ONCOLOGIC EMERGENCIES

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ONCOLOGIC EMERGENCIES

• Recognize abnormal laboratory results and associated nursing implications.

• Recognize the most common oncologic emergencies and important nursing interventions for each.

• Implement practices designed to improve the quality of life for patients and families affected by childhood cancer.
ONCOLOGIC EMERGENCIES

• Occur at diagnosis or at any point in treatment process
• Life-threatening
• Arise as:
  - metabolic/hormonal problems
  - result of obstruction/pressure
  - consequence of cytopenias
HYPERLEUKOCYTOSIS

• **Definition**
  - peripheral WBC >100,000/mm³

• **Associated Malignancies**
  - AML/ALL
  - CML

• **Clinical Presentation**
  - SOB/tachypnea/cyanosis
  - blurred vision/papilledema
  - ataxia/agitation/confusion
  - delirium/stupor

Photo courtesy of Dr. C-H. Pui
HYPERLEUKOCYTOSIS

• Medical Management
  - IV hyperhydration (~3000 mls/M²/day)
  - maintain urine output at 1-2 mls/kg/hr
  - NaHCO₃/allopurinol/rasburicase
  - correct electrolytes
  - leukapheresis/exchange transfusions
  - blood product support
  - anti-leukemia treatment
HYPERLEUKOCYTOSIS

• Nursing Management/Interventions
  - assess cardiopulmonary/neurologic status
  - monitor fluid/electrolyte balance
  - recognize change in status/implement appropriate interventions
HYPERLEUKOCYTOSIS

• Potential Complications
  - hemorrhage/intracranial bleed
  - pulmonary leukostasis
  - metabolic alterations
  - renal failure
  - sudden death
TUMOR LYSIS SYNDROME (TLS)

• Definition
  - rapid breakdown of malignant cells causing inadequate renal function manifested by:
    • hyperuricemia (uric acid > 8 mgs/dl)
    • hyperkalemia \((K^+ > 6 \text{ mEq/mL})\)
    • hyperphosphatemia \((PO_4 > 10 \text{ mgs/dl})\)
    • hypocalcemia \((Ca^{++} < 8 \text{ mgs/dl})\)
CYTOTOXIC THERAPY/SPONTANEOUS TUMOR CELL BREAKDOWN

Tumor Cell Lysis

- Hyperuricemia
  - Uric acid crystals
    - Renal Failure
      - Dialysis
- Hyperphosphatemia
  - Calcium/phosphate crystals
- Hyperkalemia
  - Ventricular arrhythmia
  - Death

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TLS

- Associated Malignancies
  - B cell leukemia/Burkitt’s lymphoma
  - T cell leukemia/lymphoma
  - leukemia with WBC > 100,000/mm³
  - neuroblastoma (rare)
• **Clinical Presentation**
  - RAPID ONSET
  - abdominal pain/cramping/fullness/vomiting/ascites
  - back/flank pain/oliguria/anuria
  - cardiac arrhythmias/tachycardia/pleural effusion
  - numbness/tingling/tetany
  - weakness/fatigue
  - altered level of conscience
  - seizures
TLS

• Medical Management
  - IV hyperhydration (~3000 mls/M²/day)
  - urine alkalization
    • NaHCO₃/allopurinol/rasburicase
  - correct electrolyte/metabolic abnormalities
  - +/- dialysis
TLS

• **Nursing Management/Interventions**
  - accurate I&O/monitor weights
  - monitor urine pH/specific gravity
  - assess for symptoms of hypocalcemia
    • Chvostek’s sign
    • Trousseau’s
  - patient/family support
SEPTIC SHOCK

• Definition
  - systemic response to pathogenic micro-organisms and endotoxins in the blood
  - leads to ↓ perfusion, cellular hypoxia, and death
  - usually associated with gram negative organisms arising from endogenous flora
SEPTIC SHOCK

• Risk factors
  - ANC < 100/mm³
  - prolonged neutropenia (> 7 days)
  - immunosuppression
  - asplenism
  - infancy
  - mechanical device
  - poor skin integrity/mucositis
# Septic Shock

## Sepsis Versus Septic Shock

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Sepsis</th>
<th>Septic Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vital Signs</strong></td>
<td>Temperature: &lt; 36°C or &gt; 38°C&lt;br&gt;HR: tachycardia&lt;br&gt;RR: tachypnea&lt;br&gt;BP: normal</td>
<td>Temperature: &lt; 36°C or &gt; 38°C&lt;br&gt;HR: tachycardia&lt;br&gt;RR: tachypnea&lt;br&gt;BP: hypotension unresponsive to fluid resuscitation</td>
</tr>
<tr>
<td><strong>Physical Changes</strong></td>
<td>Warm, flushed skin&lt;br&gt;Weak/malaise&lt;br&gt;Adequate urine output</td>
<td>Cool, clammy skin&lt;br&gt;Bilateral rales, hypoxia&lt;br&gt;Anasarca&lt;br&gt;Oliguria → anuria</td>
</tr>
<tr>
<td><strong>Mental Status Changes</strong></td>
<td>Minor confusion/restlessness</td>
<td>Confusion, anxiety, agitation, delirium, ↓ LOC</td>
</tr>
</tbody>
</table>
COMPENSATED SEPTIC SHOCK
HYPERDYNAMIC

- Early stage of shock
- Patient usually pancytopenic
- Often initial presentation
- May not appear “sick”
COMPENSATED SEPTIC SHOCK HYPERDYNAMIC

Intermediate stage of shock
Patient usually pancytopenic
Appears “sick”
May need intubation
Still reversible
DECOMPENSATED SEPTIC SHOCK CARDIOGENIC

Late stage of shock
Patient usually pancytopenic
Organisms often gram negative
Metabolic/lactic acidosis
May not be reversible

- DELETERIUM → COMA
- >25% ↓ BLOOD VOLUME/CARDIAC OUTPUT
- PROFOND HYPOXIA
- SEVERE ↓ BP
- RAPID THREADY PULSE
- TRUNK COOL/MOTTLED
- RESPIRATORY FAILURE PULMONARY EDEMA
- HEMORRHAGIC LESIONS IN GI TRACT/DIC
- OLIGURIA → RENAL FAILURE
- COLD EXTREMETIES
- PERIPHERAL EDEMA

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SEPTIC SHOCK

• Medical Management
  - symptom management
    • pressor support medications
  - fluid boluses/hyperhydration
    • isotonic crystalloid solution (NS)
    • 20 mls/kg IV
  - blood product support
  - +/- dialysis/ventilator support
  - treat underlying cause
  - antibiotics/+- antifungal agents
  - +/- CXR
SEPTIC SHOCK

- **Nursing Management/Interventions**
  - obtain blood cultures
  - administer IV antibiotics
  - close monitoring of VS
  - identify early trends
  - good communication with team
  - patient/family support
DISSEMINATED INTRAVASCULAR COAGULATION (DIC)

• Definition
  - alteration in blood clotting mechanisms with ↑ amounts of thrombin and plasmin in the circulation
    • ↓ platelets
    • ↑ prothrombin
    • ↓ fibrinogen

• Manifested by
  - diffuse intravascular coagulation
  - tissue ischemia

• Risk Factors
  - malignancies
  - infection
  - trauma
DIC

• **Clinical Presentation**
  - petechiae/ecchymosis/purpuric rash
  - diffuse bleeding
  - plt count <20,000/mm$^3$
  - PT/PTT 1 1/2-2 times normal
  - fibrinogen < 75,000 mgs/dl
  - D-dimer > 500 μg/L
DIC

• Medical Management
  - symptom management
  - blood product
  - clotting factor replacements
  - +/- heparin

• Nursing Management/Interventions
  - accurate patient assessment
  - communicating lab values/findings
  - patient/family support
TYPHLITIS

• Definition
  - inflammation of the cecum leading to necrotizing colitis caused by bacterial invasion of the mucosa
    • most commonly occurs in neutropenic leukemic patients

• Risk Factors
  - severe/prolonged neutropenia
  - acute leukemia induction
  - infection/mucositis
TYPHLITIS

• Clinical Presentation
  - profound neutropenia/fevers
  - severe RLQ abdominal pain/distended abdomen
  - high pitched “tinkling” bowel sounds
  - N&V/diarrhea
TYPHILITIS

• Medical Management
  - broad spectrum antibiotics
  - supportive management/bowel rest
  - radiology evaluation
  - +/- surgery

• Nursing Management/Interventions
  - accurate patient assessment
  - pain management/abdominal girths
  - oral/skin/peri-anal care
  - patient/family support
SPINAL CORD COMPRESSION

SCC

• Definition
  - neurological emergency
  - occurs in ~ 5% of patients
  - usually NOT life threatening
  - goal is to preserve neurological function

• Risk Factors
  - primary CNS tumor of the spinal cord
  - neuroblastoma
  - lymphoma
  - metastatic sarcoma
SCC

• Clinical Presentation
  - pain which may be local, referred, or diffuse
  - motor deficits
    • weakness/ataxia
    • hypotonic/hyporeflexia
    • paralysis/muscle atrophy
  - sensory deficits
    • bowel/bladder dysfunction
    • loss of pain/temperature sensation
    • paresthesia
SCC

• Medical Management
  - neuro exam/MRI
  - steroids
  - +/- surgical decompression/XRT
  - treat underlying disease

• Nursing Management/Interventions
  - accurate patient assessment
  - positioning/ROM/skin care
  - safety related to altered mobility
  - patient/family support
SUPERIOR VENA CAVA SYNDROME
(SVCS)

• Definition
  - compression of superior vena cava (SVC)

• Risk Factors
  - tumors arising in the anterior mediastinum or involving mediastinal lymph nodes
    • NHL, Hodgkin’s disease, T cell ALL, thoracic neuroblastoma, germ cell tumor
  - obstruction of airway
  - thrombosis

Tracheal deviation
SVCS

- Clinical Presentation
  - cough/dyspnea/orthopnea
  - wheezing/stridor
  - anxiety/confusion
  - edema/plethora
  - cyanosis of face/neck/upper arm/chest
SVCS

• Medical Management
  - symptom management
  - treat underlying cause
  - +/- steroids/XRT

• Nursing Management/Interventions
  - accurate respiratory assessment
  - $O_2$
  - ↑ head of bed
  - patient/family support
SIADH

• Definition
  - continuous release of ADH without a relationship to plasma osmolality with ↓ Na\(^{++}\) leading to cerebral edema/seizures

• Associated with:
  - ↓ in urine output/↑ in weight without edema
  - → hyponatremia & H\(_2\)O intoxicification

• Risk Factors
  - vincristine/cyclophosphamide
  - CNS tumors/ALL
  - trauma/surgery
SIADH

• Medical Management
  - restrict fluids
  - treat symptoms/underlying cause

• Nursing Management/Interventions
  - know “high risk” population
  - accurate assessment/I&O/weights
  - understand significance of labs
  - patient/family support
ANAPHYLAXIS

• Definition
  - hypersensitivity reaction to foreign proteins
  - occurs within seconds/minutes of administration or at any point during infusion

• Risk Factors
  - IV medications/infusions/chemotherapy/IVIG
  - ABX/antifungals
  - repeated blood product infusions
  - radiographic contrast media
  - latex hypersensitivity
ANAPHYLAXIS

- Clinical Presentation
  - erythema/flushing/urticaria/pruritis
  - anxiety/agitation
  - wheezing/dyspnea
  - laryngeal edema/stridor
  - tachycardia
  - N&V/diarrhea
ANAPHYLAXIS

• Medical Management
  - administer “test” doses of high risk medications
  - pretreat with diphenhydramine/hydrocortisone
  - +/- steroids/cimetidine
  - epinephrine readily available

• Nursing Management
  - know risk potential of drug/patient
  - maintain airway/O₂
  - stop infusion immediately
  - have emergency drugs/equipment accessible
  - STAY CALM!!!!!
CONCLUSION

• Child diagnosed with cancer devastating experience
• Life-threatening event
  - added stress to a family in crisis
• Excellent nursing assessment
  - helps minimize severity of oncologic emergencies
CASE STUDY

• Jose, a 10 year old with AML, who has a double lumen VAD is on day 9 of induction chemotherapy
• He presents with c/o a sore throat and fever of 101.3°F
• What do you do first?
• VS show BP 80/46, HR 124, RR 28
• Labs: WBC 0.2, HGB 7.4, PLTS 54K
• What other labs might be obtained?
  - Chem panel, possibly DIC screen
• What would you expect to be done next?
  - Begin IVF’s @ 1.5-2 times maintenance
  - Initiate ABX, always alternating lumens
CASE STUDY

• After ABX begun BP 60/34, HR 130, RR 26
• Skin cool, cap refill > 5 seconds
• What do you suspect?
  • Septic shock/release of endotoxins
• What might be next step?
  • Rapid infusion (s) NS at 20 ml/kg
• What other fluids might be given?
  • +/- albumin
  • pRBC 10-15 ml/kg when available
  • Pheresis pack of platelets
• BP now 90/68, HR 110, RR 22
• Skin warm, pink, cap refill < 3 seconds
• What is most likely organism?
  • *Alpha strep* in AML patients
  • Gram negative bacteria


BIBLIOGRAPHY


