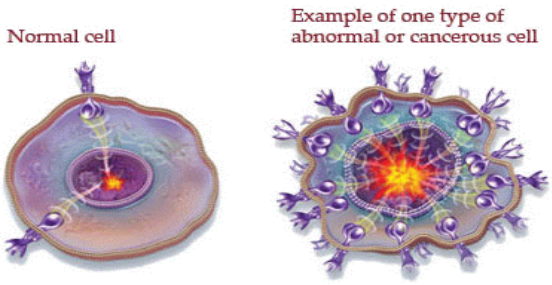
EDUCATION UPDATE

FUNDAMENTALS OF ONCOLOGY

February 26,2026



Allegheny Health Network Cancer Institute

Allegheny Health Network
Fundamentals of Oncology Course

The Fundamentals of Oncology Course is a 4-day introductory course intended for novice clinicians who practice in hematological-medical units, skilled nursing facilities, home care, hospice, radiation oncology and/or cellular transplant. This course may also be applicable to experienced oncology clinicians who require a basic review of oncology diseases and emergencies as well as complications surrounding these processes.

This course is designed to provide the oncology clinicians with basic oncology information and skills that would be applicable to any oncology patient population. The course NCPD can also be applied to the ILNA blueprint for ONCC certifications. Codes have been noted under each lecture. Please keep the course flyer for your ONCC renewal application process.

Course Faculty: This course uses a multidisciplinary approach from the knowledge and expertise of physicians, nurses, clinical nurse specialists, nurse practitioners, managers, genetic counselors, and social workers to provide a comprehensive overview of oncology.

Criteria for earning contact hours

Attendance: Participants are eligible for Nursing Continued Professional Development (NCPD) credits based on the sections they attend. Credits are only offered on the scheduled course dates attended.

Course Materials: Course materials will be distributed at the beginning of each course with additional handouts as necessary throughout the course. Materials include the course schedule, objectives, evaluation form, and content outlines. Post assessment will be provided at the end of each day, with a review conducted at beginning of next class day. Expectation is a passing score of 85%

Course Evaluation: Participants are requested to complete an evaluation for each speaker/lecture. The evaluations will be collected at the conclusion of each day. Feedback will be utilized for subsequent course evaluations.

Activity approval

West Penn Hospital is approved as a provider of nursing continuing professional development by Pennsylvania State Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.

Allegheny General Hospital is accredited by the Accreditation Council for Continuing Medical Education to provide continuing education for physicians. Allegheny General Hospital designates this live activity for a maximum of 1.0 AMA PRA category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in this activity

Disclosure Statements

- The planners and presenters have no conflicts of interest to disclose for this activity except:
  - Shelbie O'Hara- Content Creator, Item writer-Oncology Nursing Society
  - Justin Engleka- Highmark Health, Pittsburgh Mobile Footcare
  - Katherine Chorik- Beautox Aesthetics
  - Cyrus Khan- Speakers Bureau – Roche; Beigene; AstraZeneca; AbbVie; BMS; Lily; Pfizer; Kite; ADC Therapeutics
- Any relevant conflicts have been mitigated
- There is no commercial support or sponsors for this educational activity.

Expiration date of enduring material (if applicable) After completion of the live course, enduring materials will be available until December 31, 2026.

Fundamentals of Oncology – Day 4

Thursday February 26, 2026

7:30 a.m. Registration & Review of take-home material
Mary E. Kern, MSN, RN, OCN, CHSE

8:00 a.m. Oncologic Emergencies
Jennifer Jagielski, BSN, RN

10:00 a.m. Break

10:15 a.m. Care of the Oncology Patient
Katie Heddleston

11:00 a.m. Oncology Navigation
Kristen Morcheid, BSN, RN, OCN

11:45 a.m. Lunch

12:30 p.m. Oncology Rehab
Nicole Reilley Dosey DPT, CLT

1:15 p.m. Hospice, Palliative Care, and Pain Management
Justin Engleka GNP-BC, ACHPN, MBA

2:15 p.m. Break

2:30 Survivorship, and Sexuality Issues
Nicole Kulasa, RN, OCN

3:30 p.m. Wrap-up and Evaluations

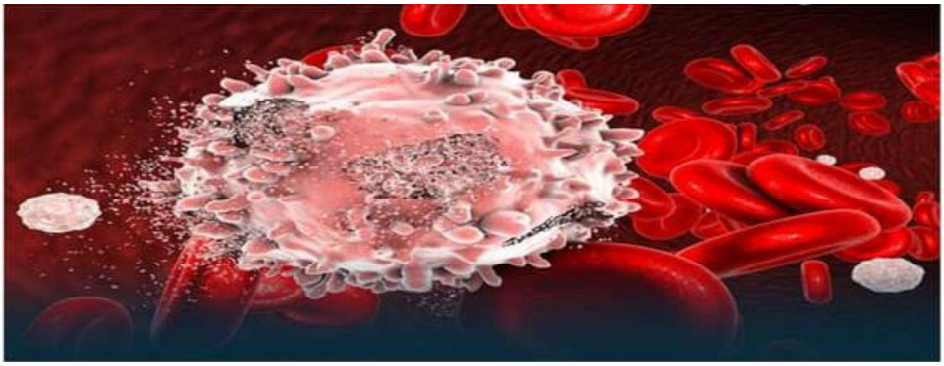
Learning Outcomes

Upon conclusion of this conference, participants will be able to:

- Explore the genetic basis of inherited cancer syndromes
- Describe the genetic counseling process: referrals, genetic counseling, and genetic counseling
- Explain tumor nomenclature, molecular biology concepts, diagnosis, and treatment principles
- Distinguish the phases and components of clinical research trials
- Recognize Diversity, Equity, and Inclusion (DEI) and how it relates in oncology
- Discuss management of various vascular access devices available for use in patients with cancer
- Summarize care of medical, surgical, hematological, and radiation oncology patients including the common side effects, complications, and management related to treatment modalities
- Examine basic pathophysiology, assessment, diagnosis and treatment interventions of solid tumor, hematologic malignancies, and benign heme disorders
- Review rationale for the use of various blood products and components
- Identify the basic process of autologous, allogenic, haplo, and cord blood transplantation
- Recall radiation terminology and safety principles
- Explain the different radiation treatment modalities: External Beam Therapy, Brachytherapy
- Give examples of radiation disciplines coordinating patient care and treatment
- State principles of radiation treatment planning and process
- Differentiate the various oncologic emergencies and complications that may arise in the immunocompromised oncology patient
- Summarize nutritional issues impacting patients with cancer
- Examine survivorship issues associated with cancer diagnosis and various treatment modalities
- Assess fertility and sexuality issues related to cancer diagnosis and treatment modalities
- Differentiate between hospice and palliative care programs
- Distinguish the treatment modalities for acute , chronic, and oncologic pain
- Integrate coping strategies for clinicians when caring for patients with cancer

- Recommend oncology rehab strategies contributing to survivorship outcomes and quality of life
- Recognize various psycho-social issues pertinent to patients with cancer throughout the continuum of care
- Relate knowledge from course to clinical practice

Oncologic Emergencies



FUNDAMENTALS OF ONCOLOGY COURSE
FEBRUARY 26, 2026
JENNIFER JAGIELSKI
RN CLINICAL SUPERVISOR PHYSICIAN PRACTICES
ACMO-AGH
JENNIFER.JAGIELSKI@AHN.ORG

"I HAVE NOTHING TO DISCLOSE"

AHN CANCER INSTITUTE

1

Learning Outcomes

1. Identify metabolic and structural oncologic emergencies.
2. Explain the pathophysiology of each oncologic emergency.
3. Describe nursing assessment and management of each oncologic emergency.

AHN CANCER INSTITUTE

2

Oncologic Emergencies

Structural

- Spinal Cord Compression (SCC)
- Superior Vena Cava Syndrome (SVC)
- Pleural Effusion
- Pericardial Effusion/Tamponade
- Increased Intra-cranial Pressure (ICP)

Metabolic

Hypercalcemia
Sepsis/Septic Shock
Cytokine Release Syndrome (CRS)
Immune Effector Cell Associated Neurotoxicity Syndrome (ICANS)
Tumor Lysis Syndrome (TLS)
Disseminated Vascular Syndrome (DIC)
Syndrome Inappropriate Antidiuretic Hormone (SIADH)
Hypersensitivity reaction

AHN CANCER INSTITUTE

3

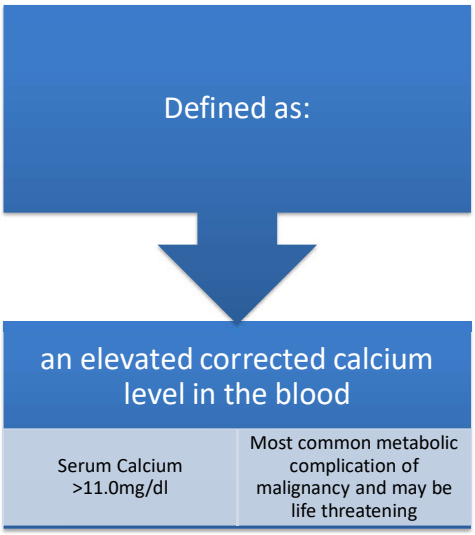
Metabolic

Hypercalcemia
Sepsis/Septic Shock
Tumor Lysis Syndrome (TLS)
Cytokine Release Syndrome (CRS)
Immune Effector Call Associated Neurotoxicity Syndrome (ICANS)
Disseminated Vascular Syndrome (DIC)
Syndrome Inappropriate Antidiuretic Hormone (SIADH)
Hypersensitivity Reaction

AHN CANCER INSTITUTE

4

Hypercalcemia



Pathophysiology:

- Humoral Hypercalcemia of Malignancy:
  - most common cause
  - Tumor cells produce PTHrP, which mimics PTH which leads to increased Ca bone resorption, decreased renal Ca excretion, thus high serum Ca
- Local Osteolytic Hypercalcemia:
  - Cancer cells invade the bone pushing calcium into extracellular space
  - Often driven by cytokines (IL-1, IL-6, RANKL)
- 1,25 Dihydroxy Vit D Production:
  - Certain cancers (lymphomas) convert vit D into Calcitrol
  - Increased Ca intestinal absorption and bone resorption.

AHN CANCER INSTITUTE

5

Hypercalcemia

- Often associated with:
  - Non Small cell lung cancer
  - Multiple myeloma
  - Breast Cancer
  - Squamous cell cancers of the head and neck
  - Urothelial
  - Ovarian cancers
- Can be a result of treatment side effects:
  - Dehydration, anorexia, nausea, vomiting
  - Hormone therapies
  - Medications such as Thiazide diuretics, calcium, vitamin D

6

Serum Calcium Level

- Total serum calcium level is poor indicator of freely ionized calcium
- Corrected Calcium:

(4.0- albumin) x 0.8 + calcium

=

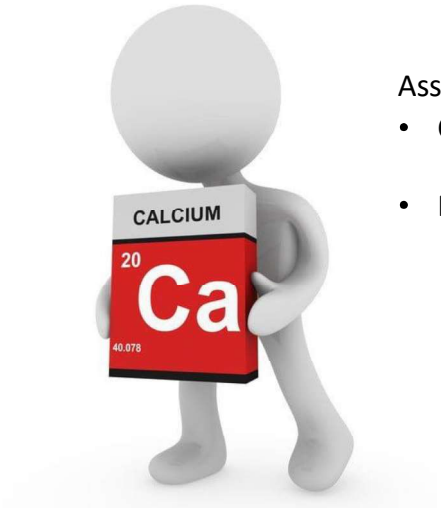
Corrected Calcium

- Ionized Calcium: "Gold Standard"

AHN CANCER INSTITUTE

7

HYPERCALCEMIA



Assessment:

- Complete physical assessment
  - onset of signs and symptoms
- Risk factors
  - history of cancer including presence of bone metastasis
  - Medications
  - Diet onset of signs and symptoms
  - Medical history: hyperparathyroidism, HTN

AHN CANCER INSTITUTE

8

Signs and Symptoms

Neurologic	• Early: drowsiness, lethargy, weakness, decreased deep tendon reflexes, restlessness, irritability, confusion, disorientation, delirium • Late: seizures, stupor, coma
Cardiovascular	• Early: ECG changes- Prolonged PR, widened QRS, shortened QT interval, Shortened ST • Late: arrythmias, heart block, death
GI	• Early: Anorexia, nausea, vomiting, hypoactive bowel sounds, constipation, vague abdominal pain, wt loss. • Late: acute pancreatitis, ileus, ulcers
Renal	• Early: Polyuria, Polydipsia, nocturia, decreased GFR • Late: kidney stones, acute/chronic renal insufficiency, renal failure
Musculoskeletal	• Early: weakness, fatigue. Hypotonia, bone pain, osteopenia/osteoporosis • Late: ataxia, pathologic fracture

AHN CANCER INSTITUTE

9

Nursing Interventions

- Hydration restores intravascular volume and enhances calcium secretion
- Diuretics (Lasix not thiazides) - promote calcium excretion from loop if Henle
- Mobilization, but also FALL RISK
- Daily weights, lytes, I&O's, VS
- Assess GI, Renal, Neuro, Musculoskeletal

AHN CANCER INSTITUTE

10

TREATMENTS

Biphosphates

Pamidronate (Aredia), Zoledronic acid (Zometa, Reclast), Alendronate/cholecalciferol (Fosamax)

- block tumor mediated bone resorption
- stop breakdown
- bind to mineralized bone matrix and prevents calcium phosphate crystal dissolution

Calcitonin	• Inhibits bone resorption via interference with osteoclast function • Promotes urinary calcium excretion
Glucocorticoids	• inhibit bone resorption, increase urinary calcium excretion, and decrease GI calcium absorption
Phosphates Potassium phosphate and sodium phosphate (oral)	• prevent intestinal absorption of calcium and inhibit bone resorption

11

SEPTIC SHOCK

Pathophysiology:

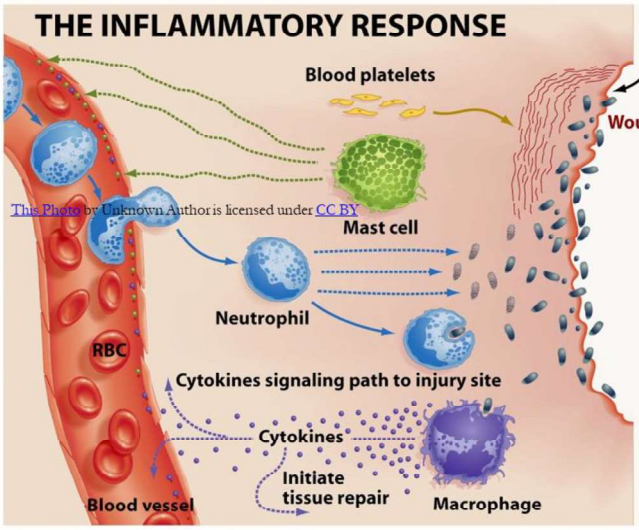
Systemic invasion of blood by micro-organisms, which results in hemodynamic instability, coagulopathies, and metabolism alterations

* Untreated bacteremia in neutropenic patients results in 40-90% mortality rate

AHN CANCER INSTITUTE

12

How does this happen?



1. Bacteria and other pathogens enter wound.
2. Platelets from blood release blood-clotting proteins at wound site.
3. Mast cells secrete factors that mediate dilation and constriction of blood vessels. Delivery of blood, plasma, and cells to injured area increases.
4. Neutrophils secrete factors that kill and degrade pathogens.
5. Neutrophils and macrophages remove pathogens by phagocytosis.
6. Macrophages secrete cytokines, which attract immune system cells to the site and activate cells involved in tissue repair.
7. Inflammatory response continues until the foreign material is eliminated and the wound is repaired.

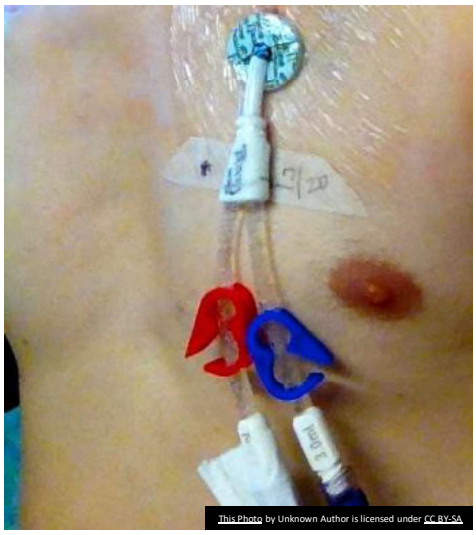
Figure 49-3 Biological Science, 2/e
© 2005 Pearson Prentice Hall, Inc.

AHN CANCER INSTITUTE

13

Risk Factors

- Portal for infection
  - Lines-CLABSI
  - Drains-CAUTI
  - Wounds
  - Surgical sites
- Underlying comorbities
  - Autoimmune diseases
  - Diabetes
  - obesity
- Decrease immune system
  - Disease
  - Treatment(neutropenia)



AHN CANCER INSTITUTE

14

Early Signs and Symptoms

- Fevers > 100.4 F or 38.3 C for anyone with ANC < 500 or <1000 with anticipated to go lower
- SOB
- Drop in BP
- Decrease urination
- Tachycardia

AHN CANCER INSTITUTE

15

Assessment

Vital Signs

- Temperature 100.4 F or higher- or less than 98.6 F
- HR greater than 90 significant for inflammatory or infectious response or if less than 90 validate not taking beta/calcium channel blocker which prevent tachycardia
- RR higher than 22 BPM increases delivery of oxygen to tissues
- BP – compare to baseline – if SBP less than 40 below baseline and/or DBP less than 50mmHg = impending sepsis

Labs

- Labs
  - CBC with differential
    - LEUKOCYTOSIS OR LEUKOPENIA
    - BANDEMIA- "LEFT SHIFT"
    - ELEVATED NLR AND MDW
    - THROMBOCYTOPENIA
  - CMP
  - Magnesium
  - LFTs
  - Procalcitonin
  - Lactic acid

AHN CANCER INSTITUTE

16

Assessment

Completing head-to-toe assessment

- Neurological
  - mental status
- Respiratory
  - tachypnea
- Cardiovascular
  - hypotension and tachycardia
- Integumentary
  - Fever/chills
- Genitourinary
  - hypo-perfusion and decreased urine output

primary causes of sepsis in patients with cancer include lung, intraabdominal, bloodstream, and urinary

AHN CANCER INSTITUTE

17

TREATMENT and Provider Orders:

Recommended to complete within 1 hour of fever:

- Recognize symptoms early
- Obtain cultures
  - Blood Cultures (2 sets peripheral or 1 peripheral and 1 line)
  - Urine and stool cultures
  - Site cultures if suspected

CXR

CT scan if warranted

- Administer broad spectrum antibiotics
  - Cefepime 2gm Q8 hr. and Vanco
  - SBP < 90 will add aminoglycosides
  - May consider antiviral and/or antifungal
  - Pneumocystis jirovecii pneumonia (PJP) prophylaxis

Fluid resuscitation

AHN CANCER INSTITUTE

18

Late Signs and Symptoms

Prepare for ICU transfer

- Multi-Organ dysfunction syndrome (MODS)
  - Hypotensive SBP < 90 Not responsive to IVF- needs IV pressor
  - Elevated Creatinine or decreased Urine Output
  - Hypoxic and in need of CPAP/AIRVO or Intubation
  - Decreased LOC
  - Elevated Bilirubin

AHN CANCER INSTITUTE

19

Test Your Knowledge

Which of the following actions is most critical for the oncology clinicians to complete within the first hour of sepsis recognition?

a. Administer antibiotics
b. Obtain blood cultures
c. Measure creatinine levels
d. Initiate vasopressors

AHN CANCER INSTITUTE

20

CYTOKINE RELEASE SYNDROME (CRS)

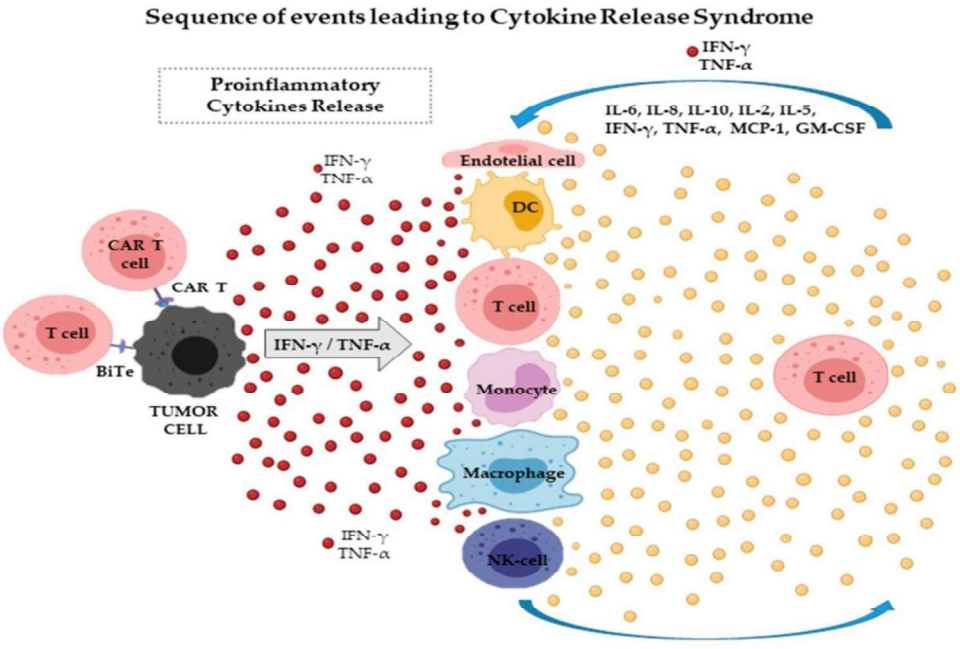
Pathophysiology:

(CRS) is caused by a large, rapid release of pro-inflammatory cytokines from immune cells that results in systemic inflammatory symptoms.

- Large scale cytokine release from excessive and dysregulated immune activation.
- Proinflammatory mediators: tumor factor alpha, T lymphocytes, IL-1 and IL-6. Their endotypes include Macrophages, mast cells and other immune cells with Fc-gamma receptors.
- activated or engaged T cells and other immune effector cells.
- **Can be severe: Life threatening inflammatory response**

AHN CANCER INSTITUTE

21



AHN CANCER INSTITUTE

22

CYTOKINE RELEASE SYNDROME (CRS) Risk Factors

MoAbs
- Rituximab

Cellular Therapies (BITE)
- Tarlatamab (Imdelltra)
- Teclistamab-cqyv (Tecvayli)
- Talquetamab-tgvs (Talvey)
- Glofitamab-gxbm (Columvi)
- Mosunetuzumab-saxgb (Lunsumio)
- Tebentafusp-tebn (Kimmtrak)

CAR-T Therapy

High disease burden- ALL, lymphoma

23

SIGNS AND SYMPTOMS

- Lab abnormalities
  - Pancytopenia's
  - Electrolytes
  - Renal function (elevated Creatinine)
  - LFT's-elevated
  - High C-reactive protein, ferritin

Clinical Manifestations vary from:
- Mild: Flu like symptoms
- Severe: Life threatening systemic inflammatory response.
- However, **MUST** include **Pyrexia** at onset

Fever

Flu like symptoms
- Chills, myalgia, arthralgia

Cardiac
- **Hypotension,** Tachycardia, cardiac dysfunction (low EF), vascular leakage

Pulmonary
- Cough, dyspnea, Tachypnea, **Hypoxia**, ARDS, pulmonary edema

AHN CANCER INSTITUTE

24

CRS Grading

CRS Grade	Symptom	Management
Grade 1	Fever greater than or equal to 38º Celsius (100.4º F) without hypotension or hypoxia	• Manage constitutional symptoms and organ toxicities as per standard guidelines, including acetaminophen and hypothermia blanket as needed for fever • Assess for infection with blood cultures and as directed by the clinical findings, consider antimicrobials, if appropriate • Tocilizumab is not indicated unless symptoms progress to Grade 2 CRS **Hold further bi-specific T-cell engager treatment until resolution of CRS**
Grade 2	Fever greater than or equal to 38º Celsius (100.4º F) with systolic blood pressure less than 90 mmHg but not requiring vasopressors and/or oxygen saturation less than 90% requiring oxygen at less than or equal to 6 L/minute	• Complete infectious work-up, if not previously performed • Manage fever as in Grade 1 CRS and constitutional symptoms and organ toxicities as per standard guidelines • Hypotension with SBP less than 90 mmHg: IV fluid bolus of 500 – 1,000 mL normal saline; repeat as necessary to maintain SBP greater than 90 mmHg ○ If hypotension persists after IV fluid bolus, administer Tocilizumab 8 mg/kg (maximum dose 800 mg) for one dose and Dexamethasone 4-10 mg IV for one dose and reassess in 6 hours ○ If hypotension persists after IV fluids, dexamethasone, and tocilizumab: start vasopressors, transfer the patient to the ICU, and obtain an ECHO • Oxygen saturation of less than or equal to 90%: Use supplemental oxygen as needed ○ If hypoxia persists after the above interventions, but oxygen requirement is stable with low flow nasal cannula, continue close monitoring. If oxygen requirement increases to high flow nasal cannula, face mask, or positive pressure ventilation, refer to further management as in Grade 3 or 4 CRS **Hold further bi-specific T-cell engager treatment until resolution of CRS**
Grade 3	Fever greater than or equal to 38º Celsius (100.4º F) with systolic blood pressure less than 90 mmHg but requiring one vasopressor with or without vasopressin and/or oxygen saturation less than or equal to 90% requiring oxygen greater than 6 L/minute, facemask, nonrebreather mask, or Venturi mask	• Transfer the patient to the ICU and obtain an ECHO if not performed already • Complete infectious work-up, if not previously performed • Manage fever as in Grade 1 CRS and constitutional symptoms and organ toxicities as per standard guidelines • Administer IV fluid boluses as needed, as in Grade 2 CRS • Use vasopressors as needed; ○ If on one vasopressor: administer tocilizumab as in Grade 2 CRS and dexamethasone 10 mg IV every 6 hours ○ If on two vasopressors: administer tocilizumab as in Grade 2 CRS and dexamethasone 20 mg IV every 6 hours ○ If vasopressin and norepinephrine equivalent is greater than or equal to 15 mcg/minute, follow as in Grade 4 CRS • Tocilizumab doses may be repeated every 8 hours for a maximum of 4 total doses • Once CRS improves to Grade 1 or less, taper and/or stop corticosteroids, depending on the clinical situation **Hold further bi-specific T-cell engager treatment until CRS is resolved. It may require permanent discontinuation.**
Grade 4	Fever greater than or equal to 38º Celsius (100.4º F) with systolic blood pressure less than 90 mmHg but requiring multiple vasopressors, with or without vasopressin, and/or oxygen saturation less than or equal to 90% requiring positive pressure (e.g. CPAP, BiPAP, mechanical ventilation)	• Transfer the patient to the ICU and obtain an ECHO if not already performed • Complete infectious work-up if not previously performed • Manage fever as in Grade 1 CRS and constitutional symptoms and organ toxicities as per standard guidelines • Administer IV fluids, tocilizumab, vasopressors, and hemodynamic monitoring as in Grade 3 • Administer Methylprednisolone 1000 mg/day in divided doses for 3 days, followed by a rapid taper as directed by the clinical course **Permanently discontinue further bi-specific T-cell engager treatment.**

25

AHN CANCER INSTITUTE

CRS vs. INFECTION

What is the difference?

Important to distinguish patients with CRS from those with sepsis since the treatment for CRS could be detrimental if used in patients with sepsis.

It is can be challenging to distinguish sepsis from CRS.

A large percentage of patients with severe CRS will fulfill the clinical criteria of sepsis.

Patients are often treated for both CRS and infection

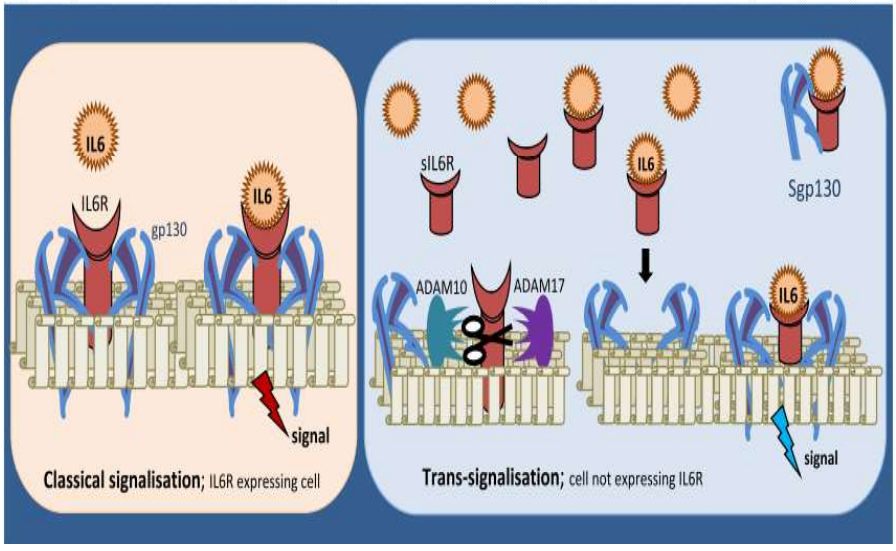
26

TREATMENT

- Treat as infection
- **Tocilizumab:** IL-6 antagonist; reduces pro-inflammatory TH1 and TH17 cells while increasing the number of regulatory T-cells.
  - Grade 2 or higher CRS
  - Can be given every 8 hours x 4 depending on cause of CRS
  - NON-Hazardous
  - Goal: administered within 30 minutes of ordering.
- Symptomatic management:
  - Antihistamines, antipyretics, IVFs
  - high dose steroids (avoided in CAR-T)

AHN CANCER INSTITUTE

27



- Tocilizumab, a monoclonal IL6R antibody, inhibits both classical and trans-IL-6 signaling in the IL6 pathway via blocking IL-6 binding to both cell-associated and soluble IL-6Rs.
- The approved dosage of tocilizumab for CRS is 12 mg/kg for patients less than 30 kg weight and 8 mg/kg for patients at or above 30 kg weight. Fever and hypotension generally ameliorates within a few hours.

28

Knowledge Check

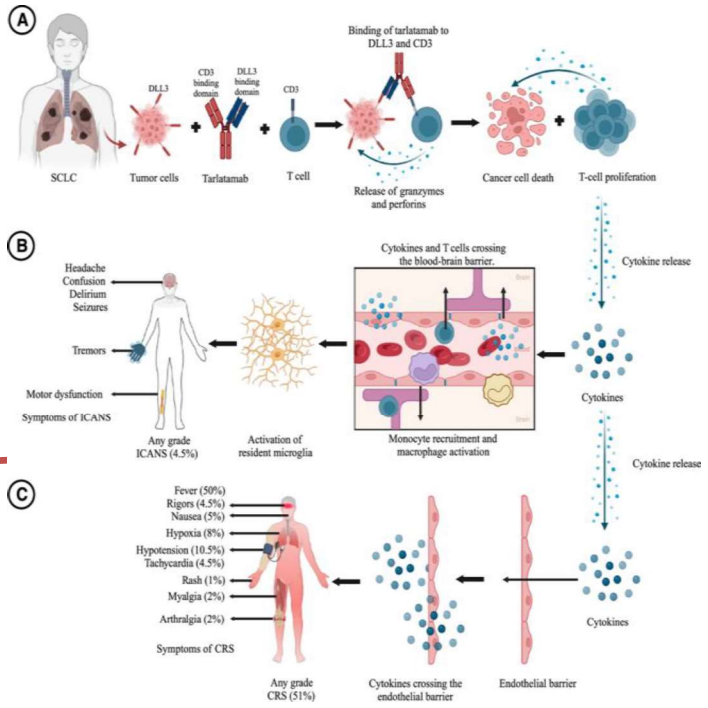
What medications are considered to treat CRS?

A. Tocilizumab and Corticosteroids
B. Diphenhydramine and Famotidine
C. Diphenhydramine and Epinephrine
D. Dexamethasone and Keppra

Immune Effector Cell-Associated Neurotoxicity (ICANS)

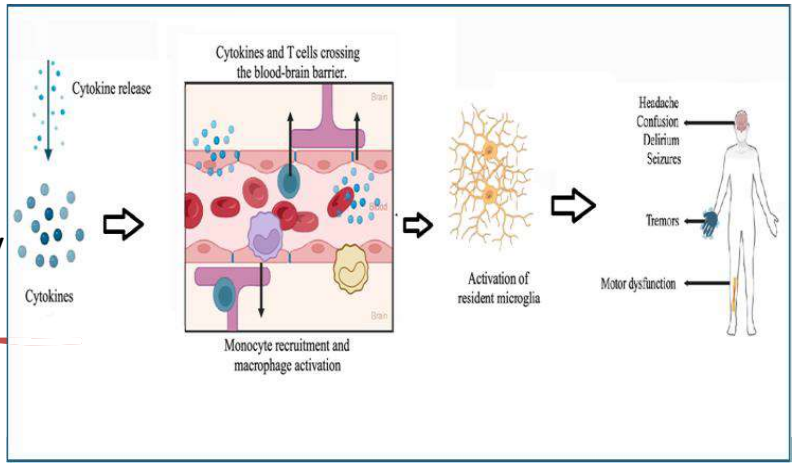
- Pathophysiology:
  - Thought to be caused by pro-inflammatory cytokines, leading to endothelial activation, increased vascular permeability, and blood-brain disruption.
  - Cytokines and T cells infiltrate CNS, activating microglia and causing neuronal injury.
  - Onset: usually within first treatment cycle (median 5 days).

Immune Effector Cell-Associated Neurotoxicity (ICANS)



31

Immune Effector Cell-Associated Neurotoxicity (ICANS)



32

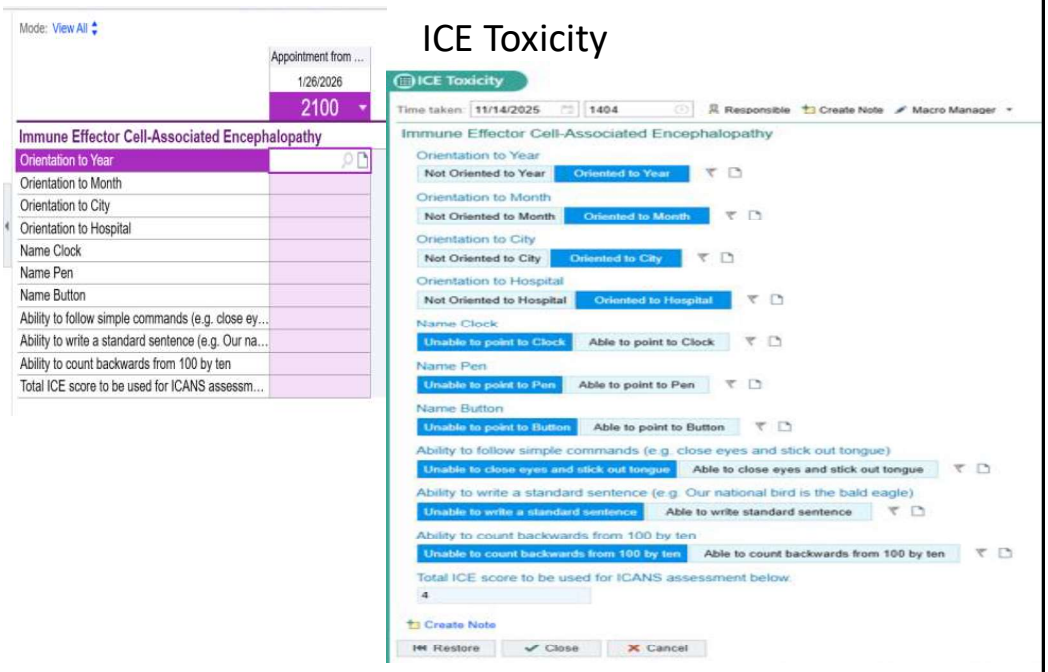
Immune Effector Cell-Associated Neurotoxicity (ICANS)

- Symptoms:
  - Somnolence
  - Confusion
  - Agitation
  - Dysgraphia
  - Tremor
  - Encephalopathy
  - Dysphasia
  - Incontinence
  - Localizing or lateralizing signs
  - Raised intracranial pressure
  - Cerebral edema
  - Seizure

EARLY RECOGNITION AND MANAGEMENT IS CRITICAL

33

Assessment & Documentation

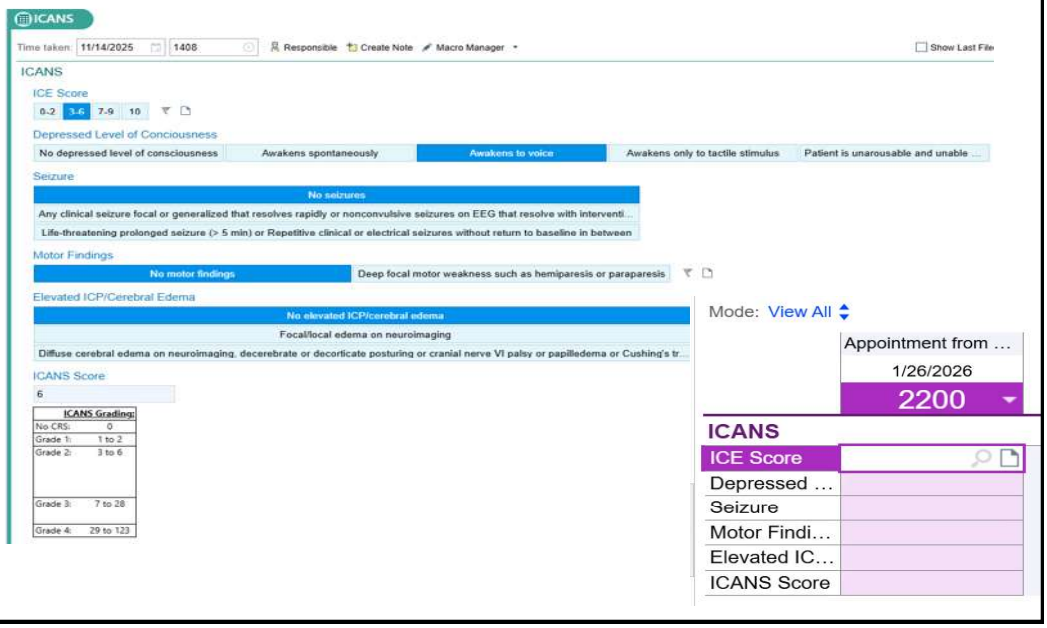


ICE Toxicity

34

Assessment & Documentation

ICANS



35

Assessment & Documentation ICANS

Allegheny Health Network

ICANS HANDWRITING ASSESSMENT LOG

Directions: Prior to each dose of an Immuno-effector Cell or Bispecific T-cell engager agent, the patient will write the sentence ***"The national bird is the bald eagle."*** The document is scanned into media using "ICANS Writing Sample" as the document type. For, subsequent assessments, the nurse will search media for the last document, print, and have the patient write the sentence on the next line and re-upload to media. Note: in-patient units will scan in the document upon to discharge.

Patient Name: _____ **Date of Birth:** _____

MRN#: _____ **Medication:** _____

Date	Time	RN initials	Sentence

Approved ACT Council 1/2025

36

ASTCT ICANS Grading

Symptom/Sign	Grade 1	Grade 2	Grade 3	Grade 4
ICE score	7-9	3-6	0-2 (awake with global aphasia)	0 (patient is unarousable and unable to perform ICE)
Depressed level of Consciousness	Awakens spontaneously	Awakens to voice	Awakens to tactile stimulus	Patient is unarousable or requires vigorous or repetitive tactile stimuli to arouse. Stupor or coma
Seizure	N/A	N/A	Any clinical seizure focal or generalized that resolves rapidly or non-convulsive seizures on EEG that resolves with intervention	Life threatening prolonged seizure (>5min); or Repetitive clinical or electrical seizures without return to baseline in between
Motor findings	N/A	N/A	N/A	Deep focal motor weakness such as hemiparesis or paraparesis
Elevated ICP/cerebral edema	N/A	N/A	Focal/local edema on neuroimaging	Diffuse cerebral edema on neuroimaging; decerebrate or decorticate posturing; or cranial nerve VI palsy; or papilledema; or Cushing's triad

37

Treatment

ICANS Grade	Symptom/Sign	Management
Grade 1	Encephalopathy and/or depressed level of consciousness	▪ Nothing by mouth ▪ If aspiration risk identified begin aspiration precautions ▪ Avoid CNS depressant medications ▪ Can use low doses of lorazepam after EEG is performed (0.25 – 0.5 mg IV q 8 hours) or haloperidol (0.5 mg q 6 hours) for agitation ▪ If no seizures on EEG, continue prophylactic levetiracetam ▪ If EEG reveals non-convulsive status epilepticus treat as per 4.10 ▪ Dexamethasone 10 mg IV for 1 dose (or methylprednisolone equivalent) and reassess in 6 hours or earlier if clinically indicated ▪ If CRS is concurrent add IL-6 antagonist
Grade 2	Encephalopathy and/or depressed level of consciousness	▪ Supportive care as in Grade 1 ICANS ▪ Consider ICU transfer ▪ Dexamethasone 10 mg IV every 12 hours (or methylprednisolone equivalent) ▪ If CRS is concurrent add IL-6 antagonist. ▪ Once ICANS improves to Grade 1 or less, taper and/or stop corticosteroids depending on clinical situation
Grade 3	Encephalopathy and/or depressed level of consciousness	▪ Supportive care as Grade 1 ICANS ▪ Transfer to ICU ▪ If there are new abnormal findings on brain imaging not related to primary malignancy, control hypertension with the goal of maintaining mean arterial pressure (MAP) within 20-25 mm Hg of baseline MAP ▪ Correct any uremia (dialysis if needed) ▪ Reverse any coagulopathy (transfuse to keep platelets >20-50 K/microliter, fibrinogen > 200 mg /dL and INR <1.5) ▪ Dexamethasone 10 mg IV every 6 hours (or methylprednisolone equivalent ▪ If CRS is concurrent add IL-6 antagonist ▪ Once ICANS improves to Grade 1 or less, taper and/or stop corticosteroids depending on clinical situation

38

Treatment-cont.

	Seizure	▪ Transfer to ICU ▪ Supportive care as in Grade 1 ICANS ▪ For focal or generalized convulsive seizures, or non-convulsive seizures see Table -9 ▪ Dexamethasone 20 mg IV every 6 hours (or methylprednisolone equivalent ▪ If CRS is concurrent add IL-6 antagonist ▪ Once ICANS improves to Grade 1 or less, taper and/or stop corticosteroids depending on clinical situation
	Focal cerebral edema	▪ Transfer to ICU ▪ Supportive care as in Grade 1 ICANS ▪ If focal edema is in brain stem or thalamus, methylprednisolone 1000 mg/day in divided doses IV for 3 days followed by taper depending on clinical situation ▪ If associated with concurrent CRS, add tocilizumab ▪ Manage organ toxicity as per standard guidelines ▪ Manage fever and constitutional symptoms as in Grade 1 CRS
Grade 4	Encephalopathy and/or depressed level of consciousness	▪ Supportive care as Grade 1 ICANS ▪ ICU transfer ▪ If there are new abnormal findings on brain imaging not related to primary malignancy, control hypertension with the goal of maintaining mean arterial pressure (MAP) within 20-25 mm Hg of baseline MAP ▪ Correct any uremia (dialysis if needed) ▪ Reverse any coagulopathy (transfuse to keep platelets >20-50 K/microliter, fibrinogen > 200 mg /dL and INR <1.5) ▪ Methylprednisolone 1,000 mg/day in divided doses IV for 3 days followed by taper as clinically indicated ▪ If CRS is concurrent add IL-6 antagonist ▪ Once ICANS improves to Grade 1 or less, taper and/or stop corticosteroids depending on clinical situation ▪ If Grade 4 ICANS is refractory for 24 hours or if patient is deteriorating rapidly, consider additional therapy
	Seizure	▪ Transfer to ICU ▪ Supportive care as in Grade 1 ICANS ▪ For focal or generalized convulsive seizures, or non-convulsive seizures see Table -10 ▪ Methylprednisolone 1,000 mg/day in divided doses IV for 3 days followed by taper as clinically indicated ▪ If CRS is concurrent add IL-6 antagonist ▪ Once ICANS improves to Grade 1 or less, taper and/or stop corticosteroids depending on clinical situation ▪ If Grade 4 ICANS is refractory for 24 hours or if patient is deteriorating rapidly, consider additional therapy

Knowledge check

What is the initial sign of ICANS that often appears during assessment?

A. Nausea, vomiting, diarrhea, and colitis.
B. Handwriting changes (dysgraphia), difficulty naming objects, confusion, and impaired attention.
C. Back pain, numbness, weakness, and loss of coordination
D. nausea, vomiting, diarrhea, fatigue, muscle cramps, tingling, abnormal heart rhythms, confusion, or seizures

TUMOR LYSIS SYNDROME

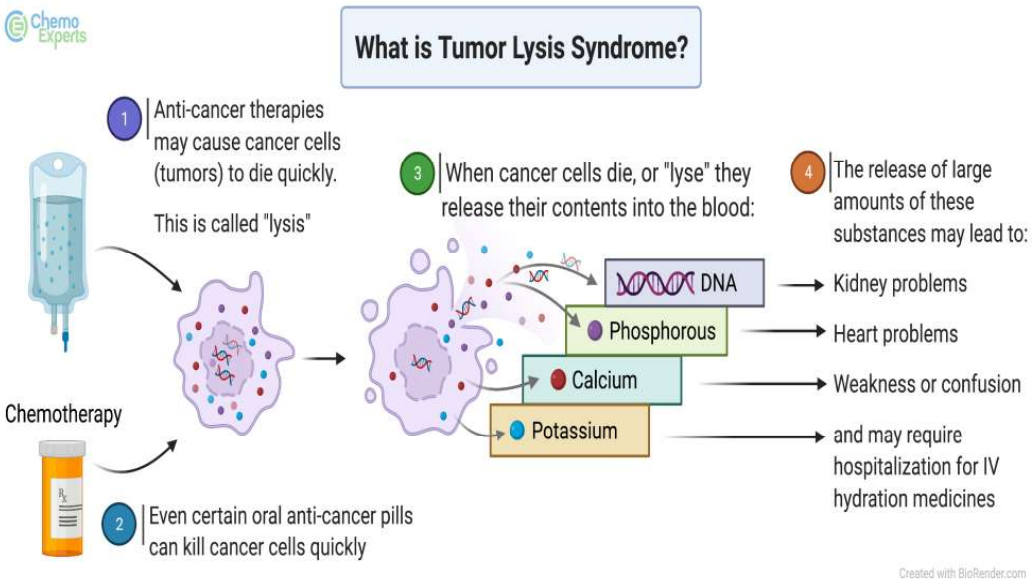
- Acute, life-threatening, metabolic oncologic emergency.
- Results in rapid cell lysis from the administration antineoplastic agents, surgery or radiation therapy.
- TLS has an estimated mortality rate of 29-79% if not treated at onset.

Pathophysiology:

- Rapid destruction and release of massive amounts of proliferating tumor cells over a short period of time (24-72 hours after treatment initiation)
- Massive release of cellular cytokines with chemotherapy induction
- Cell rupture and nucleic acids are converted into uric acid by the liver, releasing potassium and phosphorous into the bloodstream
- Malignant cells are destroyed and the intracellular contents are released into the extracellular milieu (DNA, proteins, phosphorous)

AHN CANCER INSTITUTE

41



42

TUMOR LYSIS SYNDROME

- Risk Factors:
  - High tumor burden, high WBC's, splenomegaly, and elevated LDH (140-280), preexisting renal impairment, dehydration, DM and Gout
  - hematologic malignancies: leukemia (Non-Hodgkins, ALL) lymphoma
  - solid tumors: SCLC, lymphosarcoma, soft tissue sarcomas, ovarian, prostate, breast, renal cell, GI
    - In patients with bulky, rapidly dividing tumors that are responsive to chemotherapy, TLS can occur 12-72 hrs post treatment.

TUMOR LYSIS SYNDROME

- Signs and symptoms:
  - Related to electrolyte imbalances
    - Nausea
    - Vomiting
    - diarrhea
    - parasthesia
    - muscle weakness/cramps
    - lethargy/syncope
    - Acute Kidney Injury
    - Cardiac arrythmias

ELEVATED ELECTROLYTES

Hyperuricemia **(greater than 8 mg/dL or 25% increase from baseline)**

results from conversion of nucleic acid to uric acid

hallmark increase

N/V/D, lethargy, edema, flank pain, hematuria, and crystalluria (urine crystals precipitate and eventually obstruct renal tubules causing renal failure

Hyperkalemia **(greater than 6 mEq/L or 25% increase from baseline)**

weakness, muscle cramps, nausea, diarrhea

EKG changes: tall peaked T waves, shortened QT interval, PR- prolongation and widened QRS complexes

- *may also present low K+,*

Hyperphosphatemia **(greater than 4.5 mg/dL or 25% increase from baseline)**

oliguria, anuria, renal insufficiency

AHN CANCER INSTITUTE

45

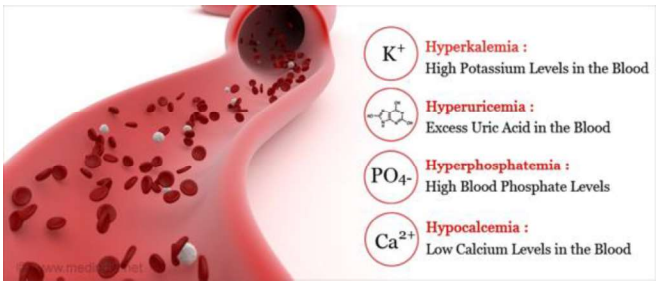
DECREASED ELECTROLYTES

- **Hypocalcemia** **(less than 7 mg/dL or 25% decrease from baseline)**

muscle twitching, tetany, hypotension, seizures

- **Hypomagnesemia**

acute pancreatitis, diarrhea



AHN CANCER INSTITUTE

46

Laboratory Tumor Lysis Syndrome
Two or more of the following laboratory results must be present within 3 days before or 7 days after cytotoxic therapy:
- Potassium ≥ 6 mEq/L (normal 3.5–5 mEq/L) or 25% increase from baseline
- Phosphorus ≥ 4.5 mg/dl (normal 2.5–4.5 mg/dl) or 25% increase from baseline
- Uric acid ≥ 8 mg/dl (normal 2.6–8.2 mg/dl) or 25% increase from baseline
- Calcium ≤ 7 mg/dl (normal 0.5–8.5 mg/dl) or 25% decrease from baseline

Clinical Tumor Lysis Syndrome
Clinical tumor lysis syndrome is defined as the presence of the following manifestations that are not considered attributable to a therapeutic agent, plus one or more of the laboratory criteria:
- Creatinine ≥ 1.5 times the upper limit of normal
- Cardiac arrythmias or sudden death
- Seizures

Laboratory Vs. Clinical TLS

Focused History and Physical Exam for TLS

Assessment and History
- Diagnosis
- Risk factors
- Baseline laboratory values
- Medications

Physical Examination
- Neurologic and neuromuscular assessment: Mental status changes may include irritability, anxiety, confusion, depression, and hallucinations.
- Pulmonary: presence of rales or rhonchi
- Cardiac
  - Early: bradycardia
  - Advanced: tachycardia, arrhythmias, and electrocardiogram changes
- Gastrointestinal: hyperactive bowel sounds with generalized abdominal tenderness
- Hypocalcemia: Diarrhea, muscle cramps, muscle spasms, tetany, positive Chvostek sign (exhibited as facial muscle spasms following a tap on one side of the face), positive Trousseau sign (exhibited as upper-arm muscular spasms following pressure to the principal vessel and nerve of the limb), seizures, syncope, laryngospasm with stridor, anorexia
- Acute and chronic renal failure with extreme lethargy, somnolence, seizure, paresthesia, endocarditis, azotemia, anuria, and hypertension

Laboratory Data
- Uric acid levels > 20 mg/dl

47

TREATMENTS and NURSING INTERVENTIONS

- Isotonic fluids 2000-3000 L/m2/day
- Q6 hours electrolytes
- Strict I&O's
  - urine output >150-200 ml/hour
- Daily weights
- Monitor for edema

- Lasix or Mannitol to counteract oliguria
- Decrease uric acid levels
  - administer allopurinol/aloprim/ rasburicase
- if Po4 is problem, reduce urine Ph

AHN CANCER INSTITUTE

48

PROPHYLACTIC TREATMENTS and NURSING INTERVENTIONS

- Hydration, Hydration, Hydration
  - Teach patients to drink at least 1.5-2L of water per day.
  - IV hydration
    - May be part of treatment plan or as a therapy plan
- Monitor Blood Chemistries
- Patient/family education
  - Dietary modifications
- Debulking process
  - use a debulking agent first or step up drug
- Anti-hyperuricemia agents
- Comorbidities

49

Allopurinol vs. Rasburicase

Rasburicase (active TLS)

- Does not increase excretion of xanthine, therefore no increase in crystallization in kidneys
- Transforms uric acid into allantoin (soluble)
- Recombinant form of urate oxidase
- Antibodies develop in about 10%
- Dosages range from 0.05-0.20mg/kg/day (IV or IM) up to 3-5 days
- Dedicated line
- Uric acid samples must be kept at 4 degrees C during transport to prevent any endogenous breakdown of uric acid by rasburicase in the sample
- Use for high risk TLS and spontaneous TLS

Allopurinol (prevention)

Inhibits xanthine oxidase and prevents the creation of uric acid from xanthine and hypoxanthine, thereby lowering uric acid levels

Decreases rate of new formation of uric acid but does not effect preexisting levels of uric acid

Generally used now in patients at relatively low risk for TLS

Dosages range from 200-400 mg/mg2/day to 800mg/day

IV dosing of Aloprim is 200-400mg/mg2/day to 600 mg/day

AHN CANCER INSTITUTE

50

Patient Monitoring Rasburicase

- Hypersensitivity
  - Bronchospasm
  - Dyspnea
  - Chest pain
  - Hypotension
  - Rash, pruritis, uticaria

Causes enzymatic degradation of uric acid in blood samples at room temperature which results in falsely low levels of uric acid

Collect samples in pre-chilled heparin tubes and place in ice immediately

Analyze samples with 4 hours of collection

AHN CANCER INSTITUTE

51

DISSEMINTED INTRA-VASCULAR COAGULATION (DIC)

Pathophysiology:

- Develops when clotting cascade becomes disrupted
- Activation of clotting cascade causes plasmin and thrombin to circulate, which induces bleeding and clot formation
- Platelet aggregation leads to thrombocytopenia and additional consumption of clotting factors
- Excess thrombin results in multiple fibrin clots in circulation
- Excess clots trap platelets which leads to microvascular and macrovascular thrombosis
- Thrombosis and organ damage occur due to excess platelet aggregation
- Fibrinolysis is initiated and FDPs are not removed effectively from circulation the RES

AHN CANCER INSTITUTE

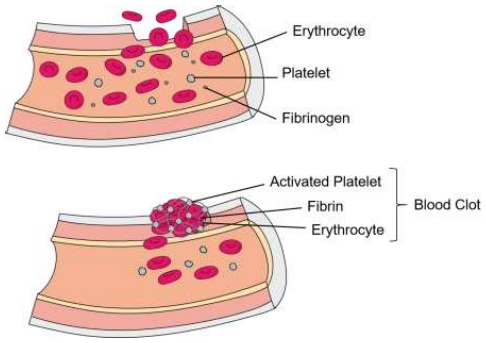
52

CANCER PROCESS

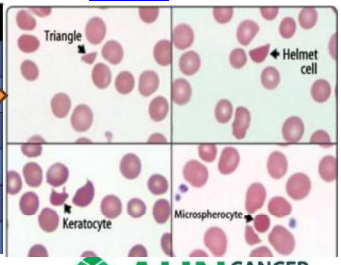
- Risk factors:
  - Sepsis
  - Malignancies: leukemias, mucinous tumors(gastric, ovarian, pancreatic) myeloproliferative disorders
  - trauma
  - vascular disorders
  - metabolic acidosis
  - immune reactions
  - hematologic and hepatic abnormalities
- Tissue injury occurs with malignancy that expresses pro- coagulant material (on surface tumor cells or on vasculature surface)
- Solid tumors develop new vasculature with an abnormal endothelial lining that activates pro-coagulant system
- Some tumors release necrotic tissue or tumor enzymes that can activate coagulation system
  - Acute Promyelocytic Leukemia (APL)

AHN CANCER INSTITUTE

Lab tests



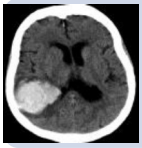
Test	DIC
Platelets	Decreased
Blood Smear	Schistocytes
PT/PTT	Increased
LDH	Increased
Fibrinogen	Decreased
D-Dimer	Increased



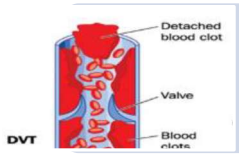
AHN CANCER INSTITUTE

Signs and Symptoms

Diffuse bleeding (petechiae, menses, GI, GU, gingiva)



H/A's



Thrombotic manifestations (lungs, kidneys, and/or vessels)

- LABS
  - prolonged PT/PTT
  - low fibrinogen (less than 100)
  - low platelet (less than 100, 000)
  - increased FSP's
  - elevated D-Dimer (3000-4000 ug/l) – protein fragment produced when blood clots are dissolved
  - fragmented RBC's (schistocytes)

AHN CANCER INSTITUTE

55

TREATMENT

- Correct PT/PTT
- (PT >17 seconds, FFP neutralizes excess thrombin and slows process)
- Administer plt. <50,000 or bleeding
- Fibrinogen <100mg/dl (Cryoprecipitate replaces fibrinogen)
- PRBC's
- Treat underlying cause of disease
  - Obstetrics
  - Sepsis-antibiotics
  - Cancer

AHN CANCER INSTITUTE

56

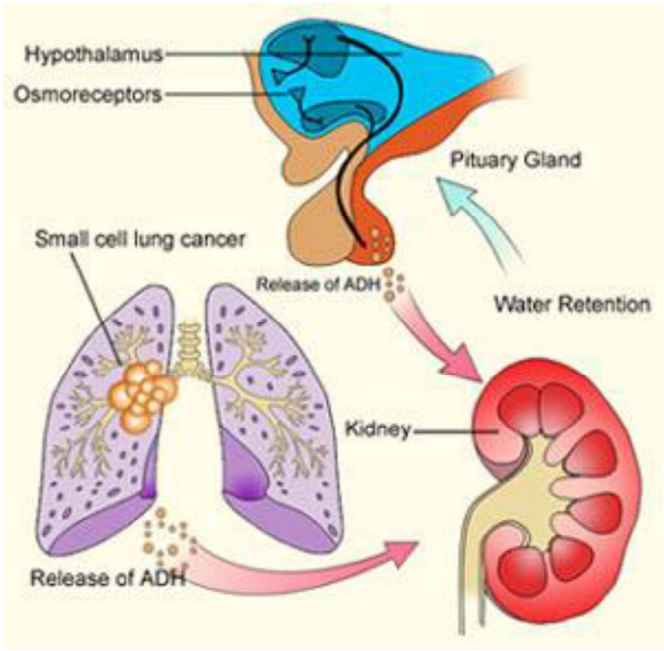
TEST YOUR KNOWLEDGE

- Which blood products would you anticipate needing to order or administer if your patient has DIC?
  - a. Packed RBCs
  - b. Salt poor albumin
  - c. Platelets
  - d. Whole blood

SYNDROME OF INAPPROPRIATE ANTIDIURETIC HORMONE (SIADH)

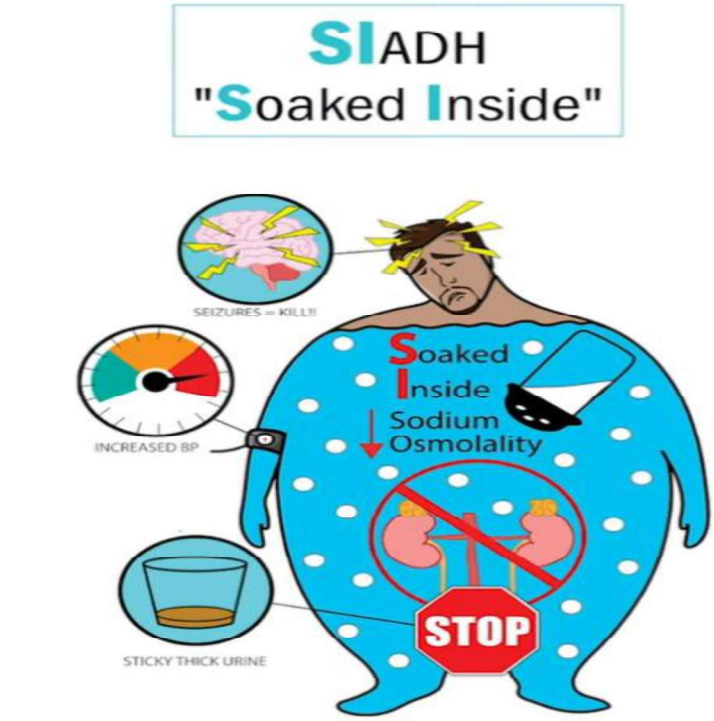
- <u>Pathophysiology</u>:
  - Overproduction of the antidiuretic hormone (ADH)- keeps fluid in the body
  - This leads to fluid retention (free water), decreased sodium, and inability to excrete dilute urine

AHN CANCER INSTITUTE



AHN CANCER INSTITUTE

59



60

SIGNS AND SYMPTOMS

- Thirst, headaches, muscle cramps, and tiredness
- Hypertension
- N/V, weight gain, some confusion
- Danger levels=seizures
- Intracellular edema (cerebral edema)
- SOAKED INSIDE –low lab values

https://www.youtube.com/watch?v=hKFGGv0E-5A

AHN CANCER INSTITUTE

61

LAB RESULTS

TABLE 8-4. CLINICAL MANIFESTATIONS OF SYNDROME OF INAPPROPRIATE ANTIDIURETIC HORMONE[A]

Type	Serum Sodium (mEq/L)	Signs and Symptoms
Normal sodium	135–145	–
Mild hyponatremia	131–135	Nonspecific or none; may present with thirst, anorexia, nausea, fatigue, weakness, muscle cramps, headache
Moderate hyponatremia	126–130	Weight gain, oliguria, progressive neurologic symptoms
Severe hyponatremia	< 120	Signs and symptoms related to cerebral edema, papilledema, delirium, hypoactive reflexes, ataxia, gait disturbances, seizures, coma, death

- low serum osmo <280mOsm/kg (excessive water retention in kidneys)
- increased urine Na >25mEq/l
- high urine osmo >330mOsm/kg (high urine concentration)
- decreased BUN and creatinine
- Decreased uric acid
- Decreased albumin

AHN CANCER INSTITUTE

62

TREATMENT

- Water restriction (500-1000ml/day), NSS with diuresis, 3% hypertonic saline
- Determine and treat the underlying cause
- Assess daily weights, neuro checks, plasma and urine osmo
- DDAVP
- Tolectin - vasopressin receptor antagonist (VRA) is an agent that interferes with action at the vasopressin receptors
- Salt tabs

AHN CANCER INSTITUTE

63

TEST YOUR KNOWLEDGE

- Which lab result could indicate SIADH?
  a. Sodium 123
  b. Potassium 3.6
  c. Uric Acid 4.5
  d. Platelets 45

AHN CANCER INSTITUTE

64

HYPERSENSITIVITY REACTION

- Pathophysiology:
  - An undesirable reaction produced by normal immune system in response to exposure to an antigen or allergen; may refer to allergic reactions or infusion-related reactions; anti-cancer therapy (ACT), supportive therapy, blood products and pre-meds.

AHN CANCER INSTITUTE

65

SIGNS AND SYMPTOMS

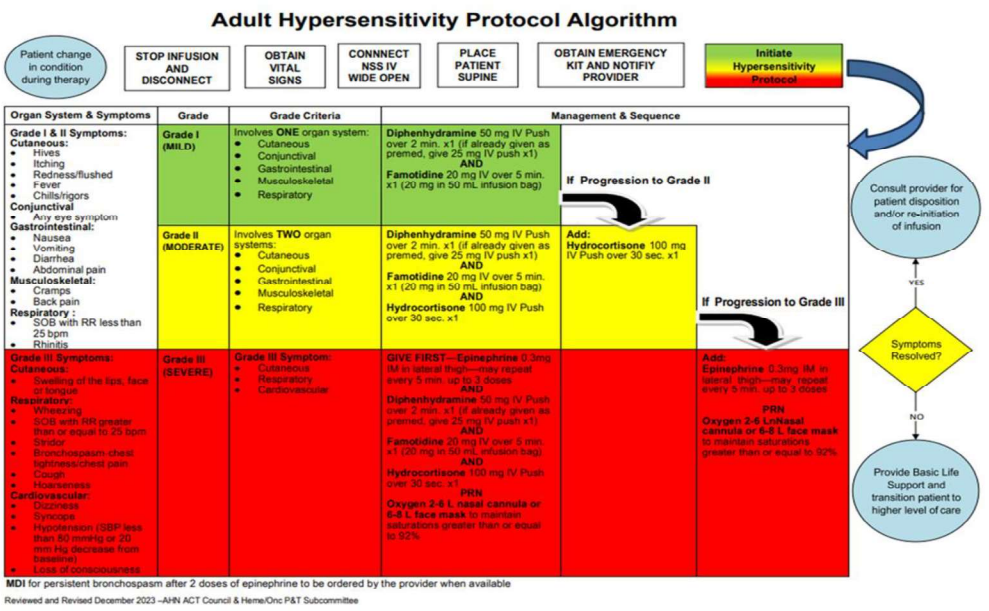
- Transient flushing/rash
- Fever less than 100.4 F
- Urticaria
- Bronchospasm
- Cough
- Scratchy throat
- Hypotension
- Angioedema or edema
- Chills / rigors
- N/V/D
- Tachycardia
- Back pain
- Dysarthria

Anaphylaxis~ Epi pen

AHN CANCER INSTITUTE

66

HYPERSENSITIVITY PROTOCOL



Adult Hypersensitivity Protocol Algorithm

Patient change in condition during therapy → STOP INFUSION AND DISCONNECT → OBTAIN VITAL SIGNS → CONNNECT NSS IV WIDE OPEN → PLACE PATIENT SUPINE → OBTAIN EMERGENCY KIT AND NOTIFIY PROVIDER → Initiate Hypersensitivity Protocol

Organ System & Symptoms	Grade	Grade Criteria	Management & Sequence		
Grade I & II Symptoms: **Cutaneous:** • Hives • Itching • Redness/flushed • Fever • Chills/rigors **Conjunctival** • Any eye symptom **Gastrointestinal:** • Nausea • Vomiting • Diarrhea • Abdominal pain **Musculoskeletal:** • Cramps • Back pain **Respiratory :** • SOB with RR less than 25 bpm • Rhinitis	**Grade I (MILD)**	Involves **ONE** organ system: • Cutaneous • Conjunctival • Gastrointestinal • Musculoskeletal • Respiratory	**Diphenhydramine** 50 mg IV Push over 2 min. x1 (if already given as premed, give 25 mg IV push x1) **AND** **Famotidine** 20 mg IV over 5 min. x1 (20 mg in 50 mL infusion bag)	If Progression to Grade II	
	Grade II (MODERATE)	Involves **TWO** organ systems: • Cutaneous • Conjunctival • Gastrointestinal • Musculoskeletal • Respiratory	**Diphenhydramine** 50 mg IV Push over 2 min. x1 (if already given as premed, give 25 mg IV push x1) **AND** **Famotidine** 20 mg IV over 5 min. x1 (20 mg in 50 mL infusion bag) **AND** **Hydrocortisone** 100 mg IV Push over 30 sec. x1	**Add:** **Hydrocortisone** 100 mg IV Push over 30 sec. x1	If Progression to Grade III
Grade III Symptoms: **Cutaneous:** • Swelling of the lips, face or tongue **Respiratory:** • Wheezing • SOB with RR greater than or equal to 25 bpm • Stridor • Bronchospasm-chest tightness/chest pain • Cough • Hoarseness **Cardiovascular:** • Dizziness • Syncope • Hypotension (SBP less than 80 mmHg or 20 mm Hg decrease from baseline) • Loss of consciousness	**Grade III (SEVERE)**	**Grade III Symptom:** • Cutaneous • Respiratory • Cardiovascular	**GIVE FIRST– Epinephrine** 0.3mg IM in lateral thigh—may repeat every 5 min. up to 3 doses **AND** **Diphenhydramine** 50 mg IV Push over 2 min. x1 (if already given as premed, give 25 mg IV push x1) **AND** **Famotidine** 20 mg IV over 5 min. x1 (20 mg in 50 mL infusion bag) **AND** **Hydrocortisone** 100 mg IV Push over 30 sec. x1 **PRN** **Oxygen 2-6 L nasal cannula or 6-8 L face mask** to maintain saturations greater than or equal to 92%		**Add:** **Epinephrine** 0.3mg IM in lateral thigh—may repeat every 5 min. up to 3 doses **PRN** **Oxygen 2-6 LnNasal cannula or 6-8 L face mask** to maintain saturations greater than or equal to 92%

MDI for persistent bronchospasm after 2 doses of epinephrine to be ordered by the provider when available

Reviewed and Revised December 2023 –AHN ACT Council & Heme/Onc P&T Subcommittee

Consult provider for patient disposition and/or re-initiation of infusion → YES → Symptoms Resolved? → NO → Provide Basic Life Support and transition patient to higher level of care

AHN CANCER INSTITUTE

67

TREATMENT

- Administer pre-medications to prevent reaction
- If reaction is anticipated, keep emergency equipment nearby
- Stop medication administration
- Monitor airway for potential compromise
- Monitor vital signs
- Administer rescue meds (epinephrine, Diphenhydramine, H1& H2 antagonists, corticosteroids, albuterol)
- Administer IV fluids, as needed
- Notify MD/APP of signs and symptoms observed
- Based on orders- restart infusion, potentially at a slower rate

AHN CANCER INSTITUTE

68

69

STRUCTURAL

- Spinal Cord Compression (SCC)
- Superior Vena Cava Syndrome (SVC)
- Pleural Effusion
- Pericardial Effusion/Tamponade
- Increased Intra-cranial Pressure (ICP)

AHN CANCER INSTITUTE

70

SPINAL CORD COMPRESSION

- Pathophysiology:
  - A neurologic/"true oncologic" emergency that occurs when the spinal cord or cauda equina is compromised by direct pressure, vertebral collapse, or both caused by metastatic spread or direct extension of a malignancy.
  - compression results in compromised neurologic function if not treated promptly

AHN CANCER INSTITUTE

71

RISK FACTORS & ETIOLOGY

- Occurs in approximately 10% of patients with Cancer.
- Certain cancer types at a greater risk:
  - Glioma, astrocytoma, ependymoma
  - Cancers that metastasize to bone: lung, renal, breast, prostate, melanoma, multiple myeloma
  - Malignancies that metastasize to the spinal cord: seminoma, lymphoma, neuroblastoma
- Variety of etiologies and consequences that can lead to temporary or permanent damage.

AHN CANCER INSTITUTE

72

SIGNS AND SYMPTOMS

- 95% present with pain not relieved by lying down
- Radicular pain (nerve root pain secondary to tumor or bone fragments)
- Motor weakness or dysfunction
- Sensory loss
- Incontinence or retention of urine/stool
- Sexual impotence
- Paralysis
- Muscle atrophy
- Loss of sweating below lesion

Dependent on level and location of compression

AHN CANCER INSTITUTE

73

Back Pain
- Presenting symptom in 90% of the cases
- Pain manifested based on spinal location; typically constant, dull, aching, and progressive
- Worst pain at night or early morning due to increased venous stasis and cord edema
- Localized and radicular pain exacerbated by coughing, sneezing, Valsalva maneuvers, movement, and lying flat
- Localized, radicular (pain in the area of the affected dermatome), referred, or a combination
- Radicular pain: constant, dull ache or a burning, shooting pain
- Bilateral band-like pain across the chest and abdomen: more common with thoracic cord lesions
- Unilateral radicular pain characteristic of lumbar or cervical lesions

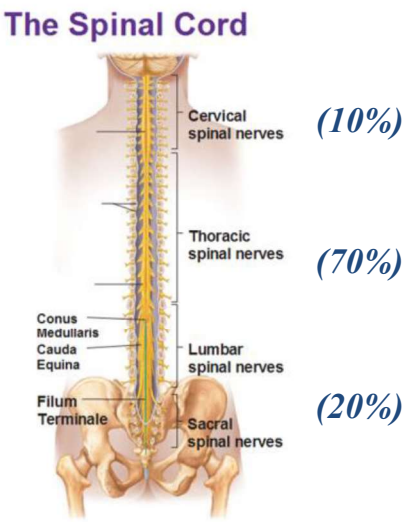
Motor Weakness
- Second most common symptom of spinal cord compression at presentation; present in up to 85% of the cases
- Leads to loss of coordination, difficulty walking, and eventually, paralysis
- Typically begins in the legs regardless of the level of compression
- Initially more proximal; difficulty rising from a chair or toilet and climbing steps
- Often described as a heaviness or stiffness in the legs
- Irreversible paraplegia within one week of experiencing motor weakness in 30% of patients
- Ability to walk at the time of diagnosis: indicative of neurologic status, prognostic of at least a one-year survival, the most important predictor of functional outcome
- Patients presenting with paraplegia: Unlikely to walk again, even after treatment; poor survival prognosis

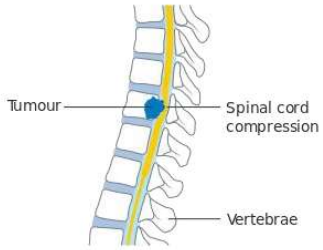
Sensory Changes
- Develop shortly after motor weakness
- Some sensory deficits in 50%–70% of patients
- Sensory loss: dependent on the level of cord compression; may include numbness, paresthesias, loss of proprioception, and loss of sensation for touch, pain, temperature, and vibration

Note. Based on information from Lawton et al., 2019.

74

NERVES AND VERTEBRAE





AHN CANCER INSTITUTE

75

SCC Focused Assessment

Assessment

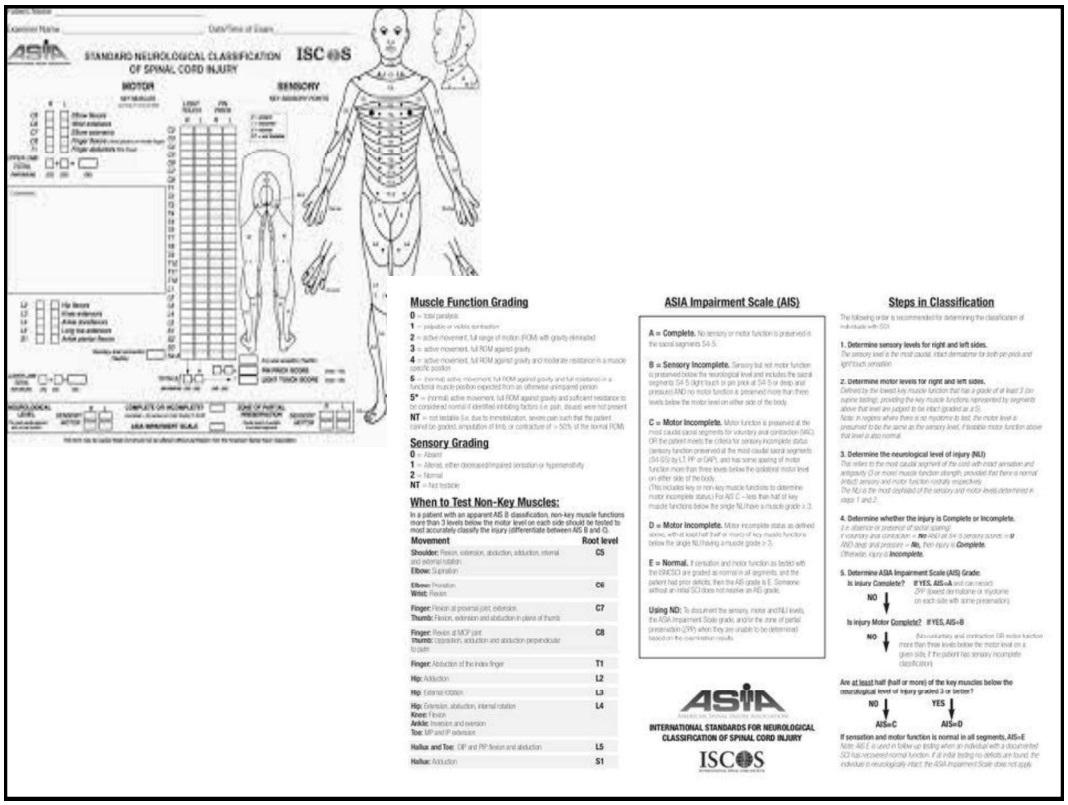
- Prompt assessment and management
- Motor function: evaluation of gait, muscle strength, involuntary movements, and coordination
- Reflex assessment: essential to provide information about neurologic status
- Sensory assessment: evaluation of sense of pain, temperature, touch, vibration, and position (proprioception)
- Assessment of autonomic function
- Risk for autonomic dysreflexia that can be triggered by a distended bladder or bowel in patients with spinal cord compression occurring at high levels in the spine (T6 or above)

Physical Examination

- Classic signs include elevated blood pressure, pounding headache, bradycardia, flushing, and profuse sweating above the level of the spinal block.
- Pain on neck flexion indicates cervical spine compression.
- Difficulty rising from a seated position or climbing stairs is seen with proximal muscle weakness of the legs and often is the first sign of motor weakness.
- Leg strength is assessed by observing heel walking, toe walking, and deep knee bends (if the patient is able), or performing active movements against resistance.
- Normal reflexes show a brisk response, whereas deep tendon reflexes decrease at the level of cord compression and become hyperactive below.
- Positive Babinski sign in adults is always abnormal and indicates dysfunction of the spinal tract. Positive response is dorsiflexion of the great toe with fanning of the other toes, reflecting upper motor neuron disease.
- Careful dermatome mapping of sensory loss can indicate the level of cord damage.
- Taking a careful history of urination is important, and a postvoid residual measurement may be needed to assess for neurogenic bladder.
- Change in bowel habits should be elicited, and digital rectal examination should be performed to assess sphincter tone.
- Questions about sexual function and recent onset of impotence also are important.

Note. Based on information from Lawton et al., 2019.

76



77

TREATMENTS

- XRT most often treatment of choice (except for instability and fragmented bones)- pain relief
- Surgical decompression-vertebral metastasis, pathological fractures, compression by bone, relapse, or failure to XRT
- Kyphoplasty (reconstructs and some stabilization, prevent further collapse and neurological compromise)
- Clam shell brace
- Steroids used to reduce edema and pain
- Bowel regimen
- Manage urinary incontinence or retention
- Rehabilitation referral-restore or prevent functional decline
- Palliative care

AHN CANCER INSTITUTE

78

SUPERIOR VENA CAVA SYNDROME (SVC)

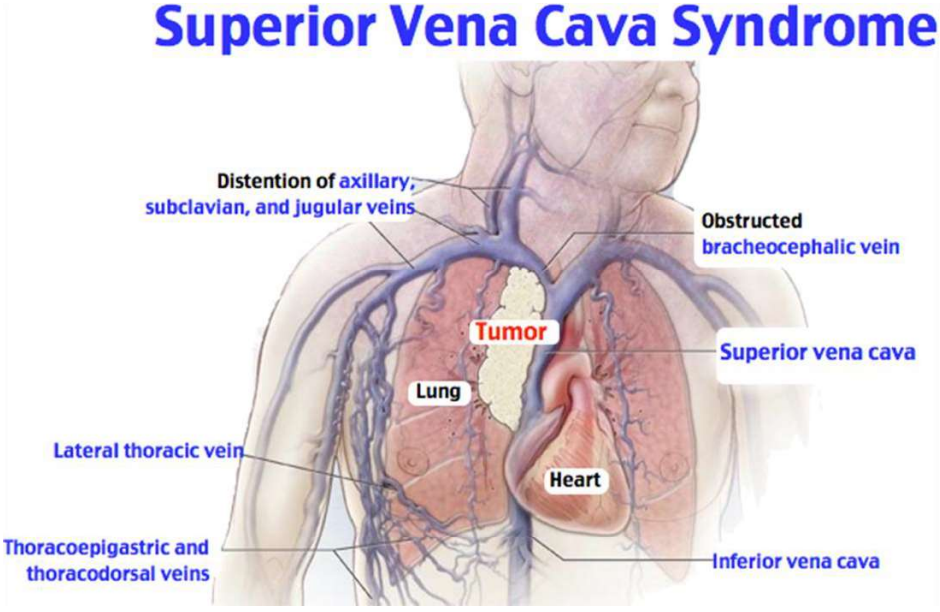
Pathophysiology:

- Occluded SVC causes reduced venous return to right atrium
  - External compression of vessel by tumor or LN
  - Direct invasion of vessel wall by tumor
  - Thrombosis of vessel
- Increased venous pressure, venous hypertension, and venous stasis in head, arms, and upper chest

AHN CANCER INSTITUTE

79

Superior Vena Cava Syndrome



AHN CANCER INSTITUTE

80

Risk Factors

- Malignant and non-malignant factors
  - Malignant:
    - NSCLC/SCLCA~ highest association
    - Non-Hodgkins lymphoma
    - Thyoma
    - Pleural mesothelioma
    - Sarcomas
    - Primary mediastinal Germ cell tumors
    - Breast
  - Non-malignant:
    - Thrombosis~ presence of CVC's
    - Substernal thyroid hypertrophy
    - Granulomatous disease

81

SIGNS AND SYMPTOMS

Early:

- Dyspnea **Most common symptom
- Symptoms worse in the morning or when bending over, improve after being upright for several hours
- Redness and edema in and around the eyes and face
- Swelling of the neck, arms, hands
- Neck and thoracic vein distention
- Nonproductive cough
- Hoarseness
- Nasal stuffiness
- May experience breast swelling

Late:

- Increased ICP- severe headaches, blurred visions, dizziness, etc
- Irritability/altered mental status
- Stridor~ laryngeal edema
- Tachycardia, tachypnea, orthopnea
- Decreased sweating (anhidrosis)
- Hypotension
- Absence of peripheral pulses
- Dysphagia
- Cyanosis
- Horner Syndrome
  -the combination of ptosis and miosis (pupil constriction)

AHN CANCER INSTITUTE

82

Assessment & Diagnostics

- Facial and periorbital edema
- Distended neck veins/JVD
- Chest pain
- Stridor

- CT of chest w/contrast

TREATMENT

- XRT treatment of choice
- Treat underlying source (chemo to reduce mass)
- Administer oxygen and monitor I&O's
- May need to treat with TNK(Tenecteplase) or systemic anticoagulation
- Diuretics and hydration (monitoring closely)
- Stenting in severe cases

AHN CANCER INSTITUTE

TEST YOUR KNOWLEDGE

- What symptom would you be most concerned about during your patient assessment?
  a. Numbness and tingling to feet Bil.
  b. Incontinent of bowel and bladder
  c. Inability to move legs below the knee
  d. Decreased sensation to cold or warm in Bil. lower extremity

PLEURAL EFFUSION

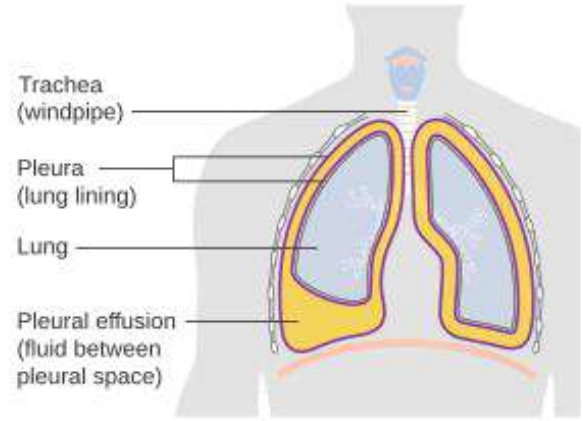
Pathophysiology:

- Fluid accumulation restricts lung expansion, alters ventilation and perfusion, and results in abnormal gas exchange and hypoxia
- Implantation cancer cells on pleural surface leading to increased capillary permeability and leakage from the intra-vascular to the interstitial compartment-usually in solid tumors
- Osmotic pressure in pleural space can be increased by necrotic malignant cells shed into the pleural space leading to decreased absorption of fluid by the visceral pleural capillaries

AHN CANCER INSTITUTE

PLEURAL EFFUSION

- 50% cancer patients will develop effusion
- breast, lung, ovarian, and lymphomas are greatest risks



AHN CANCER INSTITUTE

87

SIGNS AND SYMPTOMS

- SOB, coughing
- Pain in chest dull, aching, or sharp

AHN CANCER INSTITUTE

88

TREATMENT

- Treat underlying disease
  - Chemo
- Thoracentesis (temporary) … assess for pneumo, pain, hypotension, or pulmonary edema post procedure
- VATS procedure
- Surgery (pleurectomy)
- Chest tube OR the Rocket

AHN CANCER INSTITUTE

89

PERICARDIAL EFFUSION/ TAMPONADE

- Pathophysiology:
  - A pericardial effusion is considered to be present when accumulated fluid within the sac exceeds the small physiologic amount (15 to 50 mL) Infection

Causes:

- Cancer
  - (mesothelioma most common)
- CVC perforation
- Renal failure
- CHF
- MI
- Trauma
- Meds
- XRT to mediastinum (fibrosis)
- Dissecting aortic aneurysm
- Chemo (anti-tumor antibiotics)

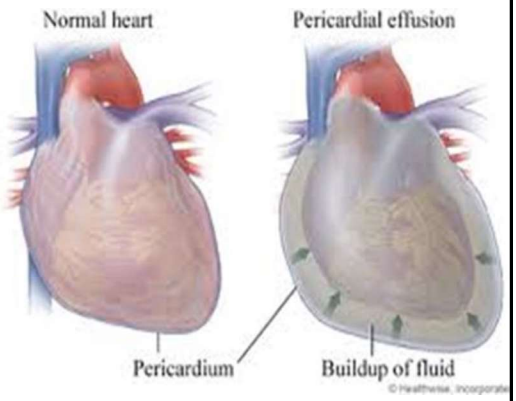
AHN CANCER INSTITUTE

90

PERICARDIAL EFFUSION

Excessive accumulation of fluid or blood between the pericardium and heart (peri-cardial sac)that prevents adequate amount of blood from flowing into the heart to fill the ventricles (life-threatening)

Normal pericardial fluid volume 15-50 ml



AHN CANCER INSTITUTE

91

SIGNS AND SYMPTOMS

Epigastric or chest pain relieved by sitting up and more severe when lying flat

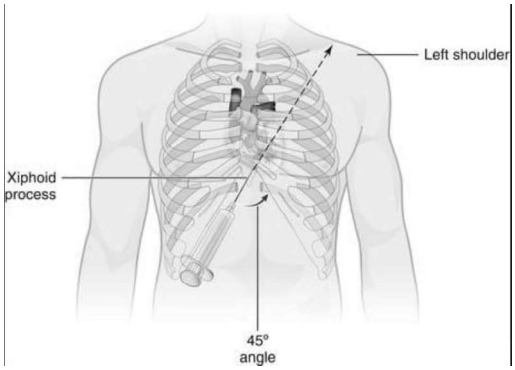
Weakness, SOB, dysphagia, edema legs, N/V

- Pulsus pardoxus
- Hoarseness
- Friction rub
- Venous distension-JVD
- Distant heart sounds
- Hypotension
- Tachycardia
- Confusion
- Diaphoresis
- Cyanosis
- Abdominal distension

AHN CANCER INSTITUTE

92

TREATMENT



- Pericardiocentesis- followed by catheter drainage for up to 5 days
  - May lead to pericardial window
- Pericardial window(surgical pericardiotomy)

AHN CANCER INSTITUTE

TEST YOUR KNOWLEDGE

- Patient presents with respiratory rate of 24. Your assessment includes all except the following:
  a. Listening to lung sounds Bil, pulse ox
  b. Neuro checks
  c. Listening to heart sounds, pedal and radial pulses
  d. Pain assessment

AHN CANCER INSTITUTE

INCREASED INTRACRANIAL PRESSURE (ICP)

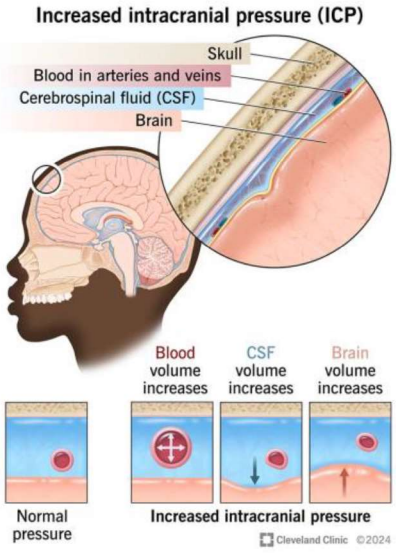
- Pathophysiology:
  - Overall volume of the cranial vault cannot change, an increase in the volume of one component (eg, hydrocephalus) or the presence of mass lesions (eg, tumor, hematoma, or abscess) necessitate the displacement of other structures, an increase in ICP, or both.

AHN CANCER INSTITUTE

95

ICP

- Blood
- CSF
- Brain mass



AHN CANCER INSTITUTE

96

TABLE 8-6. CAUSES OF INCREASED INTRACRANIAL PRESSURES

Mechanism	Etiology
Venous obstruction	Sinus venous or jugular vein thrombosis
Increased brain volume	Brain tumor, abscess, empyema, intracerebral hemorrhage
Increased blood volume	Hypercapnia, anoxia, severe anemia, hyperperfusion syndrome, arteriovenous malformation, arteriovenous fistula
Mass effect	Subdural hematoma, epidural hematoma, empyema, tension pneumocephalus
Cerebral edema	
Cytotoxic	Ischemic stroke, anoxic encephalopathy, fulminant hepatic failure, status epilepticus
Vasogenic	Hypersensitive encephalopathy, brain tumor, abscess, encephalitis
Transependymal	Subarachnoid hemorrhage, meningitis, idiopathic intracranial hypertension
Osmotic	Hyponatremia, diabetic ketoacidosis, osmotherapy rebound effect
Radiation-induced	Pseudoprogression, radiation necrosis

97

SIGNS AND SYMPTOMS

- Early:
  - Visual:
    - Diplopia
    - blurred vision
    - decreased visual fields
    - decreased visual acuity
  - extremity drifts
  - change in level of consciousness
    - lethargy
    - Confusion
    - restlessness
  - Headache: most severe in early morning
  - gastrointestinal symptoms: including loss of appetite
  - Nausea
  - Occasional/unusual vomiting.

AHN CANCER INSTITUTE

98

SIGNS AND SYMPTOMS

- Late:
  - Neurologic:
    - abnormal posturing
    - Decreased LOC
    - Personality changes
    - Hemiplegia
    - Seizures
    - Pupil changes
    - Papilledema-cardinal sign
  - temperature elevations
  - Respiratory:
    - slow and shallow respirations
    - Cheyne-stokes
    - tachypnea
  - Cardiovascular:
    - Hypotension
    - Bradycardia
    - Widening pulse pressure
  - Cushing Triad-cardinal sign

AHN CANCER INSTITUTE

99

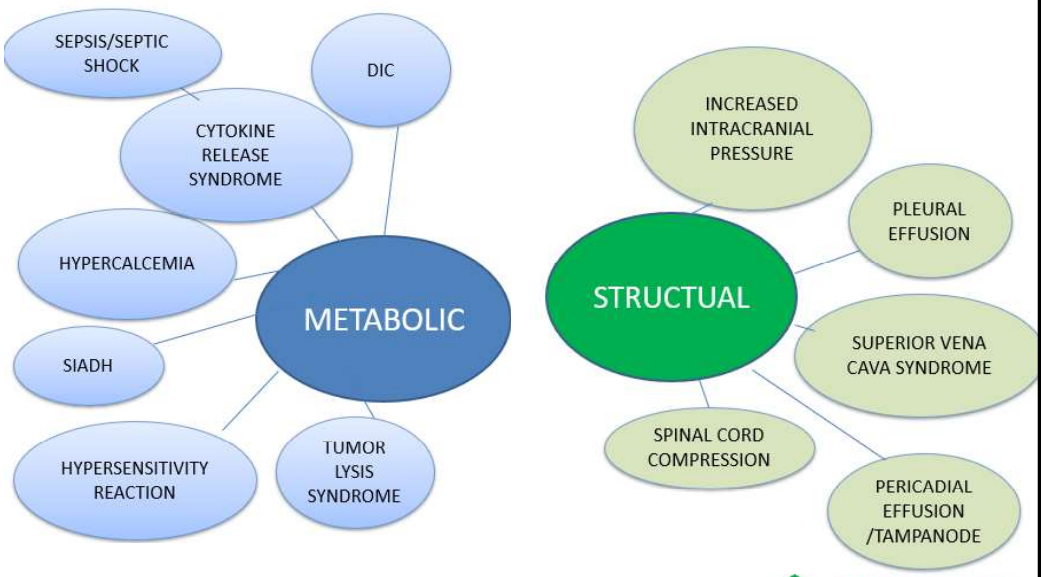
TREATMENT

- BP monitoring- MAP 80-85mmHg to maintain Cerebral perfusion pressure 60-70mmHg
  - Hypotension leads to cerebral ischemia and secondary brain injury
- Keep temperature normothermic
  - 1 degree C increase will increase cerebral blood flow by 5-6%
- ICP monitoring
- Craniotomy
- ACT into CSF (Methotrexate, Cytarabine (Ara-C), steroids)
- Fluid management – isotonic solutions
- Analgesics and sedation
- Corticosteroids and mannitol
- Seizure control-Keppra
- Elevate HOB 30 degrees
- Management of factors that increase ICP

AHN CANCER INSTITUTE

100

BREAK OUT INTO GROUPS



AHN CANCER INSTITUTE

101

Case Study Questions

1. Identify the oncologic emergency.
2. What nursing interventions would you implement?
3. What orders would you anticipate?

AHN CANCER INSTITUTE

102

CASE #1

Patient: A 62-year-old female, Ms. Eleanor Vance, presents to the clinic complaining of progressive shortness of breath, worsening over the past three weeks. She also reports facial swelling, especially noticeable in the mornings, along with headaches and upper extremity edema. She denies chest pain, cough, or fever.

- **Vitals:** BP: 100/60 mmHg, HR: 102 bpm (irregular), RR: 24 breaths/min,SpO2: 92% on room air, Temperature: 98.6°F (37°C)
- **Physical Exam:**
  - Distended neck veins (JVP elevated)
  - Facial edema, particularly periorbital
  - Bilateral upper extremity edema
  - Mild respiratory distress
  - Heart sounds are tachycardic. Lungs have scattered crackles bilaterally. Abdomen is soft, non-tender
- **Medical History:** Ms. Vance has a history of lung cancer (adenocarcinoma, diagnosed 6 months ago, currently receiving palliative chemotherapy). She is a former smoker (20 pack-year history).
- **Initial Labs:** CBC: WBC 11,000/µL, Hgb 10.2 g/dL, Hct 30.5%, BMP: Normal except for slightly elevated BUN and creatinine (suggestive of mild dehydration) Chest X-ray: Shows a large right upper lobe mass with mediastinal widening.

AHN CANCER INSTITUTE

103

Case #2

Patient: A 78-year-old male, Mr. Arthur Jenkins, presents to the ER via ambulance accompanied by his daughter. She reports that her father has become increasingly lethargic and confused over the past week, and that he's been complaining of severe constipation and abdominal pain. He also appears to have lost weight recently.

Vitals: BP: 150/90 mmHg, HR: 60 bpm (regular), RR: 18 breaths/min, SpO2: 99% on room air; Temperature: 98.8°F (37.1°C)

Physical Exam:

- Lethargic, disoriented to time and place
- Mild dehydration evident
- Decreased bowel sounds
- Abdominal tenderness on palpation
- No significant cardiac findings
- No peripheral edema

Medical History: Mr. Jenkins has a history of hypertension, treated with lisinopril, and a recent diagnosis of multiple myeloma. He is currently receiving no specific treatment for the myeloma.

Initial Labs: Glucose: 105 mg/dL; Calcium: 13.2 mg/dL

AHN CANCER INSTITUTE

104

Case #3

Patient: Ms. Evelyn Reed, a 72-year-old female, presents for her routine follow-up appointment with her primary care physician. She has a history of well-controlled hypertension and hyperlipidemia, managed with medication; She reports feeling generally well, though she mentions slight shortness of breath on exertion in the last few weeks, which she attributes to getting older.

Vitals: BP: 140/85 mmHg; HR: 80 bpm (regular); RR: 22 breaths/min; SpO2: 95% on room air; Temperature: 98.6˚F (37˚C)

Physical Exam:

- slightly diminished breath sounds at the right lung base on auscultation.
- There is dullness to percussion at the right lung base.
- No palpable lymphadenopathy.
- Cardiovascular exam is unremarkable.

Medical History:

She was treated for Stage III breast cancer 8 years ago and has undergone every 6 month appointments with her medical oncologist and surgeon. She has also suffers from arthritis and most recently had a knee replacement.

Labs: all WNL

AHN CANCER INSTITUTE

105

Case #4

Patient: Mr. David Miller, a 67-year-old male with a known diagnosis of metastatic lung adenocarcinoma, presents to the ER via ambulance complaining of sudden-onset severe chest pain and shortness of breath. He reports the pain began 30 minutes prior to arrival and describes it as sharp, constricting, and radiating to his back. He also states he feels increasingly weak and lightheaded.

- **Vitals:** BP: 80/60 mmHg (Hypotensive); HR: 120 bpm (Tachycardic) with weak, thready pulse; RR: 30 breaths/min (Tachypneic); SpO2: 88% on room air (Hypoxemic); Temperature: 99.2°F (37.3°C)
- **Physical Exam:**
  - Diaphoretic and anxious
  - Pale conjunctiva
  - Muffled heart sounds
  - Jugular venous distention (JVD)
  - Distant heart sounds
  - Tachycardia with pulsus paradoxus (significant decrease in systolic BP during inspiration)
  - Clear lung sounds
  - Mild abdominal distention
- **Medical History:** Mr. Miller has a history of metastatic lung adenocarcinoma diagnosed six months ago and has been receiving chemotherapy. He reports recent increase in fatigue and weight loss.

AHN CANCER INSTITUTE

106

Case #5

Patient: A 22-year-old male presented to the hematology oncology clinic with fatigue, weight loss, and bone pain for the past three months. Physical examination revealed pallor and significant lymphadenopathy. A Ultrasound Guided biopsy of a mass in his left groin revealed Large B-cell Lymphoma.

Treatment Plan: The patient was initiated on a multi-agent chemotherapy regimen consisting of Rituxan, Cyclophosphamide, doxorubicin, vincristine, and prednisolone.

Day 4 IP-

- On day 4 of chemotherapy, the patient developed nausea, vomiting, and lethargy. He complained of muscle weakness and cramps. Repeat blood work revealed the following:
  - **Serum Potassium:** 7.0 mEq/L (Elevated – Normal range 3.5-5.0 mEq/L)
  - **Serum Phosphorus:** 8.5 mg/dL (Elevated – Normal range 2.5-4.5 mg/dL)
  - **Serum Uric Acid:** 12.0 mg/dL (Severely elevated – Normal range 3.5-7.2 mg/dL)
  - **Serum Creatinine:** 2.0 mg/dL (Elevated – indicating renal dysfunction; baseline creatinine was 0.9 mg/dL)

AHN CANCER INSTITUTE

107

Case # 6

Patient: Ms. Amelia Hernandez, a 42-year-old female diagnosed with follicular lymphoma.

Medical History: Ms. Hernandez has a history of seasonal allergies, managed with over-the-counter antihistamines. She reported no known drug allergies. She had undergone a complete blood count and other baseline tests prior to commencing the Rituximab treatment, all of which were within normal limits.

Presenting Complaint: Ms. Hernandez presented to the infusion center approximately 45 minutes into her first infusion of Rituximab (Rituxan) reporting feeling unwell. She described feeling flushed, itchy, and experiencing a shortness of breath.

Physical Examination: Upon examination, Ms. Hernandez displayed diffuse erythema and urticaria across her chest and upper extremities. She was tachypneic (respiratory rate 28 breaths/min) and tachycardic (heart rate 110 bpm). Her blood pressure was 100/60 mmHg. Auscultation revealed mild wheezing in her lungs. She appeared anxious and distressed.

AHN CANCER INSTITUTE

108

Case #7

Patient: A 68-year-old male, Mr. John Smith, with a diagnosis of relapsed/refractory multiple myeloma.

Presenting Complaint: Mr. Smith presented to the emergency department with high fever (39.5°C), hypotension (80/50 mmHg), tachycardia (120 bpm), shortness of breath, and diffuse erythema. He reported feeling sick for the past 24 hours.

Medical History: Mr. Smith has a history of multiple myeloma diagnosed 3 years prior. He had received multiple lines of therapy, including lenalidomide, bortezomib, and carfilzomib, with progressive disease. He was recently started on a combination regimen of Tecentriq (Atezolizumab) and Tecvayli (Teclistamab). He had received his fifth dose of Tecvayli 48 hours prior to symptom onset. He has no known allergies.

Physical Examination: On examination, Mr. Smith appeared acutely ill, tachycardic, and tachypneic. He exhibited diffuse erythema, particularly on his face and chest. His lungs showed bibasilar crackles. He was mildly confused.

Laboratory Findings: WBC 2.5 with an ANC of 1.75, platelets 80, elevated LDH 600., creatinine (1.8 mg/dL), elevated AST (150 U/L), elevated ALT (120 U/L), hypocalcemia (7.8 mg/dL); **Blood cultures:** Negative.

.

AHN CANCER INSTITUTE

109

Case #8

Patient: A 55-year-old female, Ms. Jane Doe, with a history of acute myeloid leukemia (AML) undergoing induction chemotherapy.

Presenting Complaint: Ms. Doe presented to the emergency room (ER) with fever (39.5°C), chills, hypotension (90/60 mmHg), tachycardia (120 bpm), and altered mental status. She reported feeling intensely ill for the past 12 hours.

Medical History: Ms. Doe was diagnosed with AML a couple of months ago prior and had completed her third cycle of induction chemotherapy (daunorubicin and cytarabine) five days ago. She has a history of hypertension, well-controlled with lisinopril.

Physical Examination: On examination, Ms. Doe appeared acutely ill, exhibiting signs of dehydration. She was febrile, tachycardic, and tachypneic. Her skin was warm and flushed. Lung auscultation revealed crackles in the right lower lobe. She was disoriented to time and place.

Laboratory Findings: absolute neutrophil count 0. 100, anemia (hemoglobin 8.0 g/dL, platelets 50

Chest X-Ray: Shows right lower lobe infiltrate

AHN CANCER INSTITUTE

110

Case #9

Patient: A 62-year-old male, Mr. Robert Jones, presented to his primary care physician complaining of worsening back pain and lower extremity weakness.

Presenting Complaint: Mr. Jones reported progressively worsening low back pain for the past three months, initially described as dull aching but recently becoming severe and radiating down both legs. Over the past week, he noticed increasing weakness in his legs, difficulty walking, and numbness in his feet. He denied any recent trauma.

Medical History: Mr. Jones has a history of hypertension, controlled with lisinopril. He is a former smoker (quit 10 years ago). He reports no significant family history of cancer.

Physical Examination: Examination revealed significant tenderness to palpation in the lower lumbar spine. He exhibited diminished reflexes in the lower extremities, decreased sensation below the knees, and significant weakness in both legs (3/5 strength). His gait was unsteady, requiring assistance to walk. He had no bowel or bladder dysfunction at this time.

AHN CANCER INSTITUTE

111

Case #10

- **Presenting Complaint:** Ms. Carter, a 58-year-old female, presented to the emergency department with a severe headache, nausea, vomiting, and altered mental status. Her family reported that she had been increasingly lethargic and confused over the past few days, with worsening headaches.
- **Medical History:** Ms. Carter was diagnosed with stage IV lung adenocarcinoma six months prior and had been receiving chemotherapy. She reported a recent increase in the frequency and intensity of her headaches.
- **Physical Examination:** On examination, Ms. Carter was lethargic and disoriented. She exhibited papilledema (swelling of the optic disc) on fundoscopy. Her vital signs showed elevated blood pressure (160/90 mmHg) and bradycardia (50 bpm). She had decreased responsiveness to verbal stimuli.

AHN CANCER INSTITUTE

112

Case #11

Patient: A 67-year-old male, Mr. Arthur Miller, presented to his primary care physician complaining of nausea, vomiting, and general malaise.

Presenting Complaint: Mr. Miller reported feeling sick for the past two weeks, experiencing persistent nausea and vomiting. He also noted that he had been feeling unusually fatigued and weak. He denied any recent illnesses or injuries.

Medical History: Mr. Miller is a former smoker (quit 20 years ago) with a history of hypertension controlled with lisinopril. He has no known allergies.

Physical Examination: On examination, Mr. Miller appeared slightly pale and fatigued but otherwise within normal limits. His vital signs were unremarkable except for a slightly elevated blood pressure (150/90 mmHg). No edema was noted.

Blood tests: Revealed hyponatremia (sodium 122 mEq/L), slightly elevated serum osmolality, and low urine osmolality (despite the low serum sodium).

AHN CANCER INSTITUTE

113

Case #12

Patient: A 72-year-old male, Mr. Harold Davis, presented to the emergency department with severe bleeding.

Presenting Complaint: Mr. Davis presented with spontaneous gingival bleeding, petechiae on his skin, and hematuria. He reported feeling increasingly weak and fatigued over the past few days. He also complained of shortness of breath and chest pain.

Medical History: Mr. Davis had no significant past medical history. He denied any recent illnesses or injuries.

Physical Examination: On examination, Mr. Davis appeared pale and lethargic. He exhibited multiple petechiae and purpura on his skin, particularly on his extremities. His gums were bleeding spontaneously. He had tachypnea and tachycardia. His abdomen was soft and non-tender.

Diagnostic Investigations:

- **Complete Blood Count (CBC):** Showed severe thrombocytopenia (platelets 20 x 10^9/L), prolonged prothrombin time (PT) and activated partial thromboplastin time (aPTT), and decreased fibrinogen levels.
- **Peripheral blood smear:** Revealed the presence of numerous atypical promyelocytes, suggestive of acute promyelocytic leukemia (APL).
- **Coagulation studies:** Confirmed significant consumption coagulopathy, consistent with disseminated intravascular coagulation (DIC). Fibrin degradation products (FDPs) were markedly elevated.
- **D-dimer:** Significantly elevated, indicating widespread fibrinolysis.

AHN CANCER INSTITUTE

114

References

Baldwin, C. (2023). Advanced Oncology Nursing Certification Review and Resource Manual (3rd ed.). Oncology Nursing Society. https://www.r2library.com/Resource/Title/163593057X

Camp-Sorrell, D., Hawkins, R.A., and Cope, D.G. (2022) Clinical Manual for the Oncology Advanced Practice Nurse (4th ed.). Pittsburgh, PA: Oncology Nursing Society.

UpToDate (2025). Retrieved January 31, 2025. https://www.uptodate.com/contents/search

Yarbro, C. H., Frogge, M. H., & Goodman, M. (Eds.). (2018). *Cancer nursing: Principles and practice (8th ed.)*. Boston: Jones and Bartlett Publishing.

AHN CANCER INSTITUTE

Care of the Oncology Patient

Allegheny Health Network Cancer Institute
Marcia Almiron Wolbert, MSN, RN, OCN
Marcia.almironwolbert@ahn.org

Objectives

- Recognize common side effects of cancer treatments and describe interventions
- Identify chemotherapy toxicities
- Explore surgery as part of treatment modalities for patients with cancer
- Discuss nursing interventions for surgery
- Review the care of lines, tubes, and drains
- Discuss Fertility Preservation

Symptom Management of Cancer and Treatments

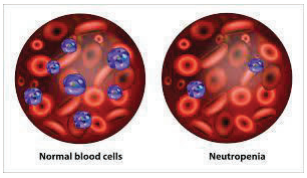
- Myelosuppression
- Constipation
- Diarrhea
- Chemotherapy Induced Nausea and Vomiting (CINV)
- Peripheral Neuropathy
- Dyspnea
- Mucositis and stomatitis
- Fatigue
- Pain
- Skin changes

3

Myelosuppression

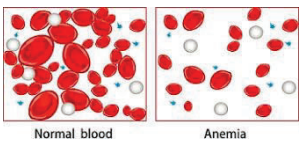
Neutropenia

- 8-12 days after chemo
- **ANC less than 1500/µL**
- Fever may be the only indication of infection
- Granulocyte - Colony Stimulating Factor



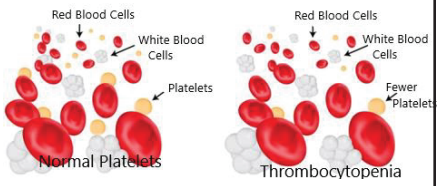
Anemia

- Low level of RBC to carry oxygen
- Anemia: Hbg < 13.5 gm/dl man or < 12.0 gm/dl woman
- Transfusion: **Hbg < 8**gm/dl
- Erythropoietin Stimulating Factors



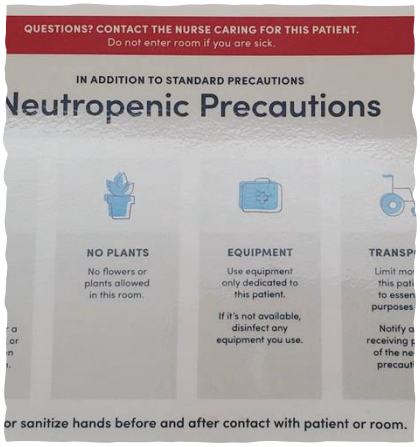
Thrombocytopenia

- 8-14 days after chemo
- **Platelets < 150,000 cells mm^3**
- Moderate risk of bleeding < 50,000 cells mm^3
- Severe risk of bleeding < 10,000 cells mm^3



4

Neutropenia



q4VS, private room, handwashing, facemask, gloves

Prevent trauma to skin and constipation

Promote healing of wounds: skin care and dressing changes

Exercise, coughing-deep breathing, incentive spirometer

T > 100.4 F, chills, dysuria, cough, and sore throat

Expect to pan culture, chest x-ray, antibiotics, hydration

5

Anemia

- Symptoms: pallor, hypotension, tachycardia, and tachypnea
- **Nursing Intervention**
- Teach energy sparing behaviors to minimize fatigue
- **Administer Blood (Hb <8g/dL)**
- Premeds: Benadryl/Tylenol
- Erythropoietin stimulating factors, epoetin alfa (Epogen, Procrit) and darbepoetin alfa (Aranesp)

6

Thrombocytopenia

- Assess for petechiae, nosebleeds, bleeding gums, blood in urine and stools, headaches and changes in mental status
- Teach bleeding precautions:
  - Avoid trauma, falls, provide safe environment
  - No venipunctures, invasive procedures, suppositories, enemas, rectal temp.
  - Avoid aspirin and NSAID
  - Hold needle sticks for 5 minutes
  - Use electric razor only
  - Use soft toothbrushes
  - Avoid tampons
- Transfuse platelets if < 20,000 or if bleeding

7

Constipation

- Cause: complication of disease process or associated with treatment side effects.
- **Nursing Interventions**:
  - Stool softeners (Colace), osmotic laxative (MiraLAX) and stimulant laxatives (Senokot)
  - Increase in dietary bulk and fluids
  - Schedule toileting, privacy, and comfort
  - Suppository and enemas
  - Relistor sq for opioid induced constipation

8

Diarrhea

Frequent passage of soft or liquid stool, 3+/day

Nursing Interventions:

- Record # of diarrhea episodes
- Send stool for culture and occult blood
- Cleanse gently, barrier creams, and local anesthetics as needed (tucks)

- Critical Thinking:
  - What anticancer therapy is the patient receiving?
  - Antidiarrheal vs. steroids

9

Small/large Bowel Obstruction

s/s: abdominal pain, nausea, vomiting, appetite loss, dark urine, tachycardia, constipation, cannot pass gas

Causes: tumor (obstructs bowel), surgery (adhesions), radiation, other (IBS, diverticulitis, medications)

Dx: CT scan or X-ray:

Management: bowel rest, IV fluids, NG tube for decompression, protonix, octreotide

10

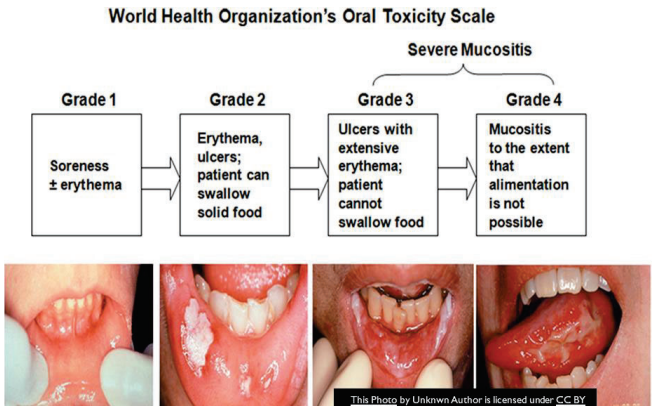
Mucositis and Stomatitis

Inflammation of mucosal surfaces, causing redness and ulcerative sores in soft tissue of the mucosa:

- Mouth
- Esophagus
- Stomach
- Duodenum
- Ileum/jejunum
- Colon
- Rectum

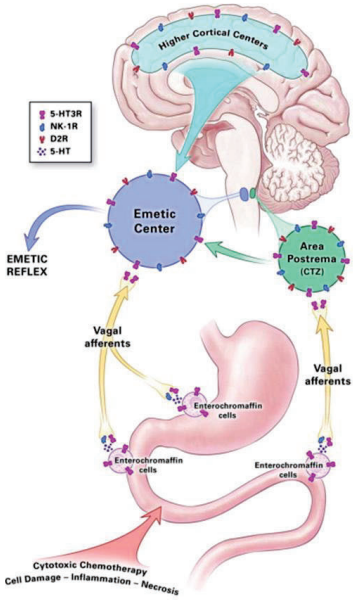
Patient education

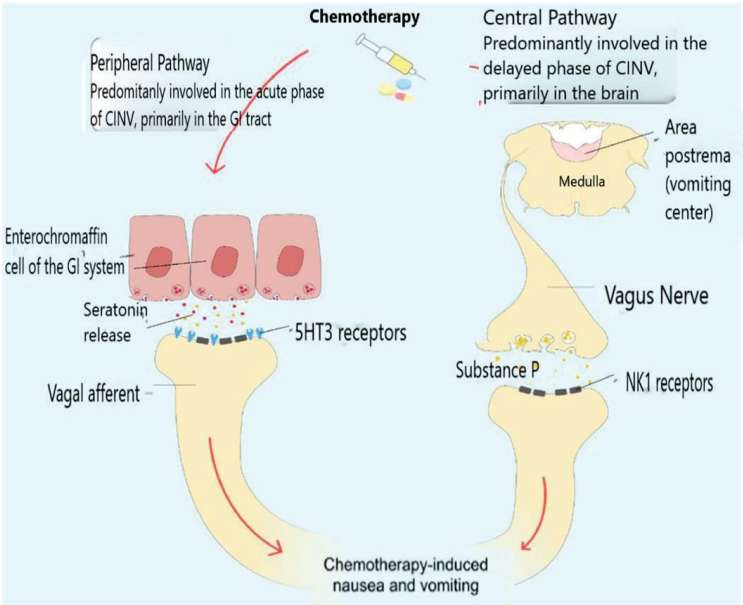
- Oral Care
- Mouth Rinses (salt and sodium bicarb)
- 2% lidocaine swish and spit
- Bland, soft, and cool foods
- Ice chips, topical anesthetics, opiates
- Oral/systemic steroids



11

Chemotherapy Induced Nausea and Vomiting





12

Chemotherapy Induced Nausea and Vomiting (CINV)

Anticipatory	Acute (first 24 hours)	Delayed (24-120 hours)	Breakthrough
• Learned/conditioned response to CINV in previous cycles • Benzodiazepines: lorazepam (ativan)	• Occurs few hours after the start of the treatment (max intensity 5-6) and lasts for 1-2 hours • **Serotonin (5HT3)** binds to **5HT3 receptor** • Tx: **5-HT3 antagonists:** ondansetron (zofran), granisetron (kytril), dolasetron (anzemet), palonosetron (aloxi) • Corticosteroids: dexamethasone (synergistic)	• Peaks 48-72 hours after chemo) • Ongoing effects of chemotherapy metabolites on the CNS and GI tract • **Substance P** binds to **NK1** • Tx: NK1 antagonist: aprepitant (emend PO), fosaprepitant (emend IV contains polysorbate 80), aprepitant (cinvanti – no polysorbate 80) • Corticosteroids: dexamethasone (synergistic)	• **Add an agent from a different drug class** • Benzodiazepines lorazepam (Ativan) • Dopamine antagonists: a. Metoclopramide (Reglan) – enhance gastric motility b. Prochlorperazine (Compazine) – also antihistaminic and anticholinergic, alleviate anxiety and hallucination • Antihistamine: Promethazine (phenergan) • Cannabinoids (dronabinol) • Antimuscarinics (scopolamine patch) • Olanzapine (Zyprexa)

13

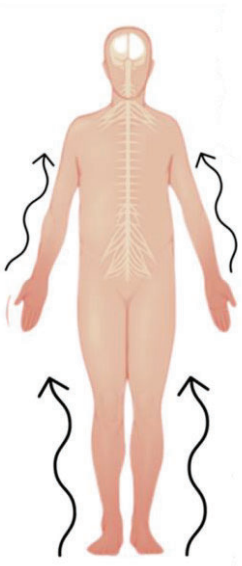
Peripheral Neuropathy

S/S: Numbness, pins-and-needles sensation, tingling, burning, and jabbing sensation to fingers of hands and toes of feet, and weakness

- Causes: chemotherapy and proteosome inhibitors

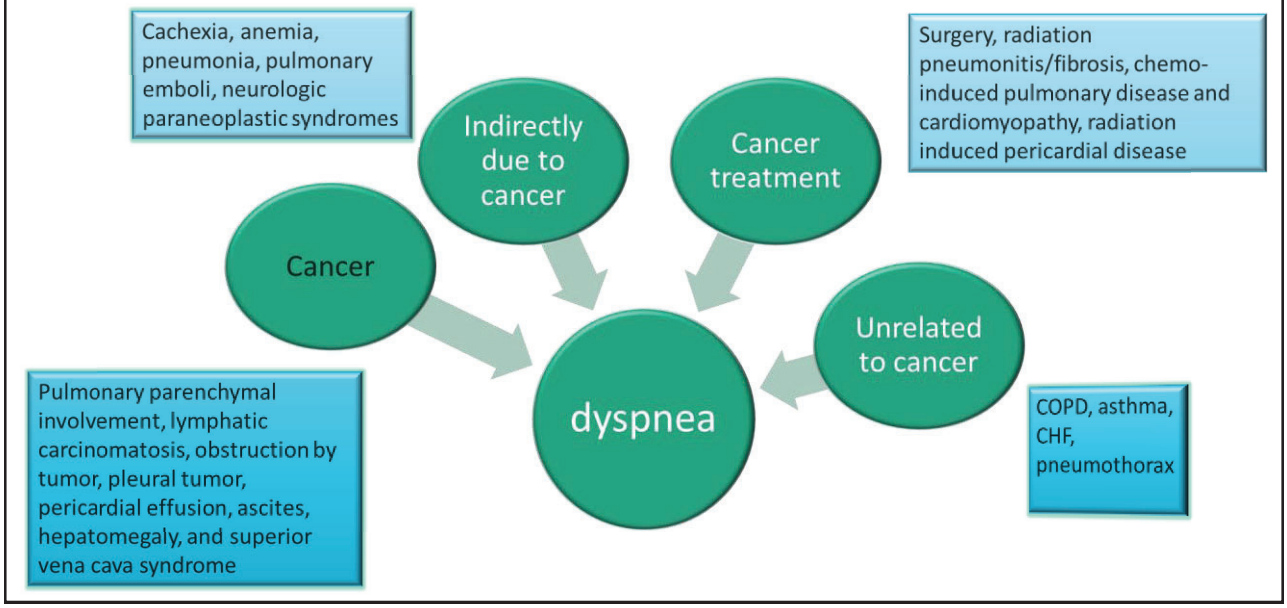
Nursing intervention:

- Safety assessment
- Pain assessment
- Analgesics, anticonvulsants (pregabalin and gabapentin) and selective serotonin-noradrenalin reuptake inhibitors (duloxetine and venlafaxine)



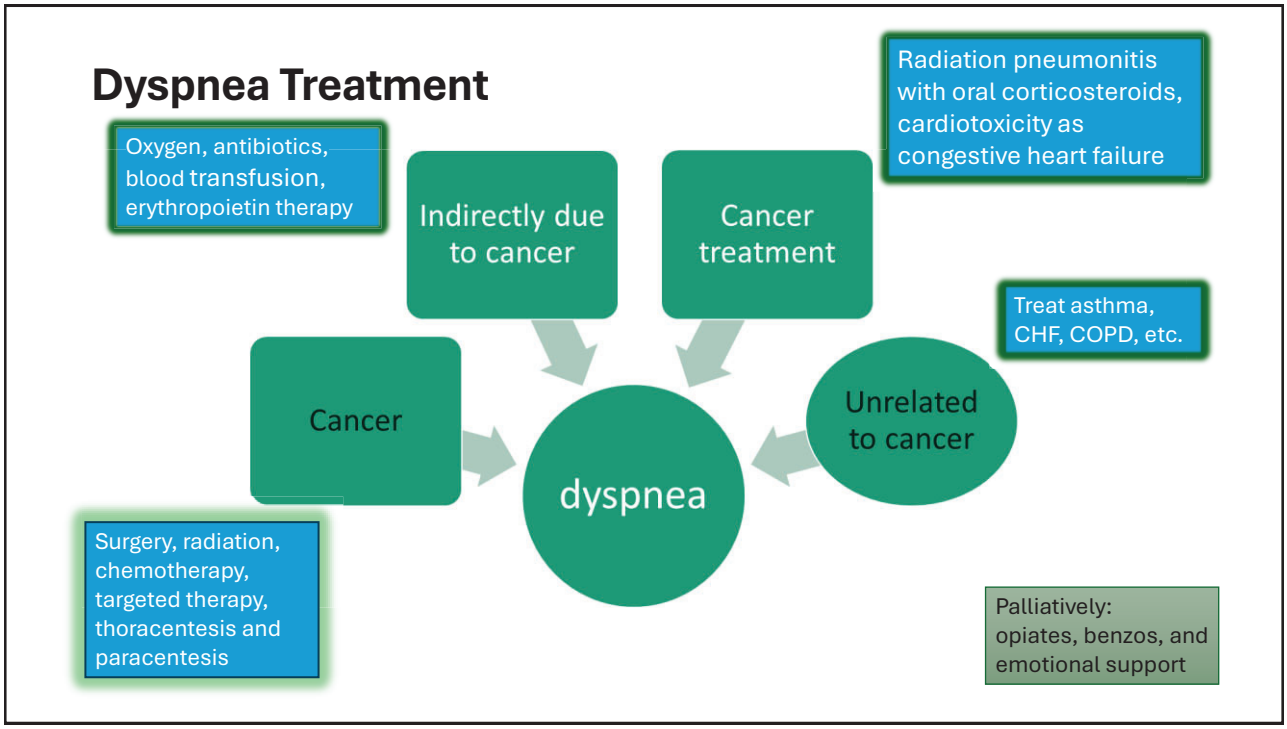
14

Dyspnea in Patients with Cancer



15

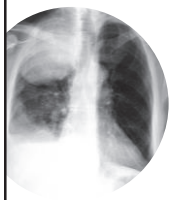
Dyspnea Treatment



16

Dyspnea Nursing Interventions

- Vital Signs
- Page HCP and Respiratory Technician
- Reposition patient
- Pursed-lip respiration
- Diaphragmatic breathing



17

Fatigue

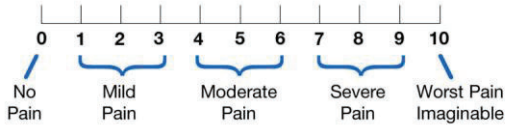
Nursing interventions:

- Assess fatigue: “0-10 scale question”
- Assess if fatigue is attributed to treatable factors
- **Teach strategies to reduce fatigue**:
  - Plans to conserve energy (prioritize, delegate)
  - Balanced, nutritious foods, supplements with vitamins and minerals
  - Exercise

18

Pain

- Assess pain 0-10 scale, location, and type
- Intervention
  - Mild pain: Acetaminophen or NSAIDs
  - Moderate or episodic: Short-acting opioids
  - Severe or intractable pain: Long-acting opioids
  - Short-acting = 5-15% of long-acting daily dose
    Example: 300 mg MSER, 15 or 45mg MSIR
- Pain reassessment
- Nursing implications
  - Assess meds during admission and discharge
  - Patient Education: side effects, adverse events, difference between long and short acting and



19

Skin Changes

- Pruritus
- Hyperpigmentation
- Photosensitivity
- Nail Changes
- Paronychia
- Hand and Foot Syndrome
- Chemotherapy Rash
- Target Therapy Rash

20

Skin Changes

	Nursing Intervention
Pruritus	
Mild	Steroid cream
Intense and intermittent	Oral anti-pruritic
Intense and constant	Bacterial culture, corticosteroids, and gabapentin
Hyperpigmentation	No treatment
Photosensitivity	Avoid sun and wear sunscreen

Nail Changes

Paronychia

- Prophylaxis: moisturizer creams, avoid wearing tight-fitting shoes, keep nails short, avoid hot baths/dishwashing, take biotin supplement
- Management: topical antibiotics and vinegar soaks daily, silver nitrate applications weekly, oral antibiotics, antifungals, and antivirals

Beau	Hyperpigmentation	Paronychia	Onycholysis	Subungual Hemorrhage
				
Transverse white lines which signals cessation of nail growth	Linear dark bands appearance of nails	Inflammation periungual areas of nails	Nails partially/fully separate from nailbed	Mass of blood in that adhere to underlying surface of nail

Hand and Foot Syndrome

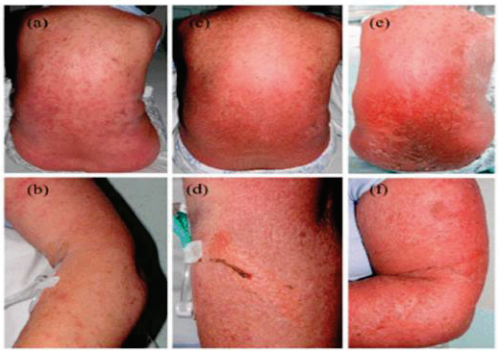
Caused by Chemotherapy

Caused by Targeted Therapy

23

Rashes

Caused by Chemotherapy



Caused by Targeted Therapy

24

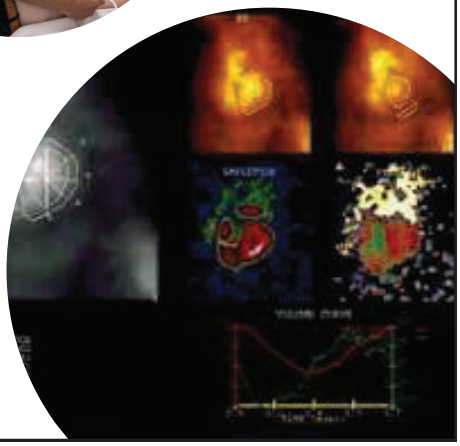
Chemotherapy Toxicities

- Cardiac Toxicity
- Neurotoxicity
- Hemorrhagic Cystitis
- Nephrotoxicity
- Financial Toxicity

25

Cardiac Toxicity

- Symptoms: chest pain, tachycardia, dyspnea, neck vein distension, rales, hypertension, pedal edema
- Protective/Management Measures: limit cumulative doses of chemotherapies, dexrazoxane, calcium channel blockers, baseline and close monitoring of LVEF via MUGA or echo
- Anthracyclines, Cyclophosphamide, 5-fluorouracil, paclitaxel, Arsenic trioxide



26

Neurotoxicity

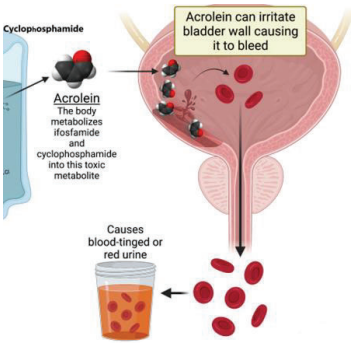
- Symptoms:
  - Cerebellar: unsteady gait, nystagmus, ataxia, dizziness, seizures, hemiparesis, coma
  - Autonomic: ileus, constipation, urinary retention, postural hypotension, impotence
  - Peripheral/Cranial: paresthesia, sensory loss, sensory perception loss, facial palsies, diplopia, foot drop, hoarseness
  - Cognitive: memory loss, attention difficulties, confused thoughts
- Protective/Management Measures: Monitor signs and symptoms, institute safety measures, make physician aware, expect dose reduction, or therapy to be withheld with severe toxicity

Ifosfamide, Vincristine, Cisplatin, Methotrexate, Cytarabine, Pemetrexed, Taxanes, Oxaliplatin, Bortezomib,

27

Hemorrhagic Cystitis

- Symptom: gross hematuria, dysuria, urgency, and suprapubic pain
- Protective/Management Measures: vigorous hydration, frequent emptying of bladder, monitor urine for blood, Mesna, 3-way Foley irrigation
- Ifosfamide and cyclophosphamide



28

Nephrotoxicity

- Signs/Symptom: increased BUN and creatinine, oliguria, azotemia, proteinuria, decreased creatinine clearance, hyperuricemia, hypomagnesemia, hypocalcemia
- Protective/management measures: saline hydration (3L/day), allopurinol (decrease uric acid), amifostine, leucovorin, bicarbonate, avoid aspirin
- Cisplatin and methotrexate

29

Financial Toxicity & Nursing Role

- It is the financial burden faced by patients receiving cancer treatment
- One third of cancer patients experience bankruptcy
- 13% of nonelderly cancer patients spend at least 20% of their income on out-of-pocket expenses
- Fifty percent of Medicare beneficiaries with cancer pay at least 10% of their income towards cancer treatment–related out-of-pocket costs
- Collaborate with Social Services and Financial Counselors
- Don't be afraid to talk about cost and finances

30

Cancer Support Resources

- American Cancer Society
- American Society of Clinical Oncology
- CancerCare
- Centers for Medicaid and Medicare Services
- Chronic Disease Fund
- Center for Cancer Research
- C-Pay Relief.
- ClinicalTrials.Gov
- Leukemia and Lymphoma Society

31

Principles of Surgery

- Surgical oncology- dual specialty
- Cancer staging and local control
- Prior to surgery
  - Goals of surgery (prevention, disease control, symptom palliation)
  - Ability to reconstruct and restore function
  - Patient's physical condition
    - "operable" patient's physiologic condition to undergo surgery
    - "resectable" ability to remove cancer

32

Roles of Surgery

Diagnosis and Staging – histologic examination of tissue

- R0 – negative margins
- R1 distance of < 1mm between tumor cells and resection margins
- R2 Macroscopic residual tumor

Types of Resections

- Local Excision: cancer + small margin of surrounding tissue
- Wide Excision: cancer + adjacent tissue +/- lymph nodes
- En-block resection: cancer + continuous tissues, lymph nodes, and vascular structures

33

Cancer Surgeries

Surgical Term	Description
Biopsy	Fine needle or tissue sample to diagnose cancer, i.e. breast biopsy
Cryosurgery	Liquid nitrogen to freeze cancer, i.e. cervical cancer
Debulking	Remove as much of cancer as possible to decrease tumor burden, i.e. ovarian cancer
Endoscopic Surgery	Technique used to biopsy and/or remove tissue of colon, bladder, or nearby organs without external incision, i.e. transvaginal cholecystectomy
Laparoscopic Surgery	Multiple small incisions to apply camera and other tools to allow tissue removal and manipulation. i.e. laparoscopic hysterectomy
Laser Surgery	Precise beam apply photosensitive agents to tumor bed to cause damage at the cellular level
Mohs Surgery	Removes thin layer of skin, one at the time, until normal cells are revealed, i.e. skin cancer
Palliative Surgery	Relieve pain or pressure caused by tumor, remove GI obstruction, place a port or tube for medication support, to stop bleeding and prevent fractures
Reconstructive Surgery	Reconstruct body parts affected by cancer surgery or treatment, i.e. breast reconstruction
Robotic Surgery	Remote controlled instruments used for fine control and improved optics, i.e. colon resection

34

Tissue Sampling Methods

Tissue Sampling Procedure	Description
Fine needle aspiration	Percutaneous fine needle guided to mass to remove tissue fragments
Core or needle biopsy	Large needle to sample tissue via percutaneous stick
Incisional biopsy	Small incision over mass to remove tissue sample
Excisional biopsy	Removal of entire mass through incision
Sentinel lymph node biopsy	Intradermal injection of dye for lymphatic mapping to identify primary (sentinel) node (s) for histopathic examination for metastatic disease
Endoscopic/laparoscopic biopsy	Direct visualization of mass, adjacent lymph nodes through scopes, cameras for tissue sample and washings for cytology

Assessment

Does the indication for surgery outweighs the risks?

- Risk calculator tool
- Functional assessment (Karnofsky scale)
- Cardiopulmonary clearance and anesthesia preparation
- Patient preoperative assessment and education

History

- Preexisting conditions
- Previous surgery, reaction to anesthesia, and blood products
- Previous chemotherapy and radiation
- Current medications

Physical Examination

- Cardiovascular changes
- Pulmonary function alterations
- Hematologic
- Gastrointestinal
- Renal
- Endocrine

Psychosocial evaluation

- Assess for psychosocial support, stressors, coping mechanisms
- Plan for discharge and recovery
- Caregiver readiness
- Advance directive
- Preoperative instructions
- Enhanced Recovery After Surgery Instructions

Management

Surgery as part of multimodal plan

- Neoadjuvant chemotherapy or radiation to downsize cancer
- Intraoperative chemotherapy
- Intraoperative radiation
- Post operative chemotherapy (adjuvant)
- Postoperative radiation (adjuvant)

Interventional Radiology

- Before surgery - biopsy, tissue sampling, central line placement
- Instead of surgery – minimally invasive procedures, i.e., percutaneous ablation, vascular embolization
- Postoperative and supportive care – drain or stent placement

37

Safety and Management

- **World health Organization** – patient confirmation, consent, site marking, safe environment, and team collaboration
- **Joint Commission National Patient Safety Goals** – ensures patient, team, and equipment preparation, site marking, “universal protocol”, and “time out” safety goals
- **Evaluate and report surgical site infection data** – peri op antibiotics, glucose control, maintenance of normothermia, VTE prophylaxis, early foley catheter removal
- **Post-op recovery**: close monitoring of patient, VTE prophylaxis, early ambulation, pulmonary toilet

38

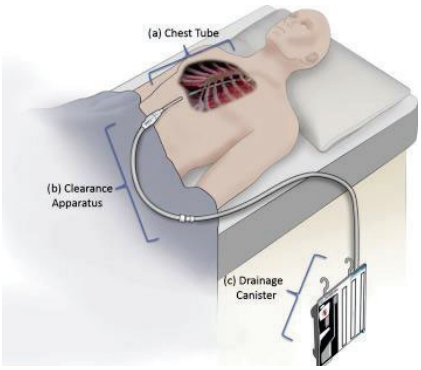
Post-Surgical Nursing Interventions

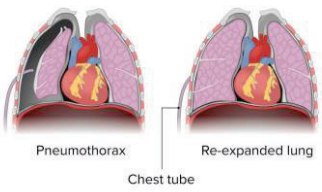
- Care: oxygen, urinary and IV catheters, chest tubes, and sequential compression device (SCD)
- Deep breathing, coughing, and incentive spirometry
- Pain Management
- Monitor for surgical site infection, cardiovascular and pulmonary complications
- Nutrition
- Early Ambulation
- Psychological and emotional support: anxiety and fear

39

Chest Tube

- Wall suction or water seal
- Assess patient: listen to lungs
- Assess skin site: dressing and crepitus
- Assess the drainage: amount, quality, and color (q1hx8 → q2h, document q8)
- Keep below waste level





40

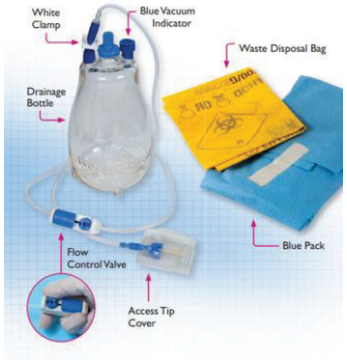
Malignant Pleural Effusion

Excess pleural fluid accumulates as result of:

- Pleural metastasis with obstruction of lymphatic vessels
- Pleural metastasis with increased permeability
- Hilar and mediastinal lymph node involvement with decreased lymphatic drainage

Symptoms: SOB and tachypnea

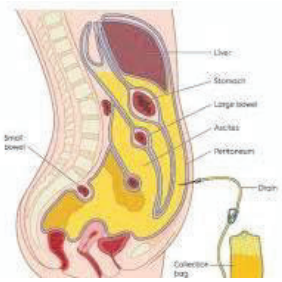
- Dx: thoracentesis

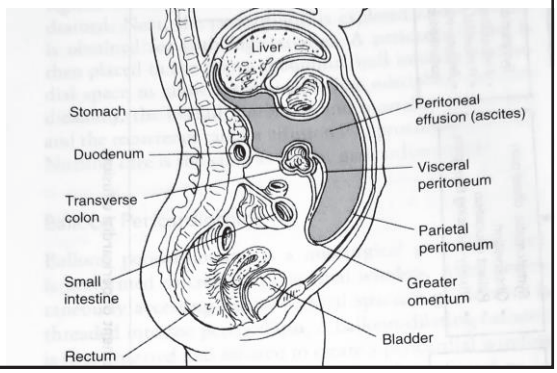


41

Malignant Peritoneal Effusion (Ascites)

- Fluid Removal: Paracentesis and long-term catheter (Tenckhoff and Rocket)
- Albumin replacement
- Diuretics
- Postural hypotension (monitor BP)





42

VTE:PE/DVT

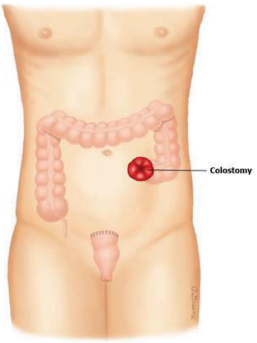
- **Risk Factors**: Cancer and therapies (surgery, hormonal therapy, chemotherapy, targeted therapy) are risk factors for VTE
- **S/S DVT**: swelling, pain, redness/heat
- **S/S PE**: SOB, CP, cough, hemoptysis
- **DX**- D-dimer, US, CTPA
- **Prophylaxis/treatment:**
  - LMWH (Lovenox) /fondaparinux (Arixtra), UFH (heparin)
  - Apibaxan (Eliquis) and Rivaroxaban (Xarelto)
  - SCD
  - Ambulation

43

Care of Patients with Colostomy/Ileostomy

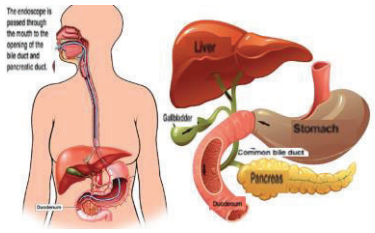
Assessment and Documentation

- Describe stoma color (red and shiny) and peristomal skin
- Stool color, amount, type, and consistency
- Date and time of pouching and appliance used
- Bloody drainage and swollen is expected first two days post-surgery
- **Call HCP if signs of compromised circulation such as light pink or black stoma**

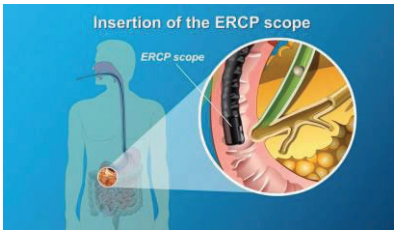


44

Endoscopic Retrograde Cholangiopancreatography (ERCP)



- Sphincterotomy
- Stent placement
- Stone Extraction
- Stricture dilation
- Remove fluid collection
- Biopsy



45

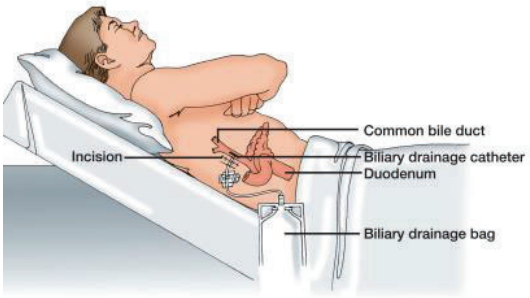
Biliary Tube (t-tube)

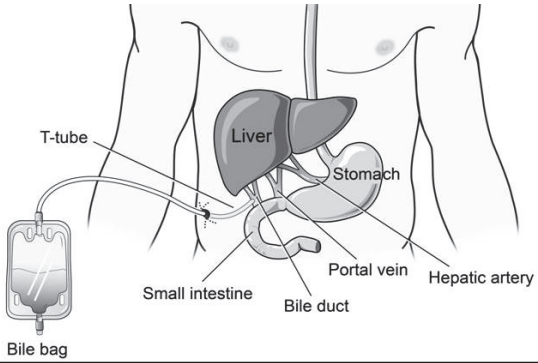
Remove excess bile from liver
- Cholecystectomy, bile duct exploration, treatment of cholelithiasis

T-tube Drain Care
- Semi-Fowler
- Measure output, make sure it's kink free, without blockage

How does it look?
- Yellowish-Green-brown.
- Might be red tinged first 2 days
- <500 ml/day
- Insertion site: change dressing, keep skin clean and dry

Clamp/flush T-tube (need order)



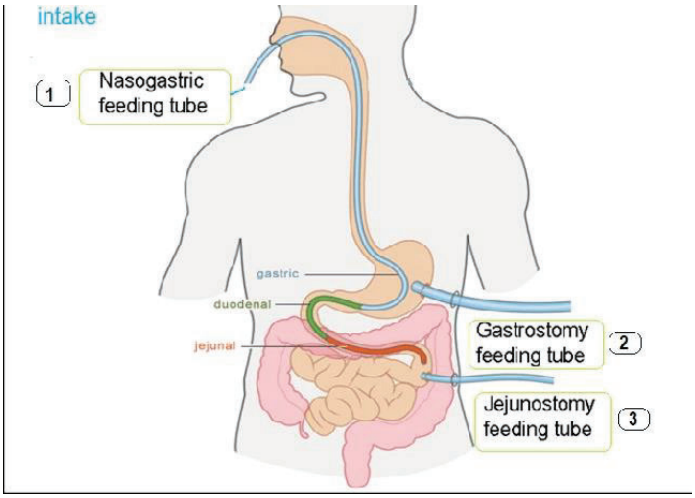


46

NG, PEG, J-Tubes

- Nasogastric tubes
  - Placement
  - Flush before and after medications
  - Check for residual

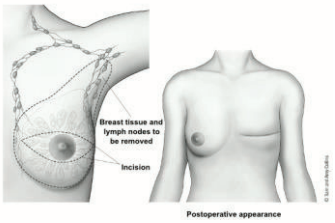
  Document:
  - volume of output and description
  - Skin care and change of securement device
- PEG and J tubes
  - Document measurement
  - Flush the line for patency
  - Change dressing/ clean the skin as needed



47

Care of Patients with Mastectomy

- Assess dressing status
- Assess drains, empty, and describe drainage
- Pain management
- Lymphadenopathy education
- Limb alert
- Psychological support

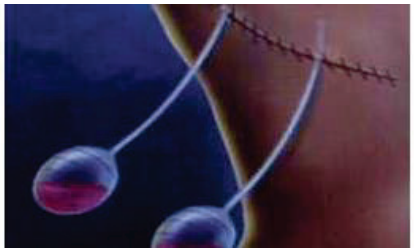


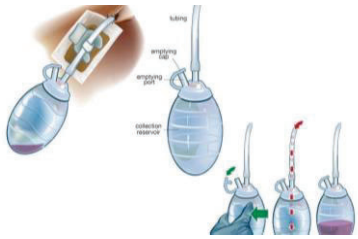
Modified radical mastectomy

48

JP drain

- Drains fluid near surgical wound
- It uses compressible bulb to create low negative pressure
- Milk the line if ordered
- Sanguineous → Serosanguineous → Serous
- Removal when < 25ml/24 hours or accidental removal

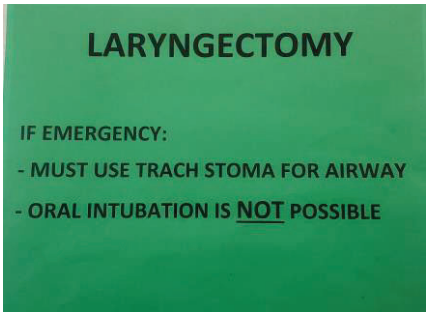


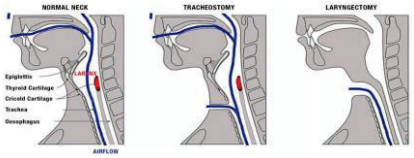


49

Head and Neck Cancer

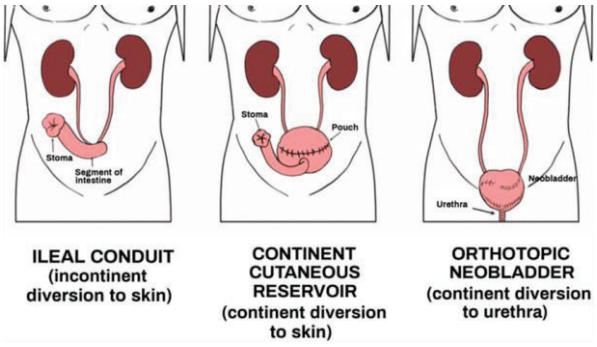
- Provide means of communication
- Alert nursing staff and sign call bell
- Sign tracheostomy/laryngectomy
- Keep obturator, inner cannula, bag valve mask near patient
- Accessible suction kits





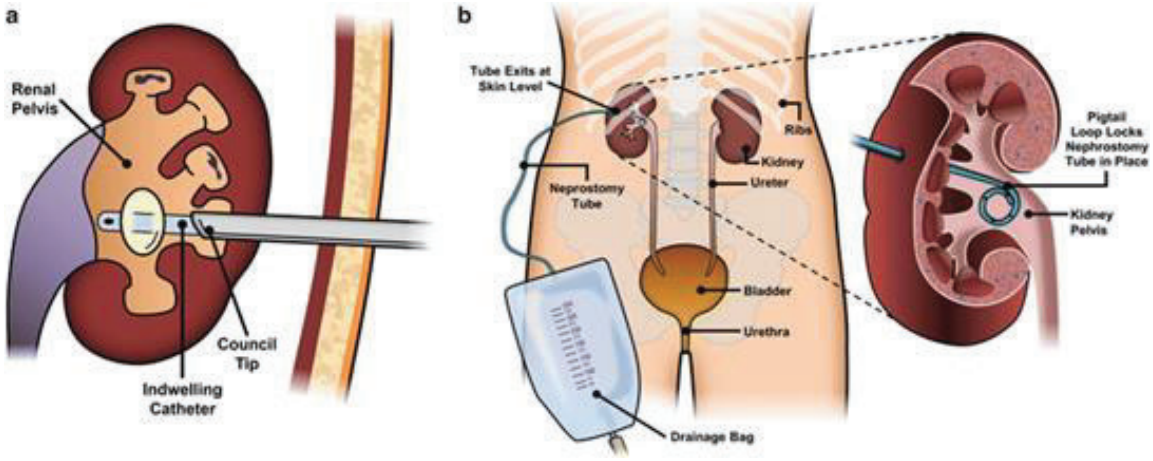
50

Bladder Surgery and Ileal Conduit



51

Nephrostomy Tubes



52

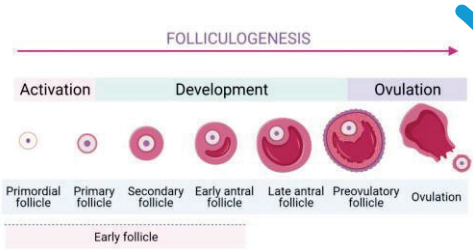
Impact of Cancer Treatment on Fertility

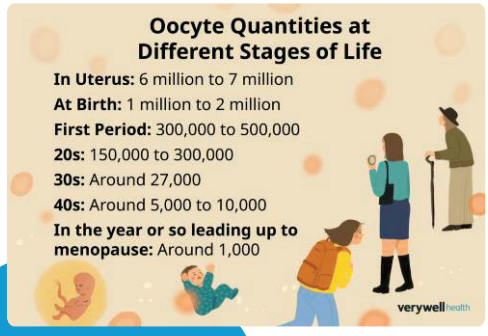
- **Chemotherapy**
  - Germ cells (oocytes and sperm)
  - Can lead to DNA mutations
  - Cause oxidative damage on somatic and germ cells
- **Radiation**
  - Abdominal, pelvic, and cranial can induce sterility
    - Damage to uterine musculature and vasculature
    - Absence of endometrial thickening
    - Significant oocyte depletion
  - Testicular
    - Azoospermia
      - Dose> 2.5Gy in adult, >6 Gy in boys
  - Total Body Irradiation
- **Surgery**
  - Hysterectomy, salpingoophorectomy, and orchiectomy

Impact of treatment depends on:

- Patients **AGE**
- Type of chemotherapy
- Dose and type of radiation

53





Woman's ability to conceive

- Age is related to oocyte number and quality
  - Follicles: oocyte +surrounding cells – decrease steadily in late 30's
  - Prepubertal patients are susceptible
  - Older woman have less oocyte thus more affected by depletion
- Poor oocyte quality:
  - Reduced fertilization
  - Poor or no embryo development
  - Reduced implantation
  - Low chance of live birth

54

Fertility Preservation

Why is time of the essence?

For females, the fertility preservation process involves harvesting eggs and **requires 2 to 4 weeks**, *if all goes well*

- *the Reproductive Endocrinologists will do their best to see the female ONCOLOGY patient within 24 to 48 hours*

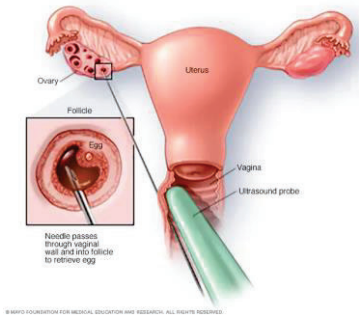
For males

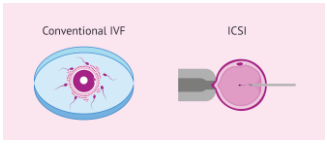
- *Patients are referred to the **Triangle Urology**.*
- *They will set up a video visit, order labs and sperm cryopreservation*
- *Patients will schedule sperm collection @ **Center for reproductive Medicine***

55

Fertility Preservation (patients with ovaries)

- Oocyte cryopreservation
  - Requires ovarian stimulation, 9-14+ days of ovarian stimulation
  - Monitor ovarian response with blood tests and transvaginal ultrasound q 1-3 days
  - Oocyte retrieval is done under conscious sedation
  - Mature oocyte is cryopreserved and stored
- Embryo cryopreservation
  - Same as cryopreservation
  - Add mature oocyte with millions of sperm in a petri dish or,
  - Inject a sperm into an oocyte
- Ovarian tissue cryopreservation
  - Prepubertal age





56

Fertility Preservation (patients with testes)

- Sperm banking via masturbation (post-puberty)
- Gonadal shielding during radiation
- Testicular tissue cryopreservation (pre-puberty) – experimental

57

Summary

- Symptom Management
- Chemotherapy toxicities
- Surgery as part of treatment modalities for patient with cancer
- Nursing interventions for surgery
- Care of lines, tubes, and drains
- Fertility Preservation

58

ONCOLOGY NURSES
THE HANDS AND HEARTS OF HOPE

Thank you!

Questions?

Marcia Almiron Wolbert, MSN, RN, OCN
marcia.almironwolbert@ahn.org
(412) 883-1608

59

References

Brown, C. G. (2015). *A Guide to Oncology Symptom Management.* Pittsburgh: Oncology Nursing Society.

Eggert, J. (2017). *Cancer Basics.* Pittsburgh: Oncology Nursing Society.

Gupta K, Walton, R., Kataria, S.P. (2021). Chemotherapy-Induced Nausea and Vomiting: Pathogenesis, Recommendations, and New Trends. *Cancer Treat Res Commun*. doi:10.1016/j.ctarc.2020.100278

Lippincott Procedures. (2022). Lippincott Solutions: https://procedures.lww.com/lnp/browse.do?disciplineId=12269#/all

Lippincott Advisor. (2022). Lippincott Solutions: https://advisor.lww.com/lna/home.do

McQuestion, M., Drapek, L. C., Witt, M.E. (2021). Manual for Radiation Oncology Nursing. Oncology Nursing Society.

60

Knowledge Check

During the morning assessment, the nurse noted that her patient who received chemotherapy 10 days ago VS: T 101.5 F, P 120, BP 80/48, RR 26, SpO2 92% on 2L oxygen. Lab studies reveal: Hemoglobin 6.8, Platelets 40, ANC 0.5. The nurse recognizes the patient is:

a. Pancytopenic
b. Anemic
c. Thrombocytopenic
d. Neutropenic

Knowledge Check

Select all that applies. The Nurse anticipates the physician will place orders for:

a. Blood cultures
b. C-Xray
c. Fluids
d. Antibiotics
e. Blood transfusion
f. Platelet transfusion

Case Study

Nurse Jackie is assessing her patient, who is complaining of nausea. She says, "I see you received Zofran and Compazine in the past six hours, and you still vomited after eating only a couple of bites of food. I see you take OxyContin and oxycodone for pain."

As Jackie assesses her patient, she finds that the patient's abdomen is distended and there are no bowel sounds.

Nurse Jackie then asks, "Is your abdomen more distended than usual? When was your last bowel movement? Are you passing gas?"

What is the concerned?

Knowledge Check

True or False

1. Ondansetron is given to prevent acute nausea and vomiting as it is a 5HT3 receptor antagonist. (True or False)
2. Emend is given to prevent delayed nausea and vomiting as it is an NK1 receptor antagonist. (True or False)
3. Antiemetics of different classes are given to work synergically to treat breakthrough nausea and vomiting. (True or False)

Knowledge Check

Nurse Jackie recognizes that patients receiving chemotherapy are susceptible to develop organ toxicities. What organ toxicity is seen in patients that develop weight gain, hypertension, chest pain and shortness of breath?

A. Nephrotoxicity
B. Neurotoxicity
C. Cardiotoxicity
D. Hemorrhagic Cystitis

Allegheny Health Network

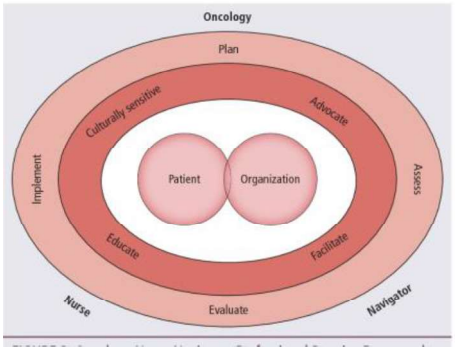
Role of Nurse Navigation in Oncology Patient Care

AHN Oncology Navigation

1

Key Roles of the Oncology Nurse Navigator

- Care Coordination
- Patient Education
- Identifying and Eliminating Barriers to Care
- Emotional Support and Guidance



Allegheny Health Network

2

Care Coordination

- Establishing touchpoints
- Touchpoints will vary based on disease site
- Common touchpoints include:
  - Meeting patient at time of biopsy/diagnosis
  - First surgical appointment
  - Pre-operatively
  - Post-operative appointment
  - First medical oncology appointment
  - First radiation oncology appointment
  - First treatment (adjuvant or neoadjuvant)
  - Post hospital discharge
  - Change in treatment modalities
  - Transition to survivorship or hospice

Allegheny Health Network

3

Care Coordination- Touchpoints

- Example of touchpoints for a Breast Nurse Navigator:
  - Meets patient at time of biopsy to introduce self.
  - Calls patient with biopsy results and sets up surgical appointment.
  - Meets patient in-person at surgical appointment.
  - Calls patient pre-operatively to answer any last-minute questions.
  - Meets patient at post-op surgical appointment and sets up medical/radiation oncology appointments if needed.
  - Meets with patient during first treatment.
  - Once patient is started on treatment, navigator will touch base with patient on an as-needed basis.
  - Transition to survivorship.

Allegheny Health Network

4

Care Coordination- Touchpoints

- Examples of touchpoints for a Neuro-Oncology Navigator:
  - Meets with patient post-op during hospital admission to introduce self and provide contact information.
  - Calls patient after discharge to assess immediate needs and coordinate appointments with medical and radiation oncology.
  - Meets with patient during post-op appointment in neurosurgery.
  - Meets with patient during first medical and radiation oncology appointment.
  - Meets with patient during first treatment.
  - Change in treatment modality or progression of disease.
  - Transition to hospice or palliative care.

Allegheny Health Network

5

Care Coordination Tools

- EPIC in-basket pools for appointment requests
- Searching for, creating, and customizing schedules in EPIC
- EPIC patient lists
- Medical records requests
- AHN Cancer Institute HOPE line for new patient appointments
- Updated contact lists for all Cancer Institute sites
- Tumor Boards
- Ambulatory Referrals
  - AHN Healthcare @ Home
  - Genetics
  - ECCM
  - Oncology Rehab

Allegheny Health Network

6

Identifying and Eliminating Barriers to Care

- Common barriers to care include:
  - Lack of transportation
  - No/Inadequate Insurance
  - High co-pays
  - Difficulty paying bills or covering cost of living
  - Need for in-home assistance or DME
  - Low health literacy
  - Nutritional deficits
- Utilize EPIC Navigation template to document barriers assessment and resolution.
- If barriers to care are identified while documenting in the EPIC build, BPAs will automatically be sent to social work, financial counseling, and/or dieticians.

Allegheny Health Network

Identifying and Eliminating Barriers to Care

- Optimal to meet with patient during first visit- usually after appointment with provider has concluded.
- Use EPIC navigation flowsheet as a framework for talking to patients about barriers, however, integrate questions into normal conversation to make the patient feel more comfortable, rather than making them feel you are trying to complete a checklist.
- Bringing in other navigation team members, if available, to address barriers (financial, nutrition).
- Patients may feel overwhelmed after meeting with the physician(s) and learning about their diagnosis. A follow up call within a few days is appropriate to complete the barriers assessment, if unable to do so at appointment.

Allegheny Health Network

Identifying and Eliminating Barriers to Care

- Internal Resources:
  - Social work
  - Financial counselors
  - Dieticians
  - Healthcare @ Home
  - Palliative Care
  - Pain Management
- External Resources:
  - ECCM
  - PALS
  - Cancer Bridges
  - Area Agency on Aging
  - American Cancer Society

Allegheny Health Network

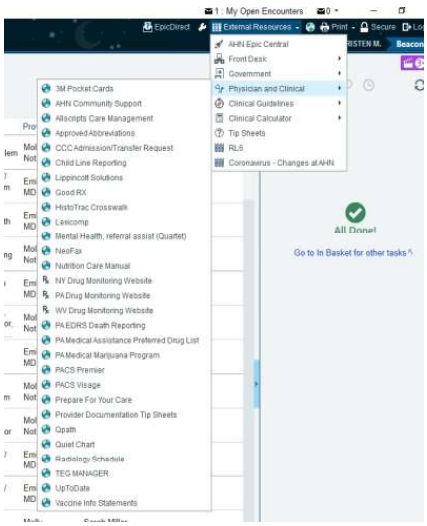
Patient Education

- Educate patient on navigation services that are available to them.
  - Explain services we offer and touchpoints when we will be contacting them.
  - We serve as their main point of contact.
  - Provide written material on navigation services for patient to review (notebook, letter, etc.).
  - Provide business card/contact information.
  - Explain that navigation is non-clinical- all medication requests and medical needs should be addressed by clinical team.
- Reinforce education of their disease and treatment.
  - Provide patient with disease-site notebook and encourage patient to bring it to their visits.
  - Discuss next steps and what to expect.
  - Can add patient education to their AVS/MyChart message

Allegheny Health Network

Patient Education Resources

- Disease-site notebooks
- ACT Pre-Teach
- ClinicalTrials.gov
- Up-to-Date
- Lippincott Solutions



Allegheny Health Network

11

Emotional Support and Guidance

- Common emotions patients experience throughout the care cancer continuum:
  - Fear
  - Anxiety
  - Frustration
  - Helplessness
  - Depression
- Also provide active listening and emotional support to the family/caregivers, who are often also in need of support.
- It is important to assure the patient and family that they are not alone during this journey, and that we will be there for them every step of the way.
  - Educate patient on best methods for communicating with you (phone, email, text, MyChart).

Allegheny Health Network

12

Emotional Support and Guidance

- Encourage patients to communicate about their concerns, including side-effects.
- Explore patient's support system/family structure.
- Encourage involvement with support groups.
- Assess spirituality/faith.
- Involve social work.

Allegheny Health Network

Allegheny Health Network

Oncology Rehabilitation

Nicole Reilley Dosey, MPT, DPT, CLT
Nicole.Reilley-Dosey@AHN.org
Network Manager AHN Oncology Rehab, Lymphedema & Pelvic Health, and Osteoporosis Therapy Services
Date: Spring 2026

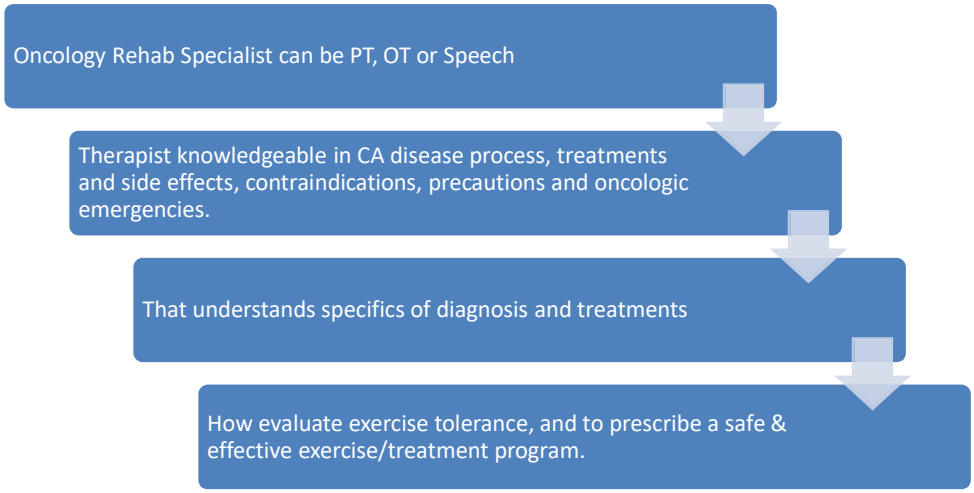
Oncology Rehabilitation

Objectives

1. What is Oncology Rehab?
2. When Should Cancer Patients be seen by Oncology Rehab?
3. What Onc Rehab Services do we offer at AHN?
4. How to refer a patient?

Allegheny Health Network

What is an Oncology Rehab specialist?



Allegheny Health Network

3

Survivorship

Recent research has shown:

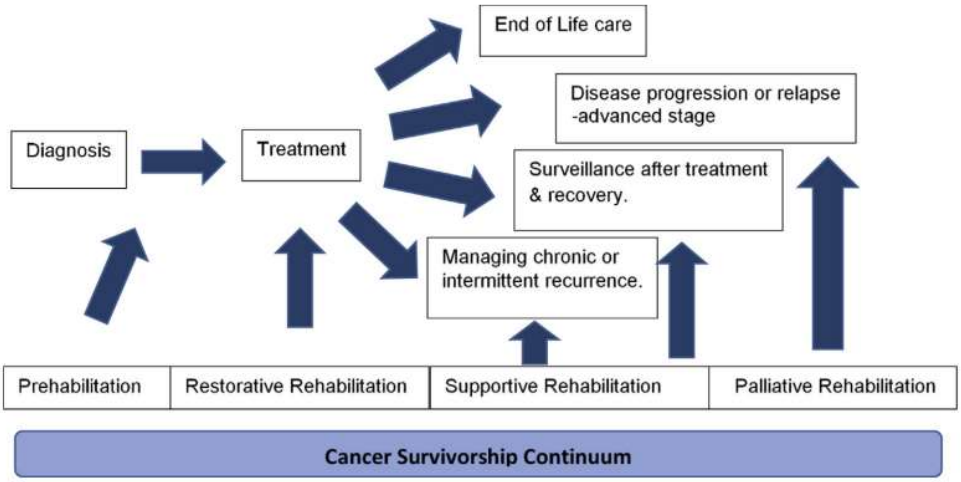
- The majority **(60-90%)** of cancer survivors have at least one functional impairment resulting from the disease and/or treatment effects

- Unfortunately, reports of rehabilitation referral rates as low as 5-8%. (AHN: 14%)
- Even w/ a referral – some research indicates only 30% of cancer patients seek therapy services

Allegheny Health Network

4

Where Oncology Rehab Fits Into the Picture



Allegheny Health Network

Chowdhury RA, Brennan FP, Gardiner MD. Cancer Rehabilitation and Palliative Care-Exploring the Synergies. *J Pain Symptom Manage*. 2020;60(6):1239-1252. doi:10.1016/j.jpainsymman.2020.07.030

5

AHN Oncology Rehab Services

6

AHN Oncology Rehabilitation

Evidence-based Oncology Rehab Services	Functional outcomes	Convenient locations
Improve Quality of Life before/during/after treatment	Am College of Surgeons CoC, NAPBC, and recommendations of ACS, ACSM.	Not overburden the patient financially or interfere with other treatments/appts

Allegheny Health Network

7

Physical and Functional Impairments

Cancer-related Fatigue: up to 96% during treatment & 82% after treatment

Muscle Weakness

Soft tissue/scar restrictions: result in pain & reduced motion/mobility

Decreased cardiac and pulmonary function

Chemo-induced neuropathy: Fine motor issues, poor balance & risk for falls.

- CIPN affects up to 68% of patients

Allegheny Health Network

8

Physical and Functional Impairments

Chemo-induced cognitive impairments (CICI)

Swallowing, eating, speech difficulties

Pelvic health issues: urinary or bowel incontinence, constipation, LB/hip/pelvic pain, sexual dysfunction & pain

Lymphedema: extremities, trunk, genital region, head & neck

Bone health concerns: at risk for bone loss or fracture(s)

Allegheny Health Network

9

Prehabilitation

10

Prehabilitation

Prehab is an emerging method of delivering a multidisciplinary approach to improving function and QoL prior to surgical intervention

Moore J, Merchant Z, Rowlinson K, et al. Implementing a system-wide cancer prehabilitation programme: The journey of Greater Manchester's 'Prehab4cancer'. *Eur J Surg Oncol*. 2021;47(3 Pt A):524-532. doi:10.1016/j.ejso.2020.04.042

Allegheny Health Network

11

What is Prehab?

Article by Silver and Baima (2013) published in *the American Journal of Physical Medicine and Rehab*: Cancer Prehabilitation: An Opportunity to Decrease Treatment-Related Morbidity, Increase Cancer Treatment Options, and Improve Physical and Psychological Health Outcomes.

"Cancer prehabilitation, a process on the continuum of care that occurs between the time of cancer diagnosis and the beginning of acute treatment, includes physical and psychological assessments that establish a baseline functional level, identifies impairments, and provides targeted interventions that improve a patient's health to reduce the incidence and the severity of current and future impairments."

Allegheny Health Network

12

Prehabilitation – Onc Rehab.

Prehab: including aerobic and strengthening exercises:

Between diagnosis and surgery offers an adequate time to improve/maintain physical fitness

Aim is to optimize physical function:

-prior to surgical intervention

-during Neoadjuvant treatment (chemotherapy, radiation therapy)

-improves tolerance to neo- and adjuvant treatments

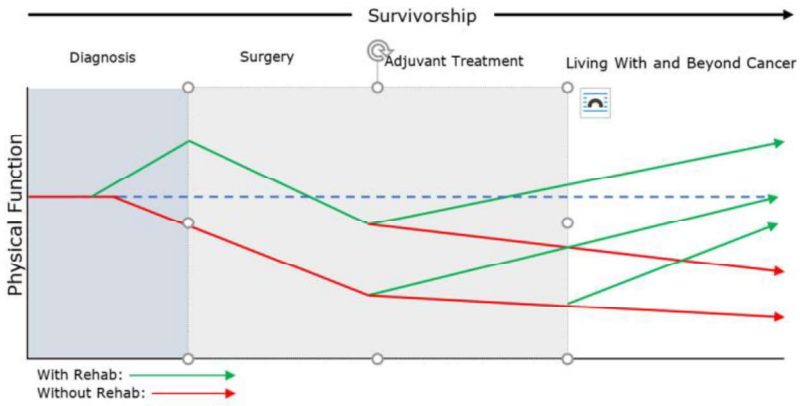
Improves post surgical outcomes:

-Reduced LOS, complications, and debility

Allegheny Health Network

13

Exercise Time-points Across the Survivorship Spectrum



Allegheny Health Network

Adapted from Silver et al. 2015

14

Exercise can…

- **Help in the Prevention of 7 cancers by 10-20%**
  - Colon
  - Bladder
  - Breast
  - Endometrial
  - Kidney
  - Esophageal
  - Stomach
- **Post-diagnosis: 31-50% reduced risk of cancer mortality:**
  - Breast
  - Colon
  - Prostate

Allegheny Health Network

15

Exercise over the Spectrum

➢ Prehab:

- Maintain and increase current abilities
- address existing impairments before treatment begins

- Decrease pain
- Reduce time in hospital
- Improve outcomes & ability to withstand treatment
- Decrease debility
- Help with depression & anxiety
- Increase strength and muscle mass

Allegheny Health Network

16

Exercise over the Spectrum

During Treatment: improve QOL

- Treating anxiety & depression
- Improve Physical function & ADLs
- Increase appetite
- Increase ability to withstand treatment
- Decrease pain
- Reduce Fatigue- 90% report cancer fatigue
- Improve Quality of life
- Improve ability to Sleep
- Bone health
- Increase immune system
- Help with CIPN – neuropathy
- Falls
- Decrease effects of chemo
- Sexual function
- Treatment tolerance
- Lymphedema

Allegheny Health Network

17

Exercise into Survivorship

Secondary prevention

31-50% reduced risk of cancer mortality in breast, colon and prostate cancers

- Increase cardiac function
- Decrease weight
- Increase Strength
- Reduce fatigue
- Treating anxiety & depression
- Improve quality of life
- Improve immunity
- Improve Sleep

Allegheny Health Network

18

Oncology Rehab in Palliative Patient Care

- Advanced cancer as a chronic disease process
- Disease control rather than curative model
- CMS allows Skilled Rehab care to
  - "improve current condition,
  - to maintain current condition, or
  - to prevent or slow further deterioration of patient's condition"
- Allow participation in daily activities and life roles. Retain health and safety. Reduce risks for falls and injuries.

Allegheny Health Network

19

Cancer Exercise Options

New Initiative

20

Oncology Rehab, Sports Performance and Oncology Exercise

- Piolet: **Chair exercise** program SVH Cancer Center in Infusion
- **Oncolgy Rehab** for exercise/strengthening, balance, conditioning, neuropathy
- **Sports Performance – Strength Package** for Supervised exercise & strengthening w/ patients
  - hand off from Onc rehab
- **Oncology Exercise** working on increasing strength and muscle mass – Dr Champ at Suburban

21

Cancer Related Fatigue - 96% during and 82% after treatment Fatigue

National Comprehensive Cancer Network:

"Fatigue in cancer patients has been under-reported, under-diagnosed and under-treated"

- "Cancer survivors reports that fatigue is disruptive for months or even years after treatment"
- "Pts become too tired to fully participate in roles and activities that make life meaningful. And it may influence time to return to work"

Allegheny Health Network

22

Fatigue Impairments?

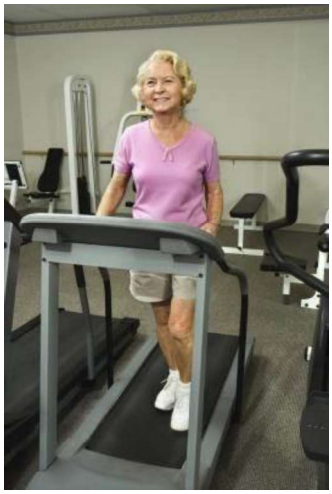
National Comprehensive Cancer Network:

- Exercise is a Key treatment for cancer-related fatigue. Exercise results in positive effects on body and mind during and after Cancer treatment.
- Educate Pts: Energy conservation
- Exercise testing and individualized prescription to guide increasing physical activity

Allegheny Health Network

23

Exercise Prescription- Aerobic



Options for testing:

- Walk on level- 2 or 6 Min
- Walk on land or treadmill
- Monitoring vital signs and RPE
- Providing a "prescription" for amount and type of exercise to do at home or in clinic.

Allegheny Health Network

24

Recommendations for Exercise

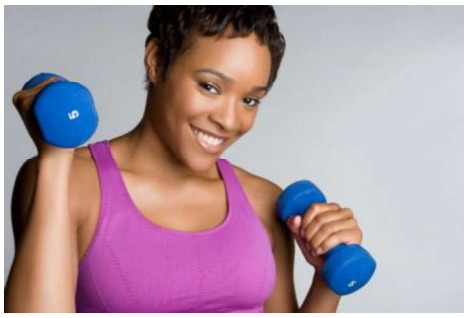
- **ACSM (American College of Sports Medicine) and ACS (American Cancer Society)**
  - 150 mins to 300 mins- 3x-5x/week for 30 mins for aerobic exercise
  - 2x/week strength/resistance training
  - Moderate Intensity – hard enough to make you sweat but can still talk

Recommendations for Exercise

Moderate Intensity:

- Brisk walking (3-4mph)
- Bike (8-10mph)
- Swim
- Tennis
- Baseball, volleyball
- Kayaking and canoeing

Exercise Prescription: ROM & Strength



- Exercise may include:
  - Active exercise against gravity
  - Isometric exercises
  - Breathing exercises
  - Stretchy band resistance
  - Weight resistance: dumbells, machine, or body weight

Allegheny Health Network

27

Resistance and Strength Training

- Goal is 8-10 exercises, 2-3x/week for 8-12 reps
  - Newer research – exercise with higher weights to load the bone and increase body muscle mass
- Start with maybe 4 exercises per week
  - Upper body
  - Lower body
  - Core
  - 1-2x 8 reps- 2 times a week

Allegheny Health Network

28

Effects of Exercise on Health-Related Outcomes in Those with Cancer

What can exercise do?

- **Prevention of 7 common cancers***
  Dose: 2018 Physical Activity Guidelines for Americans: 150-300 min/week moderate or 75-150 min/week vigorous aerobic exercise
- **Survival of 3 common cancers****
  Dose: Exact dose of physical activity needed to reduce cancer-specific or all-cause mortality is not yet known; Overall more activity appears to lead to better risk reduction

*bladder, breast, colon, endometrial, esophageal, kidney and stomach cancers
**breast, colon and prostate cancers

Overall, avoid inactivity, and to improve general health, aim to achieve the current physical activity guidelines for health (150 min/week aerobic exercise and 2x/week strength training).

Outcome	Aerobic Only	Resistance Only	Combination (Aerobic + Resistance)
Strong Evidence	Dose	Dose	Dose
Cancer-related fatigue	**3x**/week for **30** min per session of moderate intensity	**2x**/week of **2** sets of **12-15** reps for major muscle groups at moderate intensity	**3x**/week for **30** min per session of moderate aerobic exercise, plus **2x**/week of resistance training **2** sets of **12-15** reps for major muscle groups at moderate intensity
Health-related quality of life	**2-3x**/week for **30-60** min per session of moderate to vigorous	**2x**/week of **2** sets of **8-15** reps for major muscle groups at a moderate to vigorous intensity	**2-3x**/week for **20-30** min per session of moderate aerobic exercise plus **2x**/week of resistance training **2** sets of **8-15** reps for major muscle groups at moderate to vigorous intensity
Physical Function	**3x**/week for **30-60** min per session of moderate to vigorous	**2-3x**/week of **2** sets of **8-12** reps for major muscle groups at moderate to vigorous intensity	**3x**/week for **20-40** min per session of moderate to vigorous aerobic exercise, plus **2-3x**/week of resistance training **2** sets of **8-12** reps for major muscle group at moderate to vigorous intensity
Anxiety	**3x**/week for **30-60** min per session of moderate to vigorous	Insufficient evidence	**2-3x**/week for **20-40** min of moderate to vigorous aerobic exercise plus **2x**/week of resistance training of **2** sets, **8-12** reps for major muscle groups at moderate to vigorous intensity
Depression	**3x**/week for **30-60** min per session of moderate to vigorous	Insufficient evidence	**2-3x**/week for **20-40** min of moderate to vigorous aerobic exercise plus **2x**/week of resistance training of **2** sets, **8-12** reps for major muscle groups at moderate to vigorous intensity
Lymphedema	Insufficient evidence	**2-3x**/week of progressive, supervised, program for major muscle groups does not exacerbate lymphedema	Insufficient evidence
Moderate Evidence			
Bone health	Insufficient evidence	**2-3x**/week of moderate to vigorous resistance training plus high impact training (sufficient to generate ground reaction force of **3-4** time body weight) for at least **12** months	Insufficient evidence
Sleep	**3-4x**/week for **30-40** min per session of moderate intensity	Insufficient evidence	Insufficient evidence

Citation: bit.ly/cancer_exercise_guidelines

Moderate intensity (40%-59% heart rate reserve or VO_2R) to vigorous intensity (60%-89% heart rate reserve or VO_2R) is recommended.

Exercise is Medicine® | AMERICAN COLLEGE of SPORTS MEDICINE

29

Breast Oncology Rehab Services

30

New Standard of Care: Prevention

Paradigm shift…

1. Early Detection and Prevention of Clinical Lymphedema

UE complications

2. To improve function and to mitigate declines through breast cancer treatment and into survivorship

3. To regain prior functional levels and participation in quality of life after treatment

Allegheny Health Network

Prophylactic Use of Compression Sleeves Reduces the Incidence of Arm Swelling in Women at High Risk of Breast Cancer–Related Lymphedema: A Randomized Controlled Trial

- 307 Women, 155 in compression group and 154 as control group
- Instructed to wear sleeve: postop day 1 until 3 months after completion treatment, 8hrs/day during daytime hours

- The estimated cumulative incidence of arm swelling at 1 year was lower in the compression group vs control group on the basis of using bioimpedance (42% *v* 52%) and Relative volume increase (14% *v* 25%).

- Prophylactic use of compression sleeves compared with the control group reduced and delayed the occurrence of arm swelling in women at high risk for lymphedema in the first year after surgery for breast cancer.

VS Paramanandam, et al, Prophylactic Use of Compression Sleeves Reduces the Incidence of Arm Swelling in Women at High Risk of Breast Cancer–Related Lymphedema: A Randomized Controlled Trial. *Journal of Clinical Oncology 2022.*

Allegheny Health Network

AHN Breast Oncology Rehab Protocol

Prehab- Prospective Surveillance Model:

Baseline Evaluation:

Bilateral UE limb measurements/ volumes	**Shoulder ROM**	**UE strength**	**Function, Posture**	**Self-reported Functional Outcome Tool– QUICK DASH**

Allegheny Health Network

33

AHN Breast Oncology Rehab Protocol

Pt education

- Risk Reduction
- Importance of the Surveillance protocol
- Post-op exercise program

Schedule initial post-op visit 4-6 wks after surgery

Allegheny Health Network

34

AHN Prospective Surveillance Model

Re-measure BUE volumes and compare to the pre-op at: 3, 6, 9, 12, 18, 24, 30 and 36 months post surgery

If there is an increase in relative UE limb volumes of >/= 3%, fit with 20-30 compression sleeve and/or gauntlet for 4 weeks in the daytime

Re-measure BUE's 4 weeks later, if limb difference reduced to <3%, Pt can reduce wear time to strenuous activity only- ongoing.

At PSM visits, also, re-check: tissue restrictions or fibrosis, mobility, pain, strength, function, posture, self-reported function.

Allegheny Health Network

35

Oncology Rehab Services for Head and Neck Cancer

36

Lymphedema

- According to the American Head and Neck Society - Lymphedema is very common among patients who have undergone head and neck surgery or radiation therapy. Up to **75% of patients** will manifest some signs and symptoms of lymphedema after treatment for head and neck cancers.
- Over **90%** of head and neck cancer survivors develop lymphedema (Ridner, et al., 2016)

AHN

37

Head and Neck Cancer treatment

Prehabilitation

Skilled Speech and Language Pathologist.

- Speech and Swallow evaluation
- Swallow exercises/strategies, Neck and Jaw Stretches

PT/OT:

- Educate on UE and cervical ROM
- Educate on lymphedema and self MLD

38

Head and Neck Cancer Program

- Address issues with speech, swallowing/chewing, & decreased saliva
- Assess and manage scar adhesion, posture, & pain,
- Prevent and manage lymphedema
- Functional pain-free motion of jaw (trismus), c-spine, UE including shoulder complex (2ndary to involvement of the spinal accessory nerve)
- Manage fatigue, promote exercise, and healthy lifestyle

Allegheny Health Network

39

Oncology Rehab Services for Colorectal Cancer

40

ERAS (Enhanced Recovery after Surgery) Protocol

- ERAS – patient centered, evidence-based, multi-disciplinary approach for surgical patients: to decrease stress, increase function, and facilitate recovery from pre surgery through all aspects of post-op care.
- Studies have shown a pre-surgery exercise program can improve a patient's tolerance for surgery, recovery of function after surgery and less likely to need intensive care management

Allegheny Health Network

41

Prehab Program for AHN Colorectal Surgery

- Baseline CV assessment of functional capacity using treadmill or 6 minute walk test, and tests for Strength, Balance & other baseline impairments.
- A home exercise program includes: aerobic and strengthening exercise.
- Pt encouraged to follow the home program until surgery.
- Pt also encouraged to schedule f/U with PT ~ 3 weeks post-op to modify program.

Allegheny Health Network

42

Oncology Rehab Services for Gynecological & Urological Cancer

43

Pelvic Health Issues:

- Urinary: Incontinence, Frequency, Urgency, Leaking
- Digestive issues: Constipation, Incontinence
- Sexual Health concerns
- Pelvic, abdominal, back and hip pain
- Vaginal Stenosis, Pelvic Pain and Pelvic Floor Dysfunction
- Fibrotic tissue- Pelvic, LE and genital Lymphedema

Allegheny Health Network

44

Prostatectomy – New Initiative

- Prehab program: Assess baseline status w/ Pelvic floor and continence
- HEP: Pelvic Floor Strengthening
- Seen Post op once cath removed 1-3 weeks to continue to re-assess needs for PFPT

Allegheny Health Network

45

Pelvic Floor Dysfunction?

Specially trained Pelvic Floor Therapists can address these issues by using:

- Exercises for core and pelvic floor
- Manual Lymph drainage
- Dilators
- Manual therapy
- Biofeedback
- Patient Education

Allegheny Health Network

46

Oncology Rehab Treatment for Chemotoxicity

47

Chemotoxicity

- Balance
- Dizziness
- Fine motor skills
- Vestibular
- Proprioception
- Automatic Function
- Neuropathy
- Weakness
- Decreased CV function

Severe CIPN is associated with **41% increased risk** of falls

Allegheny Health Network

48

Chemo-induced Peripheral Neuropathy

- Sensory Nerves:
  - Starts toes/feet and fingers/hands
  - Pain, Burning, Tingling or Numbness or Increased sensitivity
  - Trouble w/ fine motor activities, Risk of Injury
  - Reduced Proprioception
- Motor Nerves
  - Weakness, muscle cramps
  - Tripping and stumbling while walking, vestibular imbalance
- Autonomic nerves:
  - Constipation, diarrhea
  - Urinary retention, incontinence
  - Blood pressure alterations (high or low BP)

Allegheny Health Network

49

Neuropathy

- Kinesiotape for painful foot neuropathy
- Ultrasound (pulsed) promote healing, cell membrane activity, vasc wall permeability. And TENS
- Manual Therapy: Soft tissue, joint mobilizations, stretching
- Desensitization: progressive textured materials
- Hand therapy: fine motor activities, splinting, putty exercises
- Active foot ex: trace alphabet on towel, towel scrunching, toe yoga
- Weight bearing (closed chain) LE exercises

Evidence-Based: Meta-analysis and Systematic Review

Results: Lower limb closed Kinetic chain exercises showed a decrease in tingling sensation, decrease in pain, and improved balance.

Brayall P et al. Physical therapy –Based Interventions Improve Balance, Function, Symptoms and Quality of Life in Patients with Chemotherapy Induced Peripheral Neuropathy. Rehabilitation Oncology 2018.

Allegheny Health Network

50

Rehab Interventions for CIPN

Systematic review published in 2018 by Brayall et al:

Showed that lower limb closed kinetic chain exercises resulted in a decrease in tingling, decrease in pain, and improved balance

Allegheny Health Network

51

Rehab Interventions for CIPN

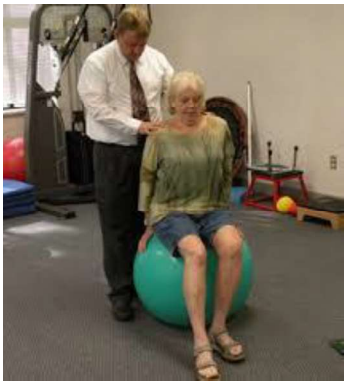
Manual therapy for the foot

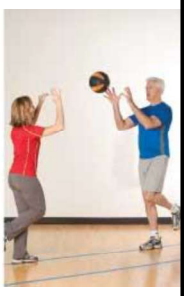
Active exercises for the foot

Allegheny Health Network

52

Balance Exercises





Allegheny Health Network

53

Kinesiotape for CIPN Symptoms

Allegheny Health Network

54

Lymphedema

55

Lymphedema

Subcutaneous accumulation of protein-rich extracellular fluid resulting from damaged or blocked lymphatic vessels.

- The International Society of Lymphology has defined stages of lymphedema (0-3).
- ISL defines Stage 0 as ‘a latent or sub-clinical condition where swelling is not evident, despite impaired lymphatic transport.”

Allegheny Health Network

56

What are the Symptoms of Lymphedema?

- Feeling of heaviness, achiness, tightness, or tingling
- Skin changes: color, texture, or temperature
- Can occur in the leg, arm, trunk or breast, or in face/neck
- Often no pain
- Visible swelling, that may fluctuate

Allegheny Health Network

57

Standard Treatment for Lymphedema

Strategy: diagnose before visible swelling occurs and patient has functional limitations

- Certified Lymphedema Therapist

  * The *gold standard* treatment for lymphedema:

    Complete Decongestive Therapy (CDT)

Allegheny Health Network

58

Treatment for Lymphedema: Complete Decongestive Therapy

Manual Lymphatic Drainage

Compression Bandaging

Allegheny Health Network

59

CDT: Compression Garments

Daytime

Nighttime

Allegheny Health Network

60

CDT: Compression Garments

Daytime

Nighttime

Allegheny Health Network

Management: Pneumatic Compression (Advanced)

- Home Device that mimics Manual Lymphatic Drainage
- "Clears" the trunk, then the arm or leg. Also new model for H & N CA
- Avoid older compression devices that "push" fluid toward armpit or groin

Allegheny Health Network

AHN Oncology Rehab Outpatient
412 854 7010 to schedule:

- AVH- Natrona Heights
- Bethel Park Higbee
- Peters/McMurray
- Cranberry
- Monroeville
- Jefferson Hills
- Montour
- Bellevue (Suburban)
- Federal North
- Wexford HWP
- Bloomfield

- AGH – Speech Therapist
- St Vincent - Speech

- Erie: Eastside & Westside
- Westfield Hospital
- Grove City

Allegheny Health Network

63

To Order Therapy Services

Outpatient Therapy

- Amb Referral to Oncology Rehab
- Amb Referral to PT or OT for Lymphedema Therapy
- Amb Referral for Pelvic Floor Therapy
- Amb Referral for Osteoporosis Therapy

One number to schedule:

412 854 7010

Allegheny Health Network

64

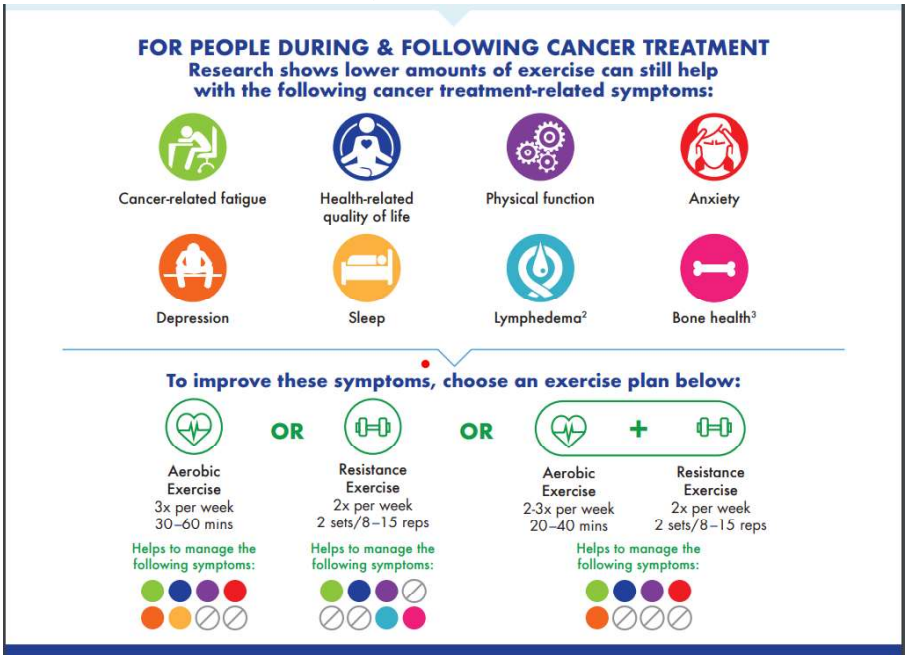
Summary

- What is Oncology Rehab
- What does AHN Oncology Rehab have to offer patients
- Why is Oncology Rehab beneficial
- Patients can benefit from Oncology rehab anywhere in their journey
- How to refer/contact AHN Onc Rehab Services

Allegheny Health Network

65

Questions:



66

References

- Armstrong et al. J Clincial Oncology. Modifiable Risk Factors and Major Cardiac Events Among Adult Survivors of Childhood Cancer. 2013 Oct 10; 31(29): 3673–3680.
- Cheville, A, et al. Prevalence and treatment patterns of physical impairments in patients with metastatic breast cancer. 2008 J Clin Onc . 26(16):2621-9.
- Ehrhardt, M. Exercise Before, during, and after therapy: how much should the cancer patient do? American College of Cardiology Conference presentation, May 2017.
- Eijsvogels et al. Amount of exercise to reduce CV events. *J Am Coll Cardiol*. 2016;67(3):316-329.
- Hayes SC et al. Upper-body morbidity after breast cancer: Incidence and evidence for evaluation, prevention, and management within a prospective surveillance model of care. *Cancer.*118;(Suppl S8): 2237–2249.
- Kolb NA et al. The association of chemotherapy-induced peripheral neuropathy symptoms and the risk of falling. *JAMA Neurol*. 2016;73(7):860-866.
- Lee K, Zhou J, Norris MK, Chow C, Dieli-Conwright CM. Prehabilitative exercise for the enhancement of physical, psychosocial, and biological outcomes among patients diagnosed with cancer. *Curr Oncol Rep*. 2020;22(7):71. doi:10.1007/s11912-020-00932-9
- Mason C et al. Long term physical activity trends in breast cancer survivors. *Cancer Epidemiol Bomarkers Prev.* 2013; 22:1153.
- Mewes et al. Effectiveness of multidimensional cancer survivor rehabilitation and cost-effectiveness of cancer rehabilitation in general: a systematic review. *Oncologist.*2012;17:1581-1593.
- Nakano J, Fukushima T, Tanaka T, Fu JB, Morishita S. Physical function predicts mortality in patients with cancer: a systematic review and meta-analysis of observational studies. Support Care Cancer. Published online 2021. doi:10.1007/s00520-021-06171-3
- Schmitz KH, et al. Controlled physical activity trials in cancer survivors: a systematic review and meta-analysis. *Cancer Epidemiol Biomark Prev*. 2005;14:1588-1595.
- Schmitz KH et al. American College of Sports Medicine Roundtable on Exercise Guidelines for Cancer Survivors. *Medicine & Science in Sports & Exercise*. 2010; 42(7):1409-1426.

Allegheny Health Network

References

- Schneider CM et al. Exercise Training manages cardiopulmonary function and fatigue during and following cancer treatment in male cancer survivors. *Integrative Cancer Therapies*. 2007;6(3):253-241.
- Shih YT et al. Incidence, treatment costs and complications of lymphedema after breast cancer among women of working age. *Journal of Clinical Oncology, 2009;*27(12):2007-2014.
- Silver JK et al. Cancer rehabilitation and palliative care: critical components in the delivery of high-quality oncology services. *Support Care Cancer*. 2005;23:3633-3643.
- Silver JK et al. Impairment driven cancer rehabilitation: as essential component of quality care and survivorship. CA Cancer J Clin. 2013;63(5):295-317.
- Silver JK. Cancer prehabilitation and its role in improving health outcomes and reducing health care costs. *Semin Oncol Nurs*. 2015;31(1):13-30. doi:10.1016/j.soncn.2014.11.003
- Silver JK et al· The **State of Cancer Rehabilitation** in the **United States**. J Cancer Rehabil. 2018;1:1-8. Epub 2018 Dec 30.
- Silver and Baima (2013) published in *the American Journal of Physical Medicine and Rehab*: Cancer Prehabilitation: An Opportunity to Decrease Treatment-Related Morbidity, Increase Treatment options and improve physical and psychological outcomes. 2013 Aug;92(8):715-27
- Stout NL. A prospective surveillance model for rehabilitation for women with breast cancer. Cancer 2012;118(8Suppl):2191–2200.
- Stout NL et al. A Systematic Review of Rehabilitation and Exercise Recommendations n Oncology Guidelines. CA Cancer J Clin. March/April 2021; (7): 149-175
- Thorsen L, et al. Cancer Patients Needs for Rehabilitation Services. ACTA Oncologica. 2011 50: 212-222.

Allegheny Health Network

INTRODUCTION TO PALLIATIVE CARE AND PAIN MANAGEMENT: AHNCI FUNDAMENTS OF ONCOLOGY

Justin Engleka CRNP
Senior Program Manager- Palliative Care: Highmark Health
CRNP-AHN Division of Supportive Care/Palliative Medicine
Justin.Engleka@highmarkhealth.org

1

1

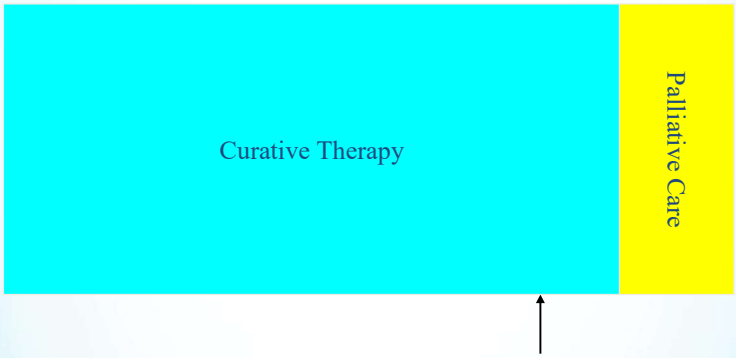
Objectives

1. Differentiate between curative, palliative and hospice models of care
2. Discus various disease trajectories and advocating for earlier palliative care interventions
3. Establish hospice criteria for admission and explore hospice benefits
4. Provide an overview of general cancer pain management principles
5. Differentiate between opioid dependence, tolerance and addiction

Allegheny Health Network

2

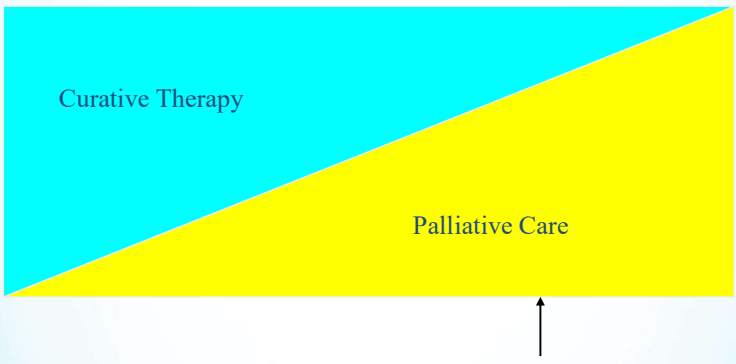
Models of Care (Traditional)



Allegheny Health Network

3

Models of Care (Palliative)



Allegheny Health Network

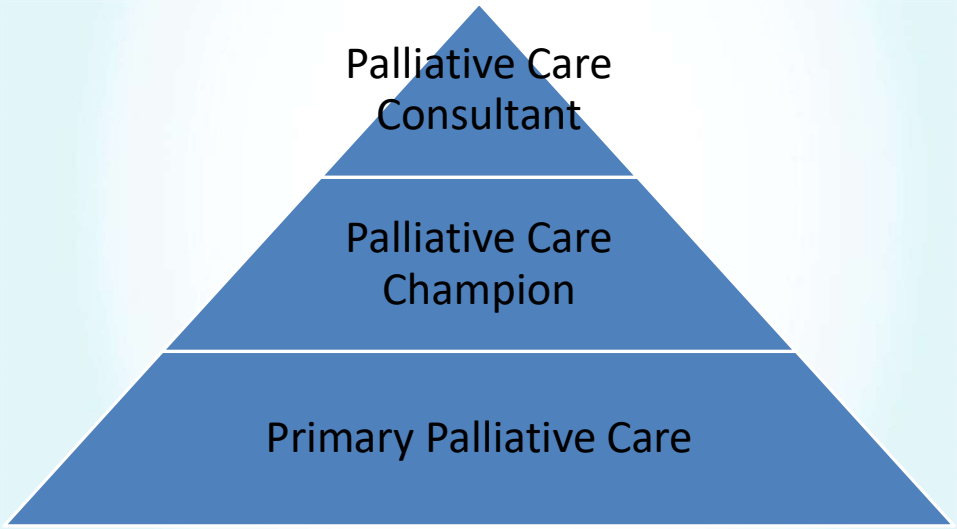
4

Primary Palliative Care

- All clinicians should have fundamental knowledge on palliative care
  - Communication skills
  - Symptom management
  - Palliative care consult resources
  - Hospice
  - Advance care planning conversations

5

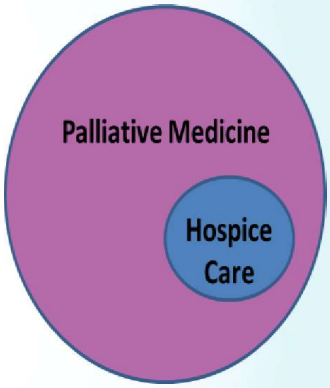
Palliative Care Training Hierarchy



6

Palliative vs. Hospice

- An interdisciplinary medical specialty that focuses on preventing and relieving suffering and on supporting the best possible quality of life for patients and their families during any stage serious illness
- Hospice is a model of palliative care that is offered to patients at the end of life when curative or life-prolonging therapy is no longer indicated



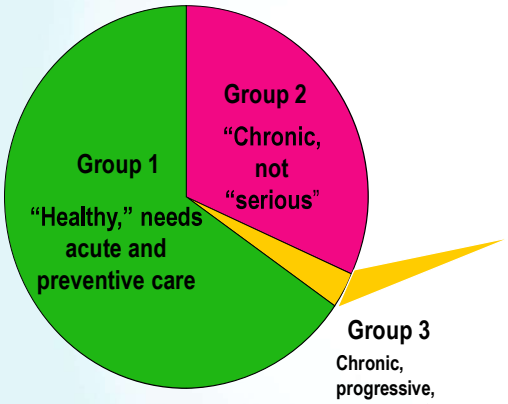
7

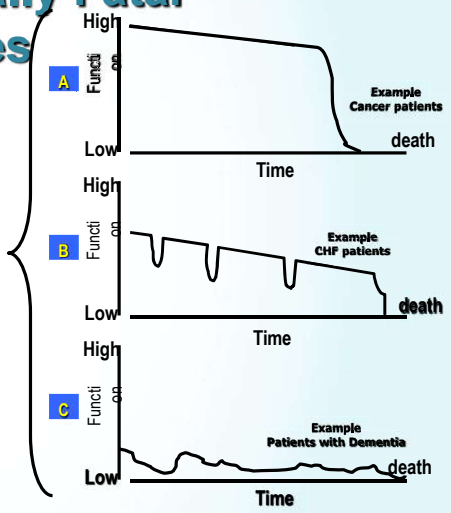
How Americans Die

20% of Americans die in intensive care units, part of the 50-60% who die in hospitals

8

Divisions by Health Status in the Population and Trajectories of Eventually Fatal Chronic Illnesses





RAND document WP-137, Living Well at the End of Life: Adapting Health Care to Serious Chronic Illness in Old Age, which can be found online at: http://www.rand.org/pubs/white_papers/WP137/. Used with permission

Interdisciplinary Delivery of Care: Hospice and Supportive/Palliative Care

Cornerstones of Hospice Criteria

Certified terminal illness (<6 months)

Certified by two MDs

Usually PCP and hospice medical director

Patient/family agrees to goals of palliation

Usually avoids hospitalization

Most life prolonging therapies completed

Medicare Hospice Benefit

Other private insurance coverage

Can be prolonged care for 6 months or longer

Defining Diminishing Functional Status

Karnofsky Score < 50%

ECOG 2-3

Dependence in at least 3 of 6 ADLs

1. Bathing
2. Dressing
3. Feeding
4. Transfers
5. Continence of stool/urine
6. Ability to ambulate independently

Impaired Nutritional Status

Unintentional progressive weight loss greater than 10% over 6 months

Serum albumin less than 2.5 gm/dl

Progressive dysphagia

Decision not to pursue artificial feedings

Dementia

Death usually occurs as result of other co-morbidities

Should have all of the following:

Unable to dress without assistance

Unable to bathe properly

Urinary or fecal incontinence

Unable to speak or communicate meaningfully

Dementia Related Complications

Aspiration pneumonia

Pyelonephritis or upper urinary tract infection

Septicemia

Stage III-IV decubitus ulcers

Fever recurrent after antibiotics

Malnutrition/wt. loss over 6 months

End-Stage Heart Disease

Symptoms of CHF at rest NYHA class IV

Ejection fraction < 20%

Need to be treated optimally with diuretics, vasodilators, and ACE-Inhibitors

Persistent symptoms despite above efforts

Symptomatic supraventricular or ventricular arrhythmias resistant to therapy

History of cardiac arrest in any setting

History of unexplained syncope

Cardiogenic brain embolism ie: embolic CVA of cardiac origin

End-Stage Lung Disease

Disabling dyspnea at rest, poorly responsive to bronchodilators

FEV1 after bronchodilator < 30% of predicted

Progressive pulmonary disease

Multiple hospitalizations

Presence of right heart failure

Hypoxemia at rest O2 sats<88% on oxygen

Hypercapnia

Unintentional progressive wt. loss >10% over 6 months

Resting tachycardia > 100 bpm

End-Stage Liver Disease

Not liver transplant candidate

Labs: PT> 5 seconds over control

Albumin < 2.5gm/dl

Should have at least one of the following:

1. Ascites refractory to diuretics
2. Spontaneous bacterial peritonitis
3. Hepato-renal syndrome
4. Hepatic encephalopathy
5. Recurrent variceal bleeding

End-Stage Renal Disease

Refusing/or stopping hemodialysis

Creatinine clearance of < 10cc/min AND

Serum creatinine > 8.0 mg/dl or > 6 for diabetics

Clinical signs and symptoms associated with renal failure

1. Uremia
2. Oliguria (urine output less than 400cc/24hrs)
3. Intractable hyperkalemia (K>7 not responsive to medical therapy)
4. Uremic pruritus

Stroke and Coma

Coma or PVS > 3 days secondary to CVA

Post-anoxic event accompanied by severe myoclonus 3 days post event

Comatose patients with any 4 of the following on day 3 of coma had 97% mortality

1. Abnormal brain stem response
2. Absent verbal response
3. Absent withdrawal response to pain
4. Serum creatinine >1.5 mg/dl
5. Age>70

Stroke and Coma (..cont)

Chronic stroke

- Age > 70
- Karnofsky <50%
- Poor nutritional status (>10% wt loss/ albumin<2.5mg/dl)
- Dysphasia
- Medical complications:
  - Aspiration pneumonia
  - Upper UTI
  - Stage III-IV decubitus ulcers
  - Fever recurrent after antibiotics

Cancer

- Most metastatic diseases
- Finished therapies (chemo, XRT, surgery)
- Declining functional status
- Decline in weight/nutritional status
- Agree for palliation

Hospice Benefits

Paid medications related to symptom management

100% coverage for all staff services (under Medicare Benefit)

Paid durable medical equipment

Access to inpatient care and respite

Access to home health aides and social work (not always covered under homecare)

Other levels of care (respite,general inpatient, continuous care)

13 months of bereavement follow-up for families

Hospice Interdisciplinary Team

Medical Director

RN/Case Manager or LPN

Social Worker

Home Health Aid

Chaplain

PT/OT/Speech

Bereavement staff

Volunteers

Other therapy staff (pet therapy, music therapy, Reiki, reminiscence, etc…)

Levels of Hospice Care

General inpatient care/ Virtual Hospice

Routine homecare (most commonly at home)

Respite care (short break)

Continuous care ("crisis care")

(ALL 4 levels of care are reimbursed at different rates and have various criteria for enrollment)

Cornerstones of Home Palliative Care Programs

Any "life limiting illness"…not necessarily terminal

Patients can still receive treatments (ie. Chemo./XRT/Blood/Fluids)

Can still be hospitalized

Routine blood draws and therapy

Commonly tied to home hospice program

Can be a "bridge" to hospice at later date

Are not yet entitled to hospice benefits

Episodic care (not usually for months)

Home Hospice vs. Home Palliative Care

Hospice	Palliative Care
<6 months prognosis	Any "life limiting or chronic disease"
Care focused at home	May re-hospitalize
100% covered by Medicare	Insurance coverage varies
Treatments are completed	Treatments are still ongoing
All symptom medications covered	Medication coverage per insurance plan
13 month bereavement	

Palliative Homecare Case Examples

69 y.o male Dx with met. Lung Ca to brain

S/P initial chemo and xrt

Multiple readmissions to hospital for confusion

Newly diagnosed brain mets

RX for Brain XRT for several weeks

Wants to go home

Overall physical decline

May want to be readmitted to the hospital

Common Questions/Concerns

How do I introduce the idea of home P.C to patients and families?

What if the goal is to continue life prolonging therapy?

What is the difference between home palliative care and regular homecare?

Should I bring this idea up with the physician?

29

Introduction to Pain Management

Justin Engleka MSN,BC-GNP,MBA,ACHPN
Senior Palliative Care Program Manager
Highmark Health

Allegheny Health Network

30

Types of Pain

- Somatic: activation of pain receptors in cutaneous or deep tissue
- Visceral pain: infiltration, compression, extension, or stretching of the thoracic, abdominal, or pelvic structures
- Neuropathic: injury to nervous system (e.g. compression, infiltration)

Pain Prevalence

- Cancer: 25-70% at diagnosis
- Congestive heart failure: 25-70%
- Dementia: 25%-60%
- Community dwelling elderly: 25-40%
- End-of-Life/Hospice: 75-90%

Pain Prevalence

- 33-50% of cancer patients describe pain as disabling
- Pain undertreated ~40-60% of the time
- Cancer pain can be managed effectively 90% of the time with tolerable side effects
  - There is NO ceiling to most opiates
  - Go up on dose until it works or there are side effects

Categorizing pain

- Acute: short lasting and usually easy to describe and observe. Can be sub acute or intermittent
- Chronic: lasting > 3 months. Can change someone's personality, ability to function, and quality of life

What's the big deal?

- ~80% of nursing home residents
- Impairs physical function
- Impairs appetite and sleep
- Alters mood
- May decrease cooperation with care
- Causes confusion
- Decreases quality of life
- Increases caregiver work load

35

Epidemiology

- Prevalence the elderly 36 to 88
- 1/5 of elderly people take analgesics at least several times per week
- 2/3 of these people take prescription analgesics for > 6 mo.
- Most common causes of pain are musculoskeletal disorders

36

History

- Onset, quality, intensity, duration, location, timing, aggravating and relieving factors
- Effect on mood, sleep, daily activities, appetite, and bowel and bladder functions
- Current and prior drug use
- Coexisting disorders
- Psychiatric and social histories

Is the patient in pain?

- Who should be asked?
  - Patient
  - Caregivers
  - Interdisciplinary Team
- What should we ask?
- Are there tools that can help us decide?

Signs and symptoms

- Crying, moaning, frowning, or sighing
- Feeling sad, depressed, hopeless, aggressive, or angry most of the time
- Noisy breathing, calling out, or asking for help
- Not changing positions very often to avoid pain, or positioning yourself in a way that it will not hurt
- Poor appetite and eating habits, or sleeps more or sleeps less than usual
- Pulls the part of the body that is hurting or gets upset at being touched
- Restlessness, cannot get comfortable, and moves around a lot

Treatment goals

- Expectations, benefits, and risks
- Disability, limited economic resources, complex drug regimens, and lack of transportation should be considered when treatment decisions are made
- Interdisciplinary approach can be particularly useful

Pain Management Guidelines

- Right analgesic at right time
- Most appropriate route (po, iv/sq, rectal, sl)
- Maximize dose before using 2nd agent
- Consider co-analgesics
- Manage adverse effects
- One clinician takes the lead in prescribing

Complementary modalities

- Acupuncture
- Aromatherapy
- Chiropractic therapy
- Dietary supplements
- Mind-body therapies (biofeedback training, hypnosis, meditation, relaxation therapy)
- Education
- Electrical stimulation
- Heat and cold application
- Rehabilitation (assistive devices, decrease stress and strain on muscles, improve functional status
- Surgery

Analgesics

- **Opioid analgesics:** These medicines, which include morphine, contain opium. An opioid analgesic is used for moderate to severe
- **Non-opioid analgesics:** These work by changing the way the body senses pain and by cooling the body. Non-opioid analgesics are used to relieve mild to moderate pain
- **Non-steroidal anti-inflammatory drugs:** This family of medicine helps decrease pain and inflammation

Opioids

Equivalency Table

Drug	Oral/Rectal Route	Parenteral Route	Conversion Ratio to Oral Morphine	Equianalgesic Dose of Oral Morphine
Morphine sulfate	30mg Oral morphine	10mg of parenteral morphine	Parenteral morphine is **3 times** as potent as oral morphine	30mg Oral morphine
Oxycodone	20mg of oral oxycodone	NA	Oral Oxycodone is **roughly 1.5 times** more potent than oral morphine	30mg Oral morphine
Hydrocodone	20mg of oral hydrocodone	NA	Oral hydrocodone is **roughly 1.5 times** more potent than oral morphine	30mg Oral morphine
Hydromorphone	7mg of oral hydromorphone	1.5mg of parenteral hydromorphone	Oral hydromorphone is about **4-7 times** as potent as oral morphine Parenteral hydromorphone is **20 times** as potent as oral morphine	30mg Oral morphine

nford.edu/opioid-conversion/levys-rule/example-2/

Specific Opioid? Why?

- No one with superior efficacy; individual differences occur
- Morphine cheapest (in and out of hospital)
- Medicare/Medicaid usually cover MS-ER or Fentanyl TD > Oxy-ER
- Fentanyl TD less constipating than MS-ER
- Fentanyl & methadone have no active (renally-excreted) metabolites

Dose Calculations

1. Convert total daily dose to oral morphine equivalent (OME)
2. Calculate equipotent dose of new opioid.
3. Decrease by 25% - 50% for incomplete cross-tolerance
   - Multiple mu receptors and affinities for receptors
4. Breakthrough dose = 10-20% (10-15%) of total daily dose.
5. Start bowel regimen
6. Maximize adjuvants

Opioid-induced Neurotoxicity - Signs

- cognitive impairment
- extreme sedation
- hallucinations
- delirium
- myoclonus
- seizures
- hyperalgesia, allodyania

Opioid-induced Neurotoxicity - Risk Factors

- high dose of opioids
- accumulation of metabolites (MG-3)
- prolonged opioid use
- dehydration
- renal failure
- recent dose escalation
- advanced age

Opioid-induced Neurotoxicity - Management

- STOP the offending opioid
- Hydrate to clear metabolites
- Rotate opioids
- Benzodiazepines for myoclonus
- Antipsychotics for psychosis
- NOT Narcan!

Other agents- “adjuvants”

- Anesthesia
- Anti-anxiety medicine
- Anticonvulsant medicine
- Anti-depressants
- Muscle relaxants
- Radiopharmaceuticals
- Biphosphonates
- Sedative
- Steroids

Definitions

- Physical dependence
- Tolerance
- Addiction
- Pseudo-addiction

Physical Dependence

- An expected change in a patient's physiology that occurs when he is receiving chronic, continuous opioid medication. Because of this, if opioids are discontinued abruptly, symptoms of withdrawal will occur (e.g., restlessness, tachycardia, hypertension, fever, tremors, lacrimation)

Tolerance

- A change in physiology resulting in the need to increase opioids over time to achieve adequate analgesia. This generally occurs slowly over time.

Addiction

- Psychological dependence; a psychiatric state characterized by compulsive drug seeking and drug using without regard for the adverse social, physical, and economic consequences. This is rare in patients with chronic pain.

Pseudo-addiction

- Behaviors similar to those of addiction that occur because of significant unrelieved pain. These patients are simply trying to get relief from suffering.

55

Conclusions

- Pain is not as simple as we thought/were taught
- Assessment requires multiple tools, information and behavior observation
- Pain in the elderly is complicated by cognition, social setting, economics and access
- Pain in the elderly is a risk factor for functional decline, institutionalization, polypharmacy and delirium

56

Free CE/CEU Opportunity

- Center to Advance Palliative Care (CAPC)
- Visit www.capc.org
- Enroll under your hospital or business unit:
- Courses:
  - Pain/symptom management
  - Advance care planning
  - Communication skills
  - General palliative care education

Summary

1. Assess and advocate for early palliative care identification and interventions
2. Palliative care interventions should be deployed regardless of the disease stage and intent to cure
3. Hospice referrals typically occur too late in the disease trajectory and five little time for full benefits of the program
4. Hospice programs provide a full compliment of supportive services to patients that they may have been neglected during cancer treatment
5. It is important to differentiate between dependence, addiction and tolerance when screening for actual “addiction”
6. Non-opioid medications and other treatments are valuable for cancer pain management.

Cancer Survivorship

Fundamentals of Oncology
Nicole Kulasa RN,BSN, OCN
Survivorship Nurse Navigator

1

Conflict of Interest

- I have no disclosures

2

Course Overview

Cancer as a chronic and survivable disease

Shifting focus from treatment to long term outcomes

Role of healthcare providers across the cancer continuum

Quality of life issues impacting cancer survivors

3

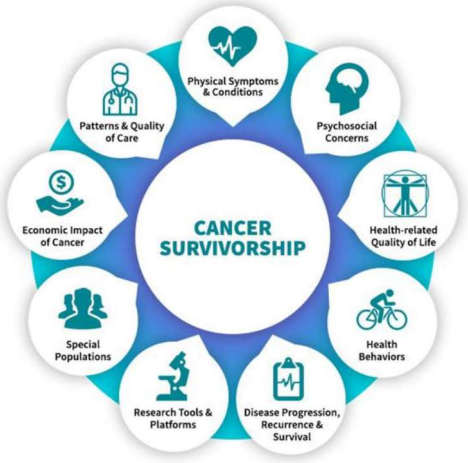
Cancer Epidemiology and Survivorship Trends

- Increase in cancer survival rates: Per the *American Cancer Society*, As of January 1, 2025, there were an estimated **18.6 million cancer survivors** in the United States. This number is projected to exceed **22 million by 2035**
- Common survivor needs across cancer types
- Implications for health care systems

4

What is Cancer Survivorship

- Survivorship begins at diagnosis
- Includes treatment, post-treatment, and long term phases
- Focus on physical , psychosocial, and functional health
- Lifelong monitoring and support



5

Goals of Survivorship Care

Detect	Detect recurrence and secondary malignancies
Manage	Manage late and long-term treatment side effects
Promote	Promote health and wellness
Improve	Improve quality of life and longevity

6

Survivorship Care Models

- Oncology-led follow up
- Shared care with primary care
- Risk stratified survivorship models
- Multidisciplinary team approach

Oncology-Led Survivorship Care Model

- Follow up managed by oncology team in the first few years
- Emphasis on recurrence surveillance and treatment side effect management
- Pros- disease specific knowledge, patient reassurance, early detection of recurrence
- Cons- limited capacity with growing number of survivors, less focus on preventative care, and fragmented.
- AHN, UPMC, Memorial Sloan Kettering, University of PA Abramson Cancer Center, Dartmouth, University of Miami health system

Primary Care –Led Survivorship Model

- Transition to PCP after tx completion either by community-based practices integrating survivorship or specialized oncology primary care clinics
- Oncology available for consultation
- Emphasis on chronic disease management , preventative care and screening, health promotion
- Pros- Continuity of care, management of co-morbidities, more patient access
- Cons- variable oncology specific expertise, inconsistent surveillance protocols, communication gaps
- Roswell Park, Dana-Farber, Johns Hopkins, GPs in United Kingdom

Shared- Care Survivorship Model

- Divided between Oncology (manages cancer specific surveillance) and PCP(preventative care and co-morbidities)
- Guided by survivorship care plans
- Pros- balanced workload, comprehensive care, improved patient satisfaction
- Cons- Requires strong communication systems , role clarity essential to avoid duplication or gaps
- Implemented globally US, UK, Australia, and the Netherlands

Risk-Stratified Survivorship Model

- Follow-up intensity based on recurrence risk and treatment toxicity
- Low risk survivors- minimal Onc follow-up, PCP led
- High risk survivors- ongoing Onc involvement, multidisciplinary car
- Pros- efficient use of resources, personalized care, evidence based
- Cons- Requires accurate risk assessment, may require system-level design
- UK, Canada, Australia

(US- NCI and ACS are leading efforts to create evidence based algorithiums for US implementation with ongoing research and pilot programs)

Multidisciplinary Survivorship Clinic

- Team based care
- Often time-limited or consultative
- Pros- comprehensive whole-body approach, ideal for complex survivors, high patient satisfaction
- Cons- resource intensive, limited availability
- MD Anderson, Penn Medicine, Mayo Clinic, Stanford

Survivorship Care Plans

Treatment summary documentation

Recommended surveillance schedule

Management of potential late effects

Care coordination and communication

13

Post-Treatment Follow-Up Principles

- Individualized follow-up schedule
- Based on cancer type, stage, and treatment
- Symptom based evaluation
- Avoidance of unnecessary testing

14

Cancer Surveillance vs. Screening

- Surveillance- ongoing monitoring for recurrence or progression in cancer survivors. Timing is post treatment/ risk based. Frequency is individualized and follows cancer specific guidelines
- Screening- detection for new primary cancers for asymptomatic people. Applied to both gen pop and cancer survivors. Timing is standardized intervals and follows public health guidelines
- Risk of over-testing

Risk of Over Testing

- False –positive results leading to unnecessary biopsies and procedures
- Increased patient anxiety and fear or recurrence
- Financial toxicity and strain on healthcare resources

Surveillance Modalities

H&P examination

Lab testing when indicated

Imaging based on guidelines

Tumor markers if appropriate (ex. PSA, CEA, CA-125,AFP, tools not screening tests)

17

Secondary Cancer Prevention

- Increased risk due to prior therapy
- Radiation associated malignancies
- Chemo-related risks
- Genetic predisposition considerations

18

Health Promotion for Cancer Survivors

- Lifestyle modifications as standard care
- Survivors benefit similarly to general population
- Address modifiable risk factors
- Long-term disease prevention

19

Physical Activity Recommendations

- Aerobic and resistance training
- Reduction and fatigue and recurrence risk
- Tailoring exercise to functional status
- Referral to rehab services

20

Nutrition and Weight Management

Balanced, plant forward dietary patterns

Avoidance of obesity

Management of treatment-related nutritional deficits

Referral to oncology dietitians

21

Tobacco and Alcohol Use

- Smoking cessation programs
- Alcohol recommendations
- Counseling and pharmacologic support
- Integration into routine follow-up

22

Vaccinations and Preventative Care

- Vaccines are safe for most cancer survivors, including those with partial immune suppression. They reduce preventable infection, hospitalizations, and mortality in cancer survivors. Considerations for tx-related immunosuppression, immune recovery, and ongoing therapies.
- Annual inactivated flu vaccine and other **if indicated** vaccines: COVID-19(primary series and booster per age and risk), Pneumococcal, Tdap/Td (booster q 10 yrs), Hep B (non-immune or High risk), HPV (reccomeneded through age based guidelines, beneficial even after ca tx)
- Age- appropriate preventive screenings
- Coordination with PCP

Reducing Risk of Cancer Recurrence

- Adherence to surveillance plans
- Lifestyle modifications
- Medication adherences
- Patient education and empowerment

Long –Term and Late Side Effects

- ***Long term-*** begin during tx and persist afterwards. May stabilize , worsen, or improve over time
- ***Late***- appear months or years after tx. Can be progressive and unexpected

25

Chemo Related Effects

Peripheral Neuropathy	Sensory loss, pain, gait instability Common w/ platinum agents, taxanes, vinca alkaloids
Cardiotoxicity/ Metabolic	Reduced EF, heart failure, DM Common w/ anthracyclines and HER-2 targeted therapies
Cognitive impairment “chemo-brain”	Attention, memory, and executive dysfunction
Infertility and gonadal dysfunction	Dose and age dependent
Secondary malignancies	Therapy related leukemia or myelodysplastic syndromes

26

Radiation Therapy Related Effects (site dependent)

Fibrosis	Skin, lung, and soft tissue scarring
Cardiovascular disease	Accelerated CAD after chest irradiation
Pulmonary toxicity	Restrictive lung disease, pneumonitis
Endocrine dysfunction	Thyroid and pituitary disorders
Secondary solid tumor	Risk increases with time exposure

27

Surgical and Local Therapy Effects

Lymphedema	Common after lymph node dissection Can also happen with radiation
Chronic pain syndrome	Neuropathic or musculoskeletal
Functional Impairment	Swallowing, speech, bowel or urinary dysfunction
Body image	Psychosocial and sexual health impact Can also happen with chemo and/or RT

28

Hormonal and Targeted Therapy Effects

Bone loss and fracture risk	AI and ADT
Metabolic changes	Weight gain, dyslipidemia, insulin resistance
Sexual dysfunction	Libido loss, ED, vaginal dryness Can also happen with chemo and/radiation
Vasomotor symptoms	Hot flashes, night sweats

29

Management of Fatigue

- Most common survivorship symptom
- Rule out medical causes
- Exercise as first-line intervention
- Psychosocial support and sleep hygiene

30

Mental Health

- Anxiety, depression, PTSD, grief, guilt
- Screening tools
- Psychosocial oncology referral , social workers, local organizations for support groups
- Normalizing emotional responses

31

Fear of Cancer Recurrence

- Common and persistent
- External and internal triggers
- Communication strategies
- Cognitive- based interventions
- Reassurance through structured follow-up

32

Social and Financial Toxicity

- Employment challenges
- Insurance and access to care
- Financial counseling resources
- Impact on treatment adherence

33

Sexual Health and Intimacy Considerations

34

Sexual Health as a Survivorship Issue

- Integral to quality of life
- Often under-addressed in clinical care
- Affects all genders and ages
- Responsibility of healthcare team

35

Impact of Cancer and Treatment on Sexual Function

- Surgery-related changes
- Chemo effects
- Hormonal effects
- Radiation-induced damage
- Psychological contributors

36

Common Sexual Health Concerns

- Decreased libido
- Erectile dysfunction
- Vaginal dryness and dyspareunia
- Body image and intimacy concerns

37

Barriers to Sexual Health Discussions

- Time constraints
- Provider discomfort
- Patient embarrassment
- Cultural and societal factors
- Lack of resources

38

Frameworks for Sexual Health Communication

- PLISSIT model
- Permission-based discussions
- Normalizing the topic
- Routine assessment

39

Sexual Health Assessment

- Open-ended questions
- Inclusions of partners when appropriate
- Gender-affirming care
- Documentation and follow-up

40

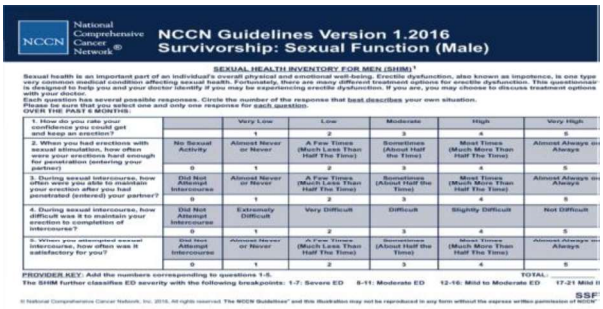
Management of Female Sexual Health Concerns

- Vaginal moisturizers and lubricants
- Pelvic floor therapy
- Vaginal dilation
- Hormonal and non-hormonal options
- Referral to gynecology or sexual health care provider
- GU Survivorship clinic

41

Management of Male Sexual Health Concerns

- PDE-5 inhibitors
- Vacuum erection devices
- Penile rehabilitation strategies
- Urology referral
- GU Survivorship clinic



42

Fertility, Reproductive Health, and Survivorship

- Fertility preservation counseling (BEFORE TX STARTS)
- Pregnancy after cancer
- Contraception considerations
- Referral to reproductive specialist

LGBTQI A+ Sexual Health Considerations

- Inclusive language
- Unique treatment impacts
- Minority stress and access issues
- Affirming survivorship care
- Center for Inclusion Medicine

Patient Cancer Survivorship Education and Self- Management

- Teaching symptom recognition
- Written and digital resources
- Empowering survivors
- Shared decision-making

45

Interdisciplinary Survivorship Care

- Oncology, PCP, Onc Rehab, Navigation team
- Mental health specialists, social workers, Patient Ambassador program
- Integrative Oncology, Exercise programs, Weight loss clinic, GU clinic, Osteoporosis clinic, Reproductive Medicine, Cardio-Oncology
- Communication across providers
- Care continuity

46

Measuring Survivorship Outcomes and Future Directions in Care

- Patient reported outcome measures
- Quality of life assessments
- Functional status tracking
- Continuous care improvement
- Survivorship research gaps
- Health equity considerations

Key Takeaways and Clinical Implications

Survivorship is lifelong care and starts at diagnosis

Evidence follow-up improves outcomes

Sexual health is essential to assess

Contact Info and Questions

Survivorship Nurse Navigators

Nicole Kulasa RN,BSN,OCN (Pittsburgh locations)
Email: nicole.kulasa@ahn.org
Tel:412-585-5356

Sarha Field RN,BSN (Erie, Beaver, Butler, Grove City)
Email: Sarha.Field@ahn.org
Tel: 814-452-6087

Resources

- AHNCI Sexual Health and Intimacy patient education. 2018. Revised 2025
- American Society of Clinical Oncology. *Cancer Survivorship. 2017.*
- American Cancer Society. (2025). Cancer Treatment and Survivorship Statistics, *2025* (2025). *CA: A Cancer Journal for Clinicians, Fast Facts: Cancer Treatment and Survivorship*
- Chang, R.J, et al. (2023) Effectiveness and Implementation of Models of Survivorship Care: An Overview of Systemic Reviews. *Journal of Cancer Survivorship: Research and Practice,*17 (1), 197-221
- Improving your Vulvovaginal Health. (2017). Retrieved from https://www.mskcc.org/cancer-care/patient-education/vaginal-health
- Katz, Anne. *After You Ring The Bell…10 Challenges for the Cancer Survivor. 2012.*
- Kluwer, Wolters. *Issues of Cancer Survivorship. 2016.*
- NCCN 2025 Survivorship Guidelines https://www.nccn.org/professionals/physician_gls/pdf/survivorship.pdf
- Steele R.J (2018) Screening and Surveillance Principles and Practice. The *British Journal of Radiology,* 91(1090)

2026 Fundamentals of Oncology
Day 4 Evaluation

Allegheny Health Network

Pittsburgh, Pennsylvania

Fundamentals of Oncology Course Post-Assessment- Day 4
Version 1- (2026)

Section I (Multiple Choice)
The following items are multiple choice. There is only one correct answer for each question. Please select and circle the correct answer. (1 point each)

1. Management of hypercalcemia includes which of the following?

    a. Denssumab (Xgeva)

    b. 3% saline

    c. Declomycin

    d. 0.45% saline

2. Which of the following is the most common presenting symptom of hypercalcemia?

    a. Nausea and vomiting

    b. Excessive thirst

    c. Loss appetite

    d. Mental status changes

3. What must be implemented first for a patient presenting with the following counts?

WBC: 2.5 K/uL	Temp: 38.0
Neutrophils: 2	Pulse: 28
Hbg: 8.9	RR: 28
Hct: 25.0	BP: 100/60
Plt: 90,000	

    a. Blood cultures

    b. IV fluids

    c. Chest X-Ray

    d. Antibiotics

4. Which of the following antibiotics treats gram negative neutropenia sepsis?
    a. Vancomycin
    b. Acyclovir
    c. Micafungin
    d. Imipenem

5. One of the most common diagnoses associated with tumor lysis syndrome includes:
    a. Sarcoma
    b. Leukemia
    c. Colon-rectal
    d. Multiple Myeloma

6. Which of the following lab results indicates the highest potential for tumor lysis syndrome?
    a. Magnesium 1.6 mg/dl
    b. LDH 620 U/L
    c. Potassium 4.8 mmol/L
    d. Uric acid 7.0 mg/dl

7. Which oncologic emergency is manifested by a patient presenting with the following labs?

WBC: 4.0	NA: 132	PT/INR: 3.2/4.5
Hbg: 7.9	K: 5.0	PTT: 100
Hct: 22.0	CA: 10.0	
Plt 22, 000		

    a. DIC
    b. SIADH
    c. Tumor lysis
    d. Hypercalcemia

8. Treatment of SIADH with a sodium level of 118 includes which of the following?
    a. 3% saline at 150 ml/hr
    b. NSS at 150ml/hr
    c. 0.4% saline at 100ml/hr
    d. 3% saline at 30 ml/hr

9. The major and only definitive treatment for DIC is:
    a. providing medications to suppress the symptoms.
    b. managing tumor- or therapy-related cause.
    c. reversing clotting cascade with heparin.
    d. administering platelets, fresh frozen plasma, and cryoprecipitate.

10. Which of the following tests are specific and sensitive to determine the diagnosis of DIC?
    a. D-dimer assay and fibrinogen degradation product (FDP) titer
    b. Platelet count and fibrinogen level
    c. Anti-thrombin III and plasminogen level
    d. Hemoglobin and platelet count

11. The type of pain most frequently associated with spinal cord compression is:
    a. bone.
    b. nociceptive.
    c. radicular.
    d. inflammatory.

12. A patient presents with complaints of dyspnea, facial swelling, head fullness, nasal stuffiness, hoarseness and cough. They also report headaches, lightheadedness, and distorted vision. This patient is most likely experiencing:

    a. pericardial tamponade.

    b. TIA.

    c. superior vena cava syndrome.

    d. congestive heart failure.

13. A patient with metastatic breast cancer presents with dry, non-productive cough. The physical exam reveals diminished breath sounds and dullness to percussion. This patient is most likely experiencing:

    a. malignant pleural effusion.

    b. cardiac tamponade.

    c. Pneumonia.

    d. superior vena cava syndrome.

14. Clinical manifestations of cardiac tamponade may include:

    a. productive cough with green-yellow sputum, dizziness.

    b. shortness of breath with productive cough.

    c. retrosternal chest pain causing patient to lean forward, progressive dyspnea, restlessness.

    d. blood-tinged frothy sputum, periods of apnea, frontal headache.

15. The <u>most</u> common presenting symptom for patent with increased cranial pressure is:

    a. dizziness.

    b. blurred vision.

    c. burning eyes.

    d. headache.

16. Which of the following would be appropriate to recommend to a patient experiencing ongoing fatigue two months after completing treatment?

A. Take daily naps lasting 45 minutes or more
B. Establish a plan to conserve energy
C. Decrease caloric intake
D. Register to run a 5K.

17. A patient has been unable to button clothes and has had several falls. Upon assessment, which adverse effect is suspected?

A. Dyspareunia
B. Failure to thrive
C. Peripheral neuropathy
D. Anorexia

18. A patient presents with new onset of treatment related dermatitis recommendations would include:

A. Wearing tight constrictive clothing.
B. Applying SPF 15.
C. Taking hot showers.
D. Using mild soap.

19. Which of the following surveillance approaches align best with evidence-based survivorship care?

a. Routine imaging at every follow-up visit regardless of symptoms
b. Tumor marking testing for all cancer survivors
c. Symptom-focused history with selective testing based on risk
d. Annual PET/CT scans for early detection

20. Which survivorship care model most effectively balances oncology expertise with comprehensive preventative care?

a. Oncology led model
b. Primary care led model
c. Shared care model
d. Multidisciplinary clinic model

21. Which of the following is considered a late effect of cancer treatment rather than a long-term effect?

a. Peripheral neuropathy beginning with chemo
b. Fatigue persisting immediately after radiation treatment
c. Nausea occurring during active treatment
d. Cardiovascular disease developing years after chest irradiation

22. Why is it important to include routine sexual health discussions during patient visits?

a. Sexual side effects are rare and usually insignificant
b. Sexual dysfunction resolves without intervention
c. Patients may hesitate to raise sexual concerns unless prompted by clinicians
d. Sexual health issues are only relevant during active treatment

23. The hospice approach to care involves:

a. interdisciplinary team.
b. nursing care 24 hours per day.
c. undefined time limits.
d. oncology treatment for eligible patients.

24. Hospice services are best paid for by:

a. the patient.

b. Medicare.

c. Medicare, Medicaid, and private insurance companies.

d. private insurance companies.

Scenario: A woman with non–small-cell lung cancer was initially treated with right lung resection and radiation therapy that she completed 3 months ago. She feels well except for persistent aching in the right side of her chest with occasional burning pain that has increased over the past several weeks. The pain increases if clothing touches the healed incision, but areas proximal to the scar are numb to light touch. She is taking hydrocodone and ibuprofen, which provide partial relief; however, she requests stronger pain relief.

25. Which of the following is the most appropriate to add to his patient's pain management plan?

a. Nabumetone
b. Oxycodone (5mg)/acetaminophen (325 mg) every 4 hours, as needed
c. Meperidine, 50 to 100 mg every 4 to 6 hours as needed
d. Gabapentin, 100 mg 3 times daily

<u>Scenario</u>: A man with prostate cancer and widespread bone metastasis has failed hormonal therapy and is being considered for chemotherapy. He is currently taking:

Controlled-release oxycodone, 80 mg every 12 hours. **Ibuprofen, 600 mg 3 times daily; and** **Oxycodone, 15 to 20 mg up to twice daily with no side effects**

He reports a pain level of 1/10 to 2/10. He wants to decrease the dose of pain medicine due to concern that his pain will worsen in the future, and he will already be taking maximum doses.

26. Which of the following is most appropriate explanation?

    a. Opioids have no ceiling dose
    b. Tolerance limits the amount of opioid that can be taken over time
    c. Taper the controlled-release oxycodone
    d. Switch to intravenous medications

Section II Short Answer/Fill in the blank)
The following items are short answer/fill in the blank. (1 point each)

27. Calculate the corrected calcium based on serum calcium 10.2 and albumin 2.8.

    _____

28. Calculate the corrected calcium based on the serum calcium 12.8 and albumin 3.4.

    _____

29. Name three foundational skills of the Primary Palliative Care Model