ONCOLOGIC EMERGENCIES

Rapid Integration Course – New PA’s/NP’s. Jacksonville, FL
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Oncologic Emergencies

I have no financial relationships, commercial interests or conflicts to disclose
Oncologic Emergencies

■ Objectives

I. To Learn and Understand the Types of Oncologic Emergencies

II. To Learn and Understand the Association between Oncologic Emergencies and Types of Cancers

III. To Learn and Understand the Different Presentations of Oncologic Emergencies

IV. To Learn and Understand the Appropriate Treatment Plans
I. Which oncologic emergency is characterized by hyperuricemia, hyperkalemia, hypocalcemia and renal failure?

A. Neutropenic Fever
B. Hypercalcemia of Malignancy
C. Tumor Lysis Syndrome
D. Hyperviscosity Syndrome
Oncologic Emergencies

II. A 50 year old patient with metastatic breast cancer presents with an onset of back pain, motor weakness and decreased buttocks sensation. You are concerned about spinal cord compression. You give her Dexamethasone 10 mg IV x 1. What is the next step that you would do?

A. Radiation Oncology Consult
B. Neurosurgery Consult
C. Consult both Radiation and Neurosurgery immediately
D. Wait for MRI results before you consult a service
III. Which Oncologic Emergency is referenced by the following phrase: “Stones, Bones, Moans, Groans, Thrones, Psychiatric Overtones”

A. Superior Vena Cava Syndrome
B. Increased Intracranial Pressure
C. Hypercalcemia of Malignancy
D. Hyperviscosity Syndrome
Oncologic Emergencies

- Metabolic
- Cardiovascular
- Infectious
- Neurologic
- Hematologic
- Respiratory
- Chemotherapeutic
Oncologic Emergencies

- **Metabolic**
  - Tumor Lysis Syndrome

I. Most frequently encountered
II. 29-79% mortality
III. Malignancies with rapid cell turnover
IV. Subsequent/Spontaneous Presentation
Oncologic Emergencies

- **Metabolic**
  - Tumor Lysis Syndrome

I. **Presentation:** Fatigue
   - Dehydration
   - Seizures
   - Cardiac Dysrhythmia
   - Nausea/Vomiting
   - Muscle Cramps/Paresthesia
   - Syncope
   - Fluid Overload
   - Chest Pain/Palpitations
Oncologic Emergencies

- **Metabolic**
  - Tumor Lysis Syndrome

I. Labs: CBC, CMP, Magnesium, Phosphorus, Uric acid, LDH, Total/Ionized Calcium, Urinalysis

II. Clinical v Laboratory TLS: Cairo-Bishop Criteria

<table>
<thead>
<tr>
<th>Laboratory criteria</th>
<th>Clinical criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uric acid $\geq 8.0$ mg/dL</td>
<td>or 25% increase of baseline or creatinine $\times 1.5$ times the upper limit of normal.</td>
</tr>
<tr>
<td>Potassium $\geq 6.0$ mmol/L</td>
<td>or 25% increase or cardiac arrhythmias.</td>
</tr>
<tr>
<td>Phosphorus $\geq 4.6$ mg/dL</td>
<td>or 25% increase or seizures.</td>
</tr>
<tr>
<td>Calcium $\leq 7.0$ mg/dL</td>
<td>or 25% increase or other signs of hypercalcemia.</td>
</tr>
</tbody>
</table>
Oncologic Emergencies

- Metabolic
  - Tumor Lysis Syndrome

I. Treatment: IV Fluids

Electrolyte Abnormalities

- Hyperuricemia
- Hyperphosphatemia
- Hyperkalemia
- Hypocalcemia
Oncologic Emergencies

■ Metabolic

■ Hypercalcemia of Malignancy

■ “Stones, Bones, Groans, Moans, Thrones, Psychiatric Overtones”

I. Association: Breast, Lung, Non-Hodgkin’s Lymphoma, Multiple Myeloma.

II. Presentation: N/V, Constipation, Anorexia, Polyuria, Polydipsia, Lethargy, Confusion, Coma.

III. Labs: CBC, CMP, Magnesium, Phosphorus, Total/Ionized Calcium, PTHrP

IV. Diagnostic: EKG
Oncologic Emergencies

- **Metabolic**

- **Hypercalcemia of Malignancy**

V. Treatment:

- < 12 mg/dl - Monitor
- 12-14 mg/dl – Symptom Control/Clinical
- > 14 mg/dl - IVF (UO goal: 100-150ml/hr)

Biphosphonates
Calcitonin
Hemodialysis (Renal Failure)
Monitor/ICU Admission
Oncologic Emergencies

■ **Metabolic**

■ **SIADH**

I. **Association:** Small Cell Lung Cancer, Head and Neck Chemotherapy Agents

II. **Presentation:** Amt of Na in body → Vol of fluid outside cells
- Circulatory Volume
- Interstitial Space
- Cells

III. **Diagnosis:**
- Serum Osmolality < 280 mOsm/kg
- Urine Osmolality > 100 mOsm/kg
- Urine Na > 40 mOsm/kg
- BUN < 10 mg/dL

Rule out Hypothyroidism and Adrenal Insufficiency
Rule out Hyperglycemia (Correct Na = Na + .016(BG−100))
Oncologic Emergencies

■ Metabolic
  ■ SIADH

IV. Treatment: Acute v Chronic
Neurologic (Lethargy, Delirium, Seizures, Coma)
Hypertonic (3%) v Normal (0.9%)
Correction: < 0.5 mEq/L/hour
Avoid Central Pontine Myelinolysis
Remove Stimulus for ADH Secretion
Fluid Restriction < 1200 mL/day
Demeclocycline
Oncologic Emergencies

- **Metabolic**
- **SIADH**

IV. Treatment: Acute v Chronic

Neurologic (Lethargy, Delirium, Seizures, Coma)

Hypertonic (3%) v Normal (0.9%)

Correction: < 0.5 mEq/L/hour

Avoid Central Pontine Myelinolysis

Remove Stimulus for ADH Secretion

Fluid Restriction < 1200 mL/day

Demeclocycline BUT NOT WITH FLUID RESTRICT
Oncologic Emergencies

■ **Cardiovascular**

■ Superior Vena Cava Syndrome

I. Association: Lung Cancer, Lymphomas, Mediastinal Tumor, Breast, Lymphadenopathy, Catheters, Radiation

II. Presentations: Facial Edema, Cough, Dyspnea, Hoarseness, Chest/Shoulder Pain, Edema and Discoloration of Neck and Extremities

III. Diagnosis: Gold Standard: Selective Venography CT or MRI
Oncologic Emergencies

▪ Cardiovascular

▪ Superior Vena Cava Syndrome

III. Diagnosis : Gold Standard: Selective Venography

  Doty and Standford Classification

  CT (common) or MRI

IV: Treatment : Radiation

  Steroids

  Chemotherapy

  Intravascular Stents

  Thrombolysis (Catheter Related)
Oncologic Emergencies

- **Cardiovascular**
  - Pericardial Effusion/Cardiac Tamponade

I. Association: Lung, Esophageal, Breast, Lymphomas, Leukemia, Melanoma, Radiation, Chemotherapy, Infection, Autoimmune Reactions

II. Presentation: Dyspnea, Chest Pain, Pulsus Paradoxus, Beck Triad (Muffled Heart Sounds, Hypotension, Jugular Venous Pressure)
Oncologic Emergencies

■ Cardiovascular

■ Pericardial Effusion/Cardiac Tamponade

III. Diagnosis: EKG, CXR, ECHO – Preferred Study

IV. Treatment: Pericardiocentesis

Pericardiocentesis with indwelling catheter

Pericardial Window

Chemotherapy
Oncologic Emergencies

■ Infectious
  ■ Neutropenic Fever

I. Association: Chemotherapy (Anthracyclines, Taxanes, Topoisomerase Inhibitors, Platinums, Gemcitabine, Vinorelbine, Alkylating Agents)

II. Presentations: Single Temperature of 101.3 or higher
  100.4 or higher for one hour
  ANC < 500 cells per mm or expected decrease to this level < 48 hours
Oncologic Emergencies

- **Infectious**
  - Neutropenic Fever

III. Diagnosis: CBC, CMP, Blood Cultures, Urine Cultures, CXR

IV. Treatment: ABX within 30 minutes of presentation
Oncologic Emergencies

- **Neurologic**
  - Spinal Cord Compression
    - MSCC: Compressive Indentation, Displacement, or Encasement of Thecal Sac that surrounds the Spinal Cord or Cauda Equina

  I. **Association:** Breast, Prostate, Lung. 15 – 20% each
     NHL, Renal, Multiple Myeloma. 5 – 10 % each
     All Tumor Types have Potential
Oncologic Emergencies

■ Neurologic

■ Spinal Cord Compression

II. Presentation: Thoracic (60%), Lumbar (30%) Cervical (10%)

Severity, Location, Duration of Compression

Back Pain – Worsen over Time.

Associated with Referred Pain

Motor Weakness

Sensory Impairment

Autonomic Dysfunction

Urinary Retention/Overflow Incontinence
Oncologic Emergencies

- **Neurologic**

- Spinal Cord Compression

II. Presentation: Decreased Sensation – Buttocks, Post Superior Thighs and Perineum

  - Tenderness on Palpation
  - Valsalva Maneuver
  - Other Early Signs: Hyperreflexia, Spasticity, Loss of Sensation

Late Signs: Weakness, Babinski Sign, Decreased Anal Sphincter Tone
Oncologic Emergencies

■ **Neurologic**

■ Spinal Cord Compression

III. Diagnosis: MRI of Entire Spine

CT myelogram if MRI not possible
Oncologic Emergencies

- Neurologic

- Spinal Cord Compression

IV: Treatment: Steroids (Dexa 10 mg IV x 1, then 4 mg IV q 6)

Neurosurgery Consult

Radiation Oncology Consult

Spine Instability Neoplastic Score

<table>
<thead>
<tr>
<th>Spine location</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junctional (occipit-C2, C7-T2, T11-L1, L5-S1)</td>
<td>3</td>
</tr>
<tr>
<td>Mobile spine (C3-C6, L2-L4)</td>
<td>2</td>
</tr>
<tr>
<td>Semi-rigid (T3-T10)</td>
<td>1</td>
</tr>
<tr>
<td>Rigid (L2-L3)</td>
<td>0</td>
</tr>
<tr>
<td>Mechanical or postural pain</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>No (occasional pain but not mechanical)</td>
<td>1</td>
</tr>
<tr>
<td>Pain-free lesion</td>
<td>0</td>
</tr>
<tr>
<td>Bone lesion quality</td>
<td></td>
</tr>
<tr>
<td>Lytic</td>
<td>2</td>
</tr>
<tr>
<td>Mixed lytic/elastic</td>
<td>1</td>
</tr>
<tr>
<td>Blastic</td>
<td>0</td>
</tr>
<tr>
<td>Radiographic spinal alignment</td>
<td></td>
</tr>
<tr>
<td>Subluxation/translation present</td>
<td>4</td>
</tr>
<tr>
<td>De novo deformity (kyphosis/scoliosis)</td>
<td>2</td>
</tr>
<tr>
<td>Normal alignment</td>
<td>0</td>
</tr>
<tr>
<td>Vertebral body involvement</td>
<td></td>
</tr>
<tr>
<td>&gt;50% collapse</td>
<td>3</td>
</tr>
<tr>
<td>&lt;50% collapse</td>
<td>2</td>
</tr>
<tr>
<td>No collapse with &gt;50% of the body involved</td>
<td>1</td>
</tr>
<tr>
<td>None of the above</td>
<td>0</td>
</tr>
<tr>
<td>Posterior involvement</td>
<td></td>
</tr>
<tr>
<td>Bilateral</td>
<td>3</td>
</tr>
<tr>
<td>Unilateral</td>
<td>1</td>
</tr>
<tr>
<td>None of the above</td>
<td>0</td>
</tr>
</tbody>
</table>

Total Score

0 - 8: Conservative treatment

9 - 11: Palliative surgery

12 - 15: Excisional surgery
Oncologic Emergencies

■ Neurologic

■ Increased Intracranial Pressure

I. Association: Metastatic - Lung (20%)
   - Breast (5%)
   - Melanoma (7%)
   - Renal (10%)
   - Colorectal (1%)

II. Presentation: Based on Location, Size and Tumor Growth Rate
Oncologic Emergencies

- **Neurologic**

- Increased Intracranial Pressure

II. Presentation: Based on Location, Size and Tumor Growth Rate

- Headache
- Nausea/Vomiting
- Seizures
- Hemorrhagic Strokes
- Focal Neurologic Changes
- Cognitive Changes
Oncologic Emergencies

- **Neurologic**
  - Increased Intracranial Pressure

II. Presentation: Cushing Response (Hypertension, Bradycardia, Irregular Resp Rate)
Oncologic Emergencies

■ Neurologic

■ Increased Intracranial Pressure

II. Presentation: Cushing Response (Hypertension, Bradycardia, Irregular Resp Rate)

TOO LATE
Oncologic Emergencies

■ Neurologic

■ Increased Intracranial Pressure

II. Presentation: Cushing Response (Hypertension, Bradycardia, Irregular Resp Rate)

TOO LATE

IMPENDING HERNIATION
Oncologic Emergencies

- **Neurologic**
  - Increased Intracranial Pressure

II. Presentation: Cushing Response (Hypertension, Bradycardia, Irregular Resp Rate)

TOO LATE

IMPEILDING HERNIATION
Oncologic Emergencies

■ **Neurologic**
  ■ Increased Intracranial Pressure

III. Diagnosis: MRI with Gadolinium

IV. Treatment: Dexamethasone
  Mannitol and Intubation – Severe Cases
  Whole Brain Radiation (WBRT)
  Surgery
  Stereotactic Radiosurgery
  Chemotherapy
Oncologic Emergencies

- **Hematologic**

- Hyperviscosity Syndrome - Proteins

I. Association: Waldenstrom macroglobulinemia
   Multiple Myeloma

II. Presentation: Neurologic Abnormalities
    - Visual Changes
    - Bleeding
Oncologic Emergencies

■ Hematologic

■ Hyperviscosity Syndrome – Proteins

Excess Proteins (IgM, IgA, IgG)

III. Diagnosis: Clinical

CMP, Serum Viscosity, Peripheral Blood Smear
Coagulation Panel, Quantitative Ig Level

IV. Treatment: Plasmapheresis
Oncologic Emergencies

■ **Hematologic**

■ Hyperviscosity Syndrome – WBC

I. Association: Leukemia
   Myeloproliferative States (PV)

II. Presentation: Leukostasis – WBC > 100,000
   Any Organ System
   Respiratory: Dyspnea, Resp Distress
   CNS: Headache, Dizzy, Visual Defects
   Vascular: MI, Ischemia, DIC
   Renal Vein Thrombosis
   Fever
Oncologic Emergencies

■ Hematologic
  ■ Hyperviscosity Syndrome – WBC

III. Diagnosis: Clinical, WBC

IV. Treatment: Induction Chemotherapy – Risk of TLS
  Leukapheresis
  Hydroxyurea
Oncologic Emergencies

- **Respiratory**
  - Malignant Airway Obstruction

I. **Associations**: Tumors of Tongue, Oropharynx, Thyroid, Trachea, Bronchi, Lungs

II. **Presentation**: Dependent on Severity and Location (External vs. Infiltration)
- Dyspnea – At night
- Productive Cough/Wheezing
- Stridor
- “Tracheal Stenosis Syndrome”
- Hemoptysis
Oncologic Emergencies

- **Respiratory**
  - Malignant Airway Obstruction

III. Diagnosis:  
- Chest X ray
- CT scan
- Pulse Oximetry
- Bronchoscopy

IV. Treatment:  
- Stenting
- Laser Therapy
- Radiation
- Chemotherapy
Oncologic Emergencies

- Chemotherapeutic
- Extravasation

- Severity of Injury – Drug Concentration/Volume

I. Presentation: Immediate Symptoms v Delayed

- Pain
- Blisters
- Induration
- Discoloration
- Ulceration
- Tissue Necrosis
Oncologic Emergencies

■ Chemotherapeutic
■ Extravasation

II. Diagnosis: Identification of Pain

- Erythema
- Edema
- Fluid Leakage
- Change in Infusion Rate
- Absence of Blood Return

III. Treatment: Prevention

- Discontinue Infusion
- Cold (Vesicants/Irritant Drugs)
- Hot (Vinca Alkaloids/ Epipodophyllotoxins)
Oncologic Emergencies

- Chemotherapeutic
- Anaphylactic Reactions
- Allergic Reaction – Rapid, Possible Death

I. Presentation: Urticaria/Angioedema 90%
   - Wheezing/Dyspnea 70%
   - GI Symptoms 35%
   - Cardiovascular 35%
Oncologic Emergencies

- Chemotherapeutic
- Anaphylactic Reactions
- Allergic Reaction – Rapid, Possible Death

II. Diagnosis: 3 criterion

A. Acute with: Skin/Mucous changes
   - Hypotension
   - Respiratory Compromise

B. 2 or more: Skin/Mucosal Involvement
   - Respiratory Compromise
   - Reduced Blood Pressure/Syncope
   - GI Symptoms

C. Reduced BP after exposure to known allergant of the patient
Oncologic Emergencies

- Chemotherapeutic
- Anaphylactic Reactions
- Allergic Reaction – Rapid, Possible Death

III. Treatment: No Anaphylaxis: Discontinue Infusion

Diphenhydramine 50 mg IV

Anaphylaxis: Discontinue Infusion

Epinephrine (0.3 - 0.5 im; 1:1000)

Oxygen

IV Fluids

Antihistamines/Glucocorticoids
Oncologic Emergencies


Oncologic Emergencies

- Thank you for your attendance and attention