg PO q8h  **PLUS**
  - Clindamycin

- **Note:** Outpatient therapy not recommended for the pediatric population.

**Inpatient Treatment**

- **Inpatient Care for Children and “High Risk” Adult Patients**
  - Monotherapy: Single, broad-spectrum IV agent
    - Ceftepime (4th generation cephalosporin)
    - Ceftazidime (3rd generation cephalosporin)
    - Carbapenem (Imipenem or Meropenem)

- **Combination Therapy:**
  - Aminoglycoside (Gentamicin, Tobramycin, or Amikacin) **PLUS**
  - Antipseudomonal beta-lactam (Ticarcillin-clavulanic acid or Piperacillin-tazobactam), **OR**
  - Antipseudomonal cephalosporin (Ceftepime or ceftazidime), **OR**
  - Carbapenem (Imipenem or Meropenem)

- **Note:** None of these have been shown to be clearly superior.

**Oncologic Emergencies**

**Spinal Cord Compression**

- **Relatively common**
- 2.5 to 6% of cancer patients
- Most common: Breast, lung, prostate
- Confers poor prognosis overall
- Urgent need to make diagnosis and treat
- Neuro status at presentation and rapidity of onset predict functional outcome
Oncologic Emergencies
Spinal Cord Compression

- Usually results from extension from spinal bony metastases
  - Less commonly extends through foramina
    - Lymphomas, sarcomas
    - Will not see bony destruction
  - Most common in thoracic spine

Presentation

- 90% have back pain
- 80% have preceding diagnosis of malignancy
- May have several simultaneous lesions
- BACK PAIN + MALIGNANCY = SCC!!

Symptoms

- Radicular pain
- Motor weakness
- Gait disturbance
- Bowel or bladder dysfunction
- Imperative to try to diagnose before neurologic dysfunction occurs

Evaluation

- MRI is imaging study of choice
- Consider imaging entire spine ( +/- C spine)
- CT myelography second choice
- Plain films / nuclear medicine poor choices
  - Limited sensitivity and specificity
  - Plain films may show bony lesions
  - Negative plain films do NOT rule out SCC
Oncologic Emergencies

Spinal Cord Compression

- Treatment
  - Start as soon as possible; need tissue diagnosis
  - Glucocorticoids
    - Dexamethasone 10-16 mg IV, then 4 mg every 6 hours
  - Radiation
    - Mainstay of therapy (?)
  - Surgery may also be indicated (or preferable)

Malignant Pericardial Effusion

- Common in advanced cancer
- Frequently asymptomatic
- Poor prognosis
  - Most patients die within one year

Presentation

- Symptoms depend on rapidity of onset
- May see dyspnea, cough, chest pain, dysphasia, hiccups, hoarseness
- May find tachycardia, distant heart sounds, JVD, UE and LE edema, pulsus paradoxus
- Tamponade = hypotension/shock with tachycardia, JVD

EKG

- Low voltages
- Electrical alternans
Oncologic Emergencies

Malignant Pericardial Effusion

- Evaluation
  - Echo preferred test
  - Presence of fluid
  - “Tamponade physiology”
  - CT and MRI also useful
- Treatment
  - Pericardiocentesis

Superior Vena Cava Syndrome

- Usually caused by compression of SVC
  - Benign and malignant causes
  - Lung cancer, lymphoma most common malignancies
  - May also be caused by intraluminal thrombus
  - Often due to indwelling catheters

- Presentation
  - Onset usually insidious; may be rapid
  - Dyspnea, facial swelling, cough
    - Cough may aggravated by leaning forward, stooping
  - Exam
    - Distended neck / chest wall veins
    - Facial edema
    - Upper extremity edema
Oncologic Emergencies
Superior Vena Cava Syndrome
- Evaluation
  - CT with contrast
  - MRI also useful
- Treatment
  - Unless respiratory compromise, not a true emergency
  - Radiation, stenting, chemo, steroids as indicated

Oncologic Emergencies
Tumor Lysis Syndrome
- Seen in aggressive hematologic malignancies
- High grade lymphoma, acute leukemia
- Seen after treatment of treatment of active solid tumors
- Massive release of intracellular contents after tumor death
- Can cause severe metabolic derangements
- May be life threatening

Oncologic Emergencies
Tumor Lysis Syndrome
- Hyperuricemia
  - Crystallize in renal tubules
  - Can lead to acute renal failure
- Hyperkalemia
  - Life-threatening arrhythmias
- Hyperphosphatemia
  - Leads to hypocalcemia, tetany, seizures, arrhythmias

Oncologic Emergencies
Tumor Lysis Syndrome
- Presentation
  - Rare to see; usually prevented during treatment
  - Suspect in patients with aggressive hematologic malignancies or solid tumors
    - Especially with recent chemotherapy
  - Seizures
  - Arrhythmias
  - Decreased urine output / volume overload
Oncologic Emergencies: Tumor Lysis Syndrome

**Presentation**
- Send uric acid, phosphorus, potassium, LDH, calcium
- Check EKG as well
- Grading systems define degree of illness

**Treatment**
- Prophylaxis best
  - Allopurinol 2-3 days before chemo
  - Maintain good hydration
- If TLS present
  - Admit ICU / monitor
  - Maintain hydration
  - Want urine output 100-200 mL/hr
  - Take care if renal failure
- Treat electrolyte disturbances

Oncologic Emergencies: Hypercalcemia

- Occurs in 10-30% of cancer patients
- Usually seen in patients with known cancer
- Carries a poor prognosis
- Most commonly seen in
  - Breast cancer
  - Lung cancer
  - Multiple myeloma

3 types
- Humoral hypercalcemia of malignancy
  - Via PTHrP (parathyroid related hormone)
  - Most common mechanism (33-88%)
- Local bone destruction
- Tumor production of vitamin D analogues
Oncologic Emergencies: Hypercalcemia

**Presentation**
- Multiple, nonspecific symptoms
- Lethargy, confusion
- Anorexia, nausea
- Constipation
- Polyuria, polydipsia
- Some correlation with rapidity of onset and degree of hypercalcemia

**Physical exam usually unhelpful**
- May see lethargy
- May see dehydration

**Laboratory**
- Must correct total serum calcium for albumin
  - Measured total Ca + [0.8 x (4.0-albumin)]
- Also check creatinine, other electrolytes, alkaline phosphatase
- Low serum chloride suggestive of hypercalcemia of malignancy

**Treatment**
- Consider the big picture; comfort measures only may be appropriate
- Hydration with normal saline first step
- Patients often very volume depleted
- Avoid loop diuretics until euvolemic

- Bisphosphonates
  - Pamidronate, zoledronic acid
  - Doses adjusted based on renal function
  - Block osteoclastic bone resorption
- SubQ or IM calcitonin (not nasal)
  - Quickly lowers serum calcium levels
  - Short-lived effect
Oncologic Emergencies: Hypercalcemia

**Treatment**
- Corticosteroids
  - Most effective in hematologic malignancies
  - (Elevated levels of vitamin D)
- Dialysis
  - Patients with renal or heart failure
- Avoid oral phosphate
- Effective treatment of underlying cancer may be useful

Oncologic Emergencies: Hypercalcemia

**Treatment**
- Mithramycin
  - Multiple side effects limit use
- Gallium nitrate
  - Slow infusion rate
- Both have fallen out of favor since introduction of biphosphonates

Oncologic Emergencies

**Case Presentation**
- Patient received IV NS
- Calcium came down to 10.2 with fluids only
- Workup showed multiple bony metastases throughout
- Follow-up with oncologist; long term care plan discussed with patient

Oncologic Emergencies

**Brain Metastases / Increased ICP**
- Seen in up to 25% of terminal cancer patients
- Lung, breast, melanoma most common
- Brain edema from tumor expansion causes increased ICP
Oncologic Emergencies
Brain Metastases / Increased ICP

Presentation
- History of cancer in most cases
- Symptoms range from focal to generalized
- Symptoms often subtle, gradual in onset
- Only 50% have headaches
- May see seizures, symptoms of increased ICP
- Confers very poor prognosis

Evaluation
- MRI preferred study
- CT may miss posterior fossa lesions

Treatment
- May want to consider palliative treatment only
- Steroids for symptom management
- Antiepileptics as needed
- Whole brain irradiation may be indicated

A personal note...
- Discussions regarding end of life care crucial in terminal diseases
- Hospice care, especially home hospice care, provides comfort and addresses quality of life
- Goal is to help the patients live comfortably on their own terms and choose how they want to live the rest of their lives

Thank You For Your Attention!!
Any Questions?