Symptom Management

Kristi Dubey, APRN, AGACNP-BC, OCN

ONS Oncology Nursing Society

CENTRAL CONNECTICUT CHAPTER

SYMPTOM MANAGEMENT

- CORNERSTONE OF ONCOLOGY NURSING
- EVIDENCE BASED
- ACUTE
- DELAYED
- CHRONIC

Assessment and Plan

- Chart Review
- Review of System
- History and Physical Examination
- Diagnostic Testing
- Therapeutic treatment
- Outcomes/Education

ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

Cardiovascular System

Common Cardiovascular Complications in cancer treatments

1. Vascular toxicity (HTN)
2. Cardiomyopathy
3. Myocarditis
4. Arrythmias/QTC prolongation
5. Venous Thromboembolism
6. Coronary Artery Vasospasm
7. Lymphedema

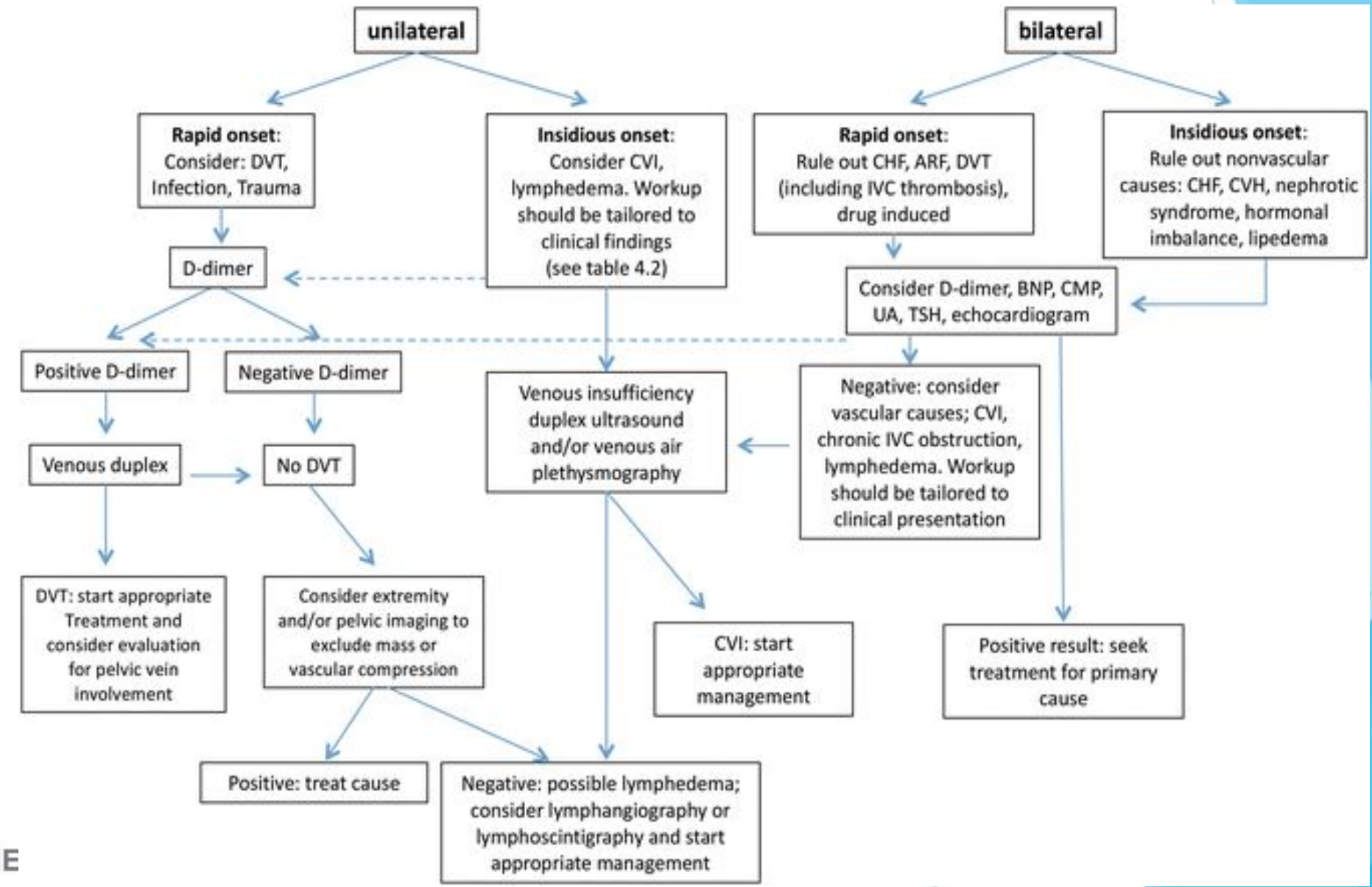
ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

CARDIOVASCULAR/Risk Factors

- Venous Thromboembolism
- PERICARDIAL EFFUSION
- CHF
- CORONARY ARTERY VASOSPASM

- Cancer, Immobility, Medication
- BREAST CANCER, RADIATION > 30% OF HEART IN FIELD, NARROWING PULSE PRESSURE LESS THAN 40 MMHGB
- ANTHRACYCLINES CAUSE INCREASED FREE RADICALS THAT IMPEDE LVEF; CUMULATIVE DOSING LIMITS RISK
- ANTIMETABOLITES, 5FU

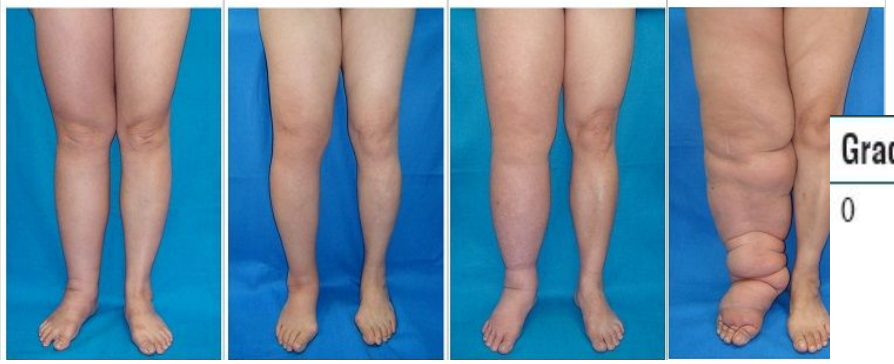
CARDIOVASCULAR: EDEMA



ONS Oncology Nursing Society

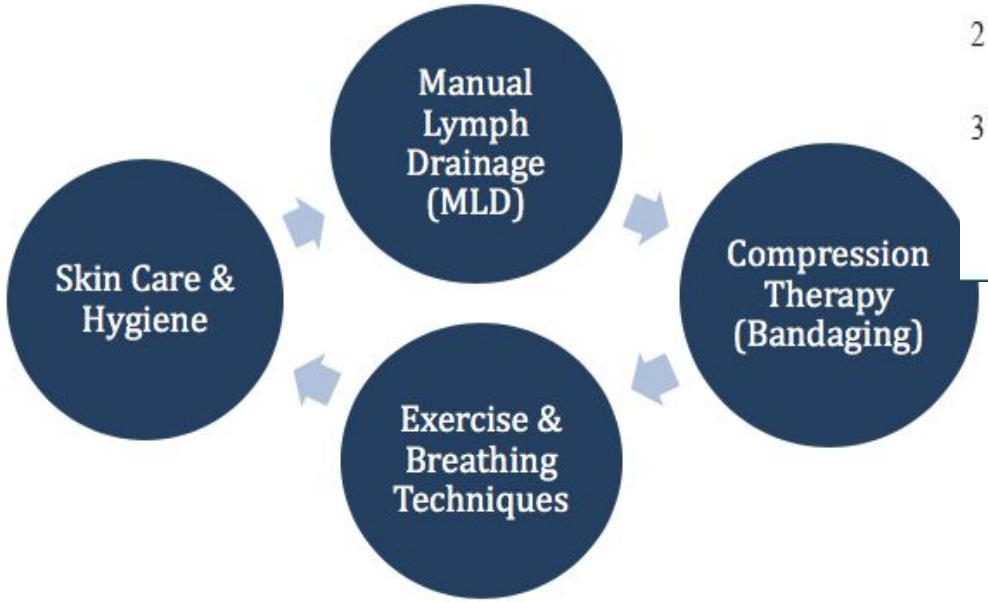
CENTRAL CONNE
CHAPTER

CARDIOVASCULAR:LYMPHEDEMA

Grade	Grade I	Grade II	Grade III	Grade IV
Circumferential Difference	10-19%	20-29%	30-39%	40-49%
Clinical Image				

LYMPHEDEMA GRADING

Grade	Features
0	Latent or subclinical condition where swelling is not evident despite impaired lymph transport, subtle alterations in tissue fluid/composition, and changes in subjective symptoms. It may exist months or years before overt edema occurs
1	Early accumulation of fluid relatively high in protein content (e.g., in comparison with "venous" edema) that subsides with limb elevation. Pitting may occur
2	Pitting may or may not occur as tissue fibrosis develops. Limb elevation alone rarely reduces tissue swelling
3	Lymphostatic elephantiasis where pitting is absent. Trophic skin changes, such as acanthosis, alterations in skin character and thickness, fat deposits and fibrosis, and warty overgrowths, often develop



ONS Oncology Nursing Society
CENTRAL CO CHAPTER

CARDIOVASCULAR SYMPTOMS

LYMPHEDEMA

Lymph node obstruction/ removal

Radiation therapy

Axilla/groin

TRAUMA
OBESITY
POOR DIET
IMMOBILITY
LONG DISTANCE TRAVEL

EDEMA

Metabolic

Drug related

Fluid overload
Anemia
Low albumin
Gabapentin
Steroids
HORMONES
COX 2 MEDS
Gemcitabine
Docetaxel

CHEST PAIN

PLEURITIC

CARDIAC

Rib mets
Filgrastim
Pneumonitis
Pulmonary embolus
Pneumonia
CORONARY VASOSPASM
RELATED TO 5FU
Pericardial effusion(15-50 MLS IN PERICARDIUM)
MI

Respiratory System

Common Respiratory Complications in cancer treatments

ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

PULMONARY: DYSPNEA

- Sensation of difficulty breathing
- Caused by increased ventilatory demand
- Impairment of the mechanical process of ventilation
- Potential life-threatening causes should be evaluated
  - Pulmonary embolus
  - Cardiac tamponade
  - Pleural effusion
  - Pneumonia
  - Anemia
  - Pneumonitis
  - Airway obstruction

PULMONARY ASSESSMENT

- Can be subjective feeling of air hunger
- Unable to breathe in or out
- Chest tightness, rapid or shallow breathing
- Lung sounds, oxygen sat with ambulation, d dimer, ldh, cbc, procalcitonin

Acute pneumonitis	**Pulmonary fibrosis**
Bleomycin	Bleomycin
Vinca alkaloids	
Methotrexate	
Procarbazine	
Carmustine	
Mitomycin	
Hypersensitivity pneumonitis	**Non cardiogenic pulmonary edema**
Procarbazine	Cyclophosphamide
Azathioprine	Methotrexate
Bleomycin	Cytarabin
Methotrexate	Mitomycin

Dyspnea in a Patient with an Underlying Malignancy

Malignancy-Related

Directly Caused By Malignancy?

- Pulmonary: Primary lung cancer, lung metastases, lymphangitic spread, malignant pleural effusion, lobar collapse, hemorrhage
- Cardiac: Pericardial effusion
- Other: SVC obstruction, dyspnea of malignancy

Indirectly Caused By Malignancy?

- Pulmonary embolism from hypercoagulability
- Pneumonia related to immunodeficiency

Unrelated

- Pulmonary: COPD, Asthma, CAP
- Cardiac: CHF, ACS

Treatment Related

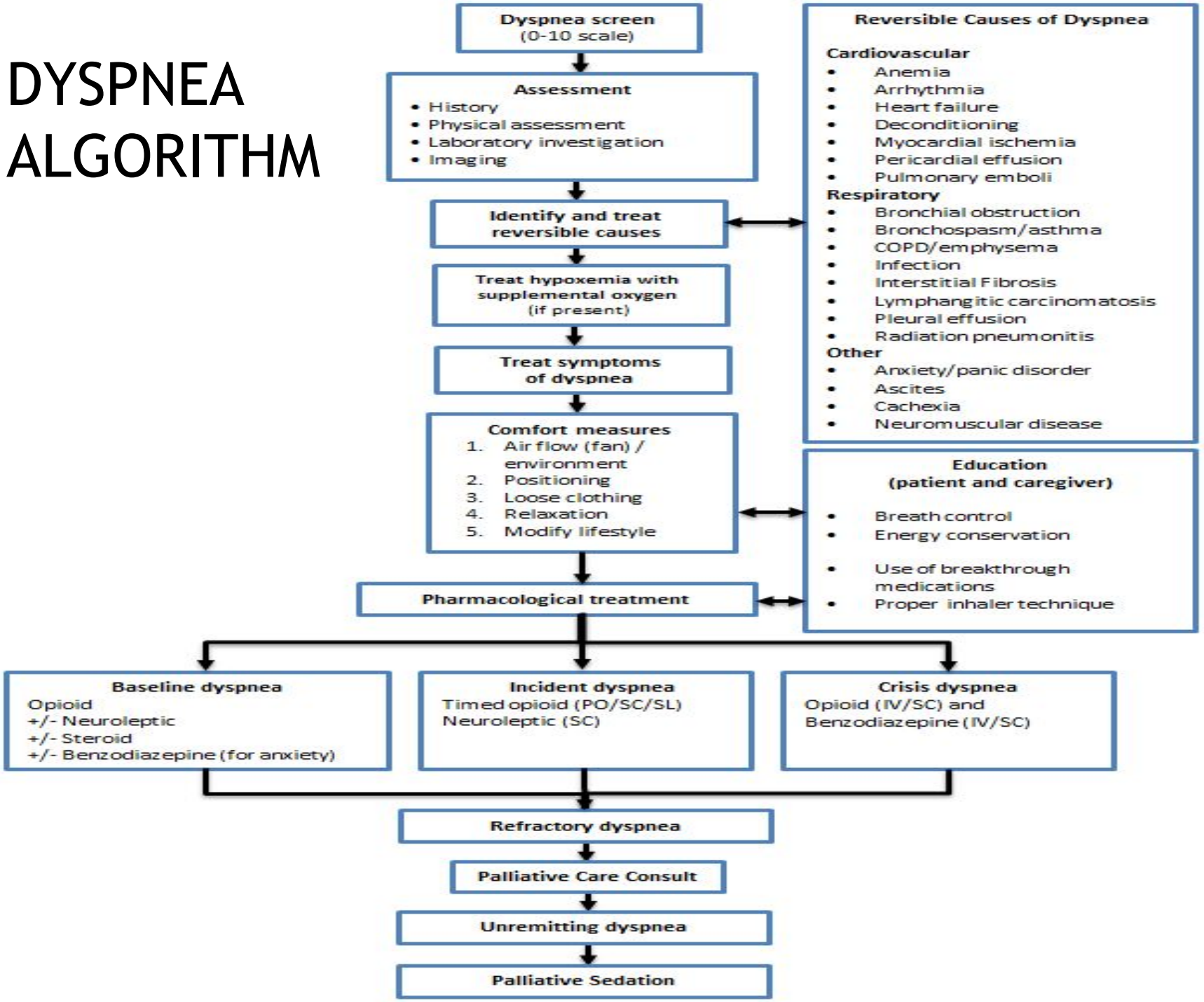
Directly Caused By Treatment?

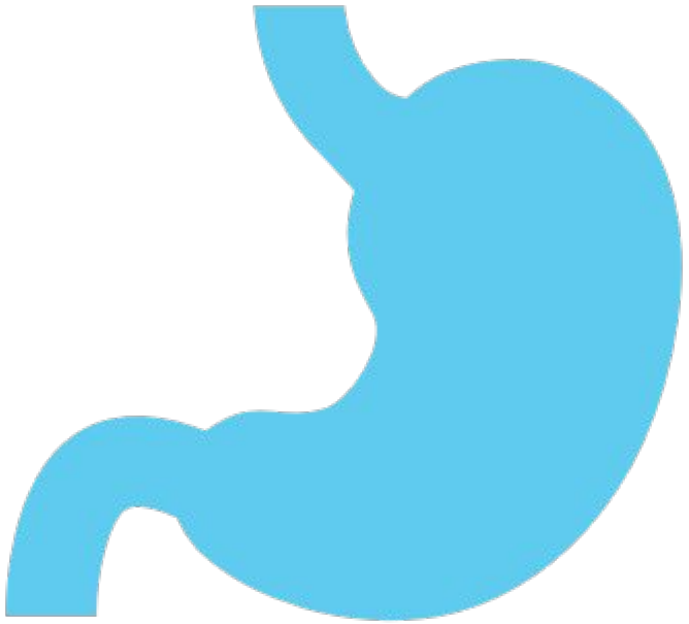
- Radiation: Pneumonitis, pulmonary fibrosis, BOOP, pericarditis
- Chemo: Lung toxicity (bleomycin, carmustine, methotrexate, cyclophosphamide, busulfan), cardiac toxicity (anthracyclines, cyclophosphamde, paclitaxel, Herceptin)

Indirectly Caused By Treatment?

- Pancytopenia resulting in dyspnea from respiratory infections or severe anemia
- Higher risk of CAD with chest wall radiation

DYSPNEA ALGORITHM





Gastrointestinal System

GASTROINTESTINAL

- Stomatitis/esophagitis/mucositis
- Aspiration
- Nausea/vomiting
- Ascites
- Diarrhea
- Constipation

MUCOSITIS

- > 50% of patients will experience
- Can lead to dehydration, electrolyte imbalances, delays in tx
- Defined as inflammation or lesions that occur anywhere in the GI tract
- Causes include chemo, radiation to any area of GI tract, poor oral hygiene, smoking, etoh
- Major offenders: MTX, 5FU, doxorubicin, head and neck radiation

DRUGS THAT CAUSE MUCOSITIS

Alemtuzumab (Campath)	Etoposide (VePesid)	Mitomycin (Mutamycin)
Asparaginase (Elspar)	Fluorouracil (5-FU)	Mitoxantrone (Novantrone)
Bleomycin (Blenoxane)	Gemcitabine (Gemzar)	Oxaliplatin (Eloxatin)
Busulfan (Myleran, Busulfex)	Gemtuzumab ozogamicin (Mylotarg)	Paclitaxel (Taxol)
Capecitabine (Xeloda)	Hydroxyurea (Hydrea)	Pemetrexed (Alimta)
Carboplatin (Paraplatin)	Idarubicin (Idamycin)	Pentostatin (Nipent)
Cyclophosphamide (Cytoxan)	Interleukin 2 (Proleukin)	Procarbazine (Matulane)
Cytarabine (Cytosar-U)	Irinotecan (Camptosar)	Thiotepa (Thioplex)
Daunorubicin (Cerubidine)	Lomustine (CeeNU)	Topotecan (Hycamtin)
Docetaxel (Taxotere)	Mechlorethamine (Mustargen)	Trastuzumab (Herceptin)
Doxorubicin (Adriamycin)	Melphalan (Alkeran)	Tretinoin (Vesanoid)
Epirubicin (Ellence)	Methotrexate (Rheumatrex)	Vinblastine (Velban)
		Vincristine (Oncovin)

Oncology nurse advisor, 2019

MUCOSITIS INTERVENTIONS

- Aggressive oral hygiene
- Oral cryotherapy
- Miracle mouthwash (Benadryl + Maalox +/- Lidocaine)
- Nystatin (only treats fungal infection)
- Saline or sodium bicarb rinses
- Avoidance of irritating foods, liquids

CANCER CACHEXIA/ANOREXIA

- Marker for poor prognosis
- Hypermetabolic state in chronic inflammatory response
- Nutritional supplements and appetite stimulation do not overcome changes in metabolic processes
- Body weight is singular best measure
- Cofactors include; nausea, constipation, diarrhea, taste changes, depression, inactivity

NUTRITIONAL COUNSELING

Megace 800 mg daily. (risk of dvt, expense) Remeron (sleep, appetite, depression) medical marijuana

Steroids, short term

Medroxyprogesterone 1 gram daily

Dronabinol

(side effects helpful with nausea, mood more than weight gain)

Melatonin nightly (possibly)

Beta blockers

Mirtazapine/olanzapine

Incorporation of activity

INTERVENTIONS

Table 1. National Cancer Institute Common Terminology Criteria for Adverse Events: Gastrointestinal Toxicity

ADVERSE EVENT	GRADE 1 (MILD)	GRADE 2 (MODERATE)	GRADE 3 (SEVERE)	GRADE 4 (LIFE THREATENING OR DISABLING)	GRADE 5 (DEATH)
Constipation	Occasional or intermittent symptoms; occasional use of stool softeners, laxatives, dietary modification, or enema	Persistent symptoms with regular use of laxatives or enemas indicated	Symptoms interfering with activities of daily living; obstipation with manual evacuation indicated	Life-threatening consequences (e.g., obstruction, toxic megacolon)	Death
Diarrhea	Increase of < 4 stools per day over baseline; mild increase in ostomy output compared to baseline	Increase of 4–6 stools per 24 hours over baseline; IV fluids indicated < 24 hours; moderate increase in ostomy output compared to baseline; not interfering with activities of daily living	Increase of 7 stools per 24 hours over baseline; incontinence; IV fluids 24 hours; hospitalization; severe increase in ostomy output compared to baseline; interfering with activities of daily living	Life-threatening consequences (e.g., hemodynamic collapse)	Death
Nausea	Loss of appetite without alteration in eating habits	Oral intake decreased without significant weight loss, dehydration or malnutrition; IV fluids indicated < 24 hours	Inadequate oral caloric or fluid intake; IV fluids, tube feedings, or total parenteral nutrition indicated 24 hours	Life-threatening consequences	Death
Vomiting	1 episode in 24 hours	2–5 episodes in 24 hours; IV fluids indicated < 24 hours	6 episodes in 24 hours; IV fluids or total parenteral nutrition indicated 24 hours	Life-threatening consequences	Death

Note. Based on information from National Cancer Institute, 2006.

NAUSEA AND VOMITING

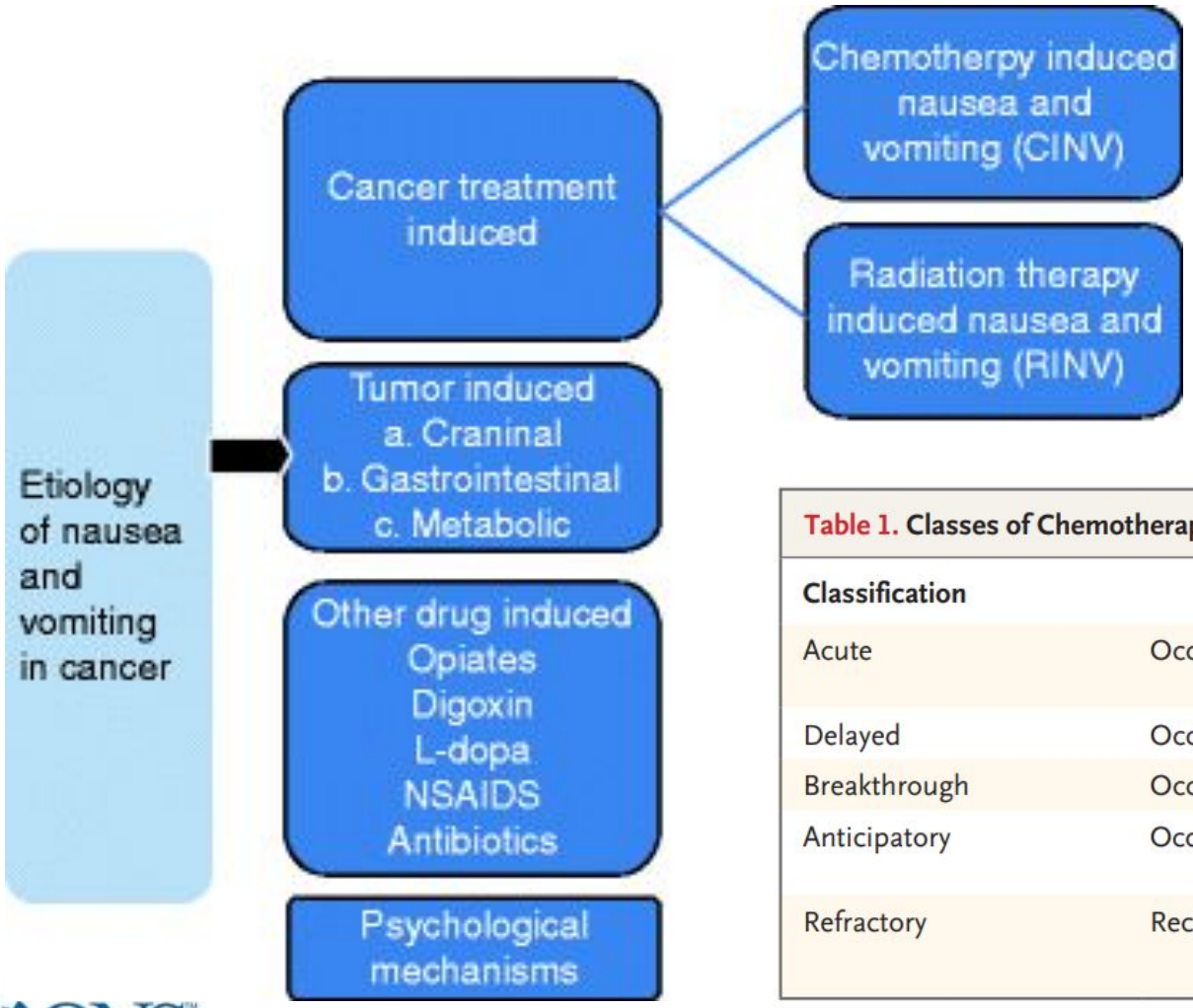


Table 1. Classes of Chemotherapy-Induced Nausea and Vomiting.

Classification	Definition
Acute	Occurring within the first 24 hours after initiation of chemotherapy[10]; generally peaks after 5 to 6 hours[11]
Delayed	Occurring from 24 hours to several days (days 2 to 5) after chemotherapy[12]
Breakthrough	Occurring despite appropriate prophylactic treatment[13]
Anticipatory	Occurring before a treatment as a conditioned response to the occurrence of chemotherapy-induced nausea and vomiting in previous cycles[14]
Refractory	Recurring in subsequent cycles of therapy, excluding anticipatory chemotherapy-induced nausea and vomiting[13]

ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

Navari RM, Aapro M. Antiemetic Prophylaxis for Chemotherapy-Induced Nausea and Vomiting. *N Engl J Med*. 2016;374(14):1356-1367. doi:10.1056/NEJMra1515442

NAUSEA AND VOMITING

Table 2. Levels of Emetogenic Potential of Chemotherapeutic Agents.

Level	Emetogenic Potential (% of Patients with Emesis)
1	Minimal (0 to <10%)
2	Low (10 to 30%)
3	Moderate (>30 to 90%)
4	High (>90%)

Table 1. Emetic Classification of Antineoplastic Agents

High Risk	Moderate Risk	Low Risk	Minimal Risk
Cisplatin	Carboplatin	Mitoxantrone	Vinorelbine
Mechlorethamine	Cyclophosphamide (<1.5 g/m^2)	Paclitaxel	Bevacizumab
Streptozotocin	Daunorubicin	Docetaxel	Rituximab
Cyclophosphamide (≥1.5 g/m^2)	Doxorubicin	Mitomycin	Bleomycin
Carmustine	Epirubicin	Topotecan	Vinblastine
Dacarbazine	Idarubicin	Gemcitabine	Vincristine
Dactinomycin	Oxaliplatin	Etoposide	Busulfan
	Cytarabine (>1 g/m^2)	Pemetrexed	Fludarabine
	Ifosfamide	Methotrexate	2-Chlorodeoxyadenosine
	Irinotecan	Cytarabine (<1 g/m^2)	
		Fluorouracil	
		Bortezomib	
		Cetuximab	
		Trastuzumab	

Source: Reference 1.

ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

Navari RM, Aapro M. Antiemetic Prophylaxis for Chemotherapy-Induced Nausea and Vomiting. *N Engl J Med*. 2016;374(14):1356-1367. doi:10.1056/NEJMra1515442

NAUSEA AND VOMITING

Table 5. Risk Factors for Chemotherapy-Induced Nausea and Vomiting (CINV)

Patient-related
Previous episodes of CINV
Age < 50 years
Female gender
History of pregnancy-associated nausea and vomiting
History of motion sickness
History of no or very limited alcohol intake
Treatment-related
Emetogenicity of cytotoxic regimen
Chemotherapy dose
Route and rate of administration of chemotherapy

The risk for developing CINV increases with the number of risk factors.

TABLE: DRUGS USED FOR CHEMOTHERAPY-INDUCED NAUSEA AND VOMITING

Drug Class	Notes
5-HT_3–receptor antagonists (dolasetron, granisetron, ondansetron, palonosetron)	• Used for acute emesis with corticosteroids and NK_1-receptor antagonists
Antihistamines (diphenhydramine)	• Useful additions to antiemetic drugs
Benzodiazepines (alprazolam, lorazepam, midazolam) and thienobenzodiazepine (olanzapine)	• Useful additions to antiemetic drugs • Drugs of choice for anticipatory emesis • Olanzapine is reserved for refractory CINV
Butyrophenones (droperidol, haloperidol)	• Usually used for breakthrough symptoms
Cannabinoids (dronabinol, nabilone)	• Second-line therapy
Corticosteroids (dexamethasone, methylprednisolone)	• Increase 5-HT_3 receptor antagonists effectiveness • Can be used alone with chemotherapy of low emetogenic risk
Dopamine-receptor antagonists (metoclopramide, prochlorperazine)	• Usually used for delayed CINV
NK_1-receptor antagonists (aprepitant, fosaprepitant)	• Used for acute emesis

CINV = chemotherapy-induced nausea and vomiting; HT = hydroxytryptamine; NK = neurokinin.
Adapted from references 2, 8-12.

ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

DIARRHEA

CHEMOTHERAPY RELATED	• fluoropyrimidines (particularly fluorouracil [5FU] and capecitabine) • irinotecan • docetaxel
MOLECULAR TARGETED AGENTS	• sorafenib • sunitinib • afatinib
EGFR AGENTS	• lapatinib, aflibercept
IMMUNE CHECKPOINT INHIBITORS	• ipilimumab • nivolumab • pembrolizumab

DIARRHEA CAN ALSO BE….

- INFECTIOUS
- MALABSORPTION(ILEOSTOMY)
- OTHER MEDICATION RELATED (METOCLOPRAMIDE, ANTIBX)
- TYPHLITIS (CECUM INFLAMMATION)
- RADIATION TO PELVIS, INTESTINE

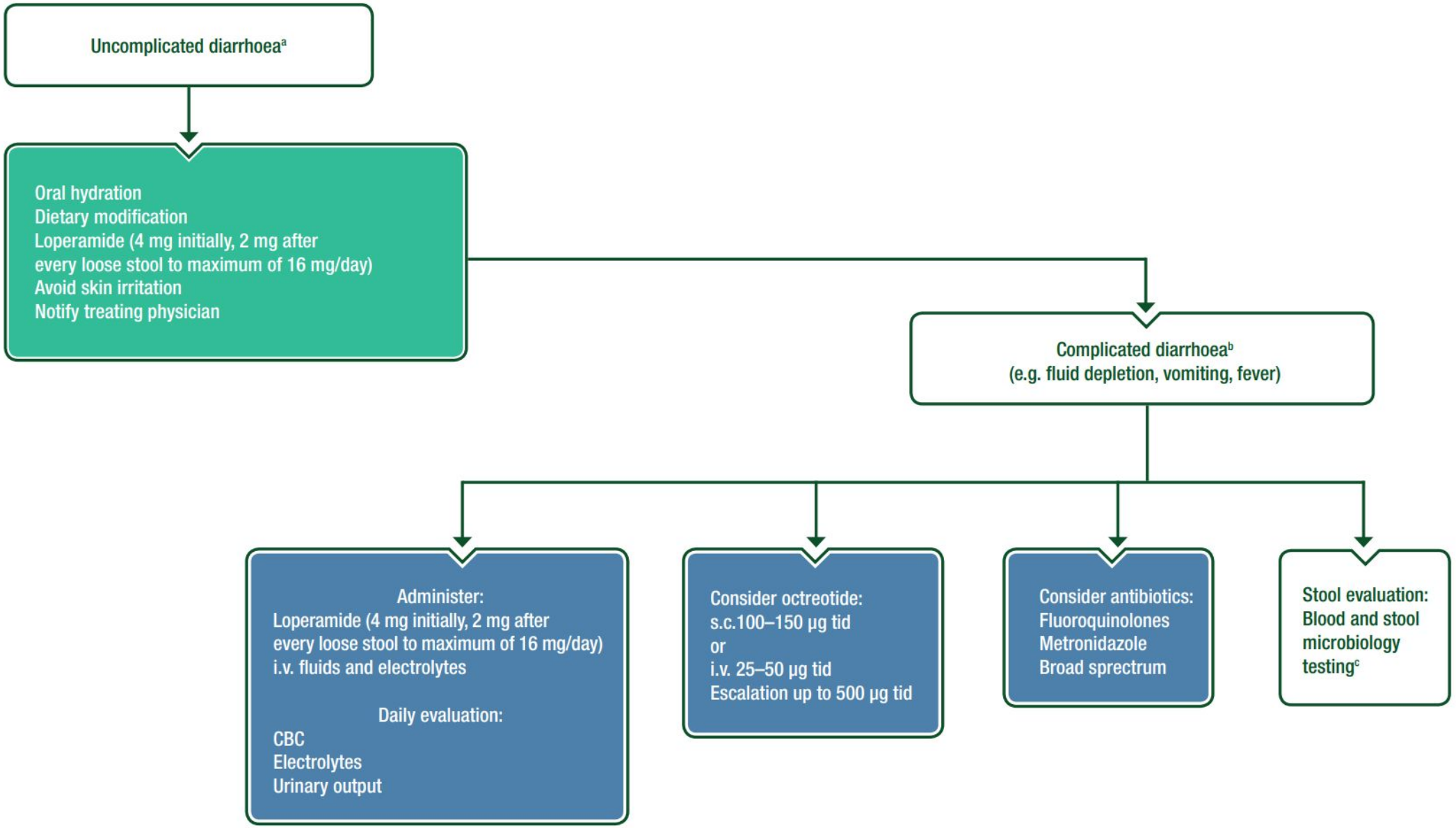


Figure 2. Algorithm for therapeutic approach.
[a]Treatment setting: ambulatory and/or outpatient supportive care outpatient unit.
[b]In-hospital treatment.
[c]Consider *Clostridium difficile*, *Salmonella*, *Campylobacter* and other causes of infectious colitis.
CBC, complete blood count; i.v., intravenous; s.c., subcutaneous; tid, three times a day.

ESMO guidelines, 2018

National Comprehensive Cancer Network®

NCCN Guidelines Version 2.2021
Management of Immune Checkpoint Inhibitor-Related Toxicities

NCCN Guidelines Index
Table of Contents
Discussion

GASTROINTESTINAL ADVERSE EVENT(S)

- Diarrhea
- Colitis[a]

ASSESSMENT/GRADING

- Stool evaluation to rule out infectious etiology[b]
  - Nucleic acid amplification tests (NAATs) for GI pathogens/bacterial culture
  - *C. difficile*
  - Ova & parasites; molecular testing for *Giardia* and *Cryptosporidium* spp and *E. histolytica*; consider microsporidia, *Cyclospora/isospora* spp
  - Viral pathogens testing when available
  - Based on institutional availability, consider lactoferrin/calprotectin[c]
- Infectious disease screening (HIV; hepatitis A, B, C) as clinically indicated
- Consider abdominal/pelvic CT with contrast if G2–G4 colitis[a]
- Consider GI consultation if G2–G4
  - Colonoscopy or flexible sigmoidoscopy ± esophagogastroduodenoscopy (EGD) with biopsy[c]

MANAGEMENT[h]

Mild (G1)[d]
- Consider holding immunotherapy[i]
- Loperamide or diphenoxylate/atropine for 2–3 days
  - If no improvement and not already done, obtain labs for infectious workup
- Hydration
- Close monitoring[j]
- If persistent or progressive symptoms, check lactoferrin/calprotectin[k]
  - If positive, treat as G2 (below)
  - If negative and no infection, continue G1 management and add mesalamine, cholestyramine

Moderate (G2)[e,f]
- Hold immunotherapy[i]
- Prednisone/methylprednisolone[l] (1–2 mg/kg/day)[m]
- No response in 2–3 days, continue steroids, consider adding infliximab[n,o,p] or vedolizumab[p] within 2 weeks[q]

Severe (G3–4)[g] → See ICI_GI-2

Severe (G3–4)[g] diarrhea or colitis
- G3: Discontinue anti-CTLA-4; consider resuming anti-PD-1/PD-L1 after resolution of toxicity[i]
- G4: Permanently discontinue immunotherapy agent responsible for toxicity[i]
- Consider inpatient care for provision of supportive care
- Intravenous (IV) methylprednisolone[l] (1–2 mg/kg/day)[m]
  - No response in 1–2 days, continue steroids, strongly consider adding infliximab[n,o,p] or vedolizumab[p,q,r]

Neurological System

NEUROLOGIC

- ALTERED MENTAL STATUS
  - BRAIN METS
  - METABOLIC
  - DRUGS
  - DEPRESSION/ANXIETY
- PARASTHESIAS
  - pins and needles
  - OXALIPLAT
  - CISPLAT
  - VINCA ALKALOIDS
  - TAXANES
- Dysesthesia
  - abnormal sensations
  - OXALIPLAT
- Extrapyramidal Effects
  - Involuntary movements
  - PROCHLORPERAZINE
  - HALDOL
  - METOCLOPRAMIDE
  - OLANZAPINE

CHEMO BRAIN

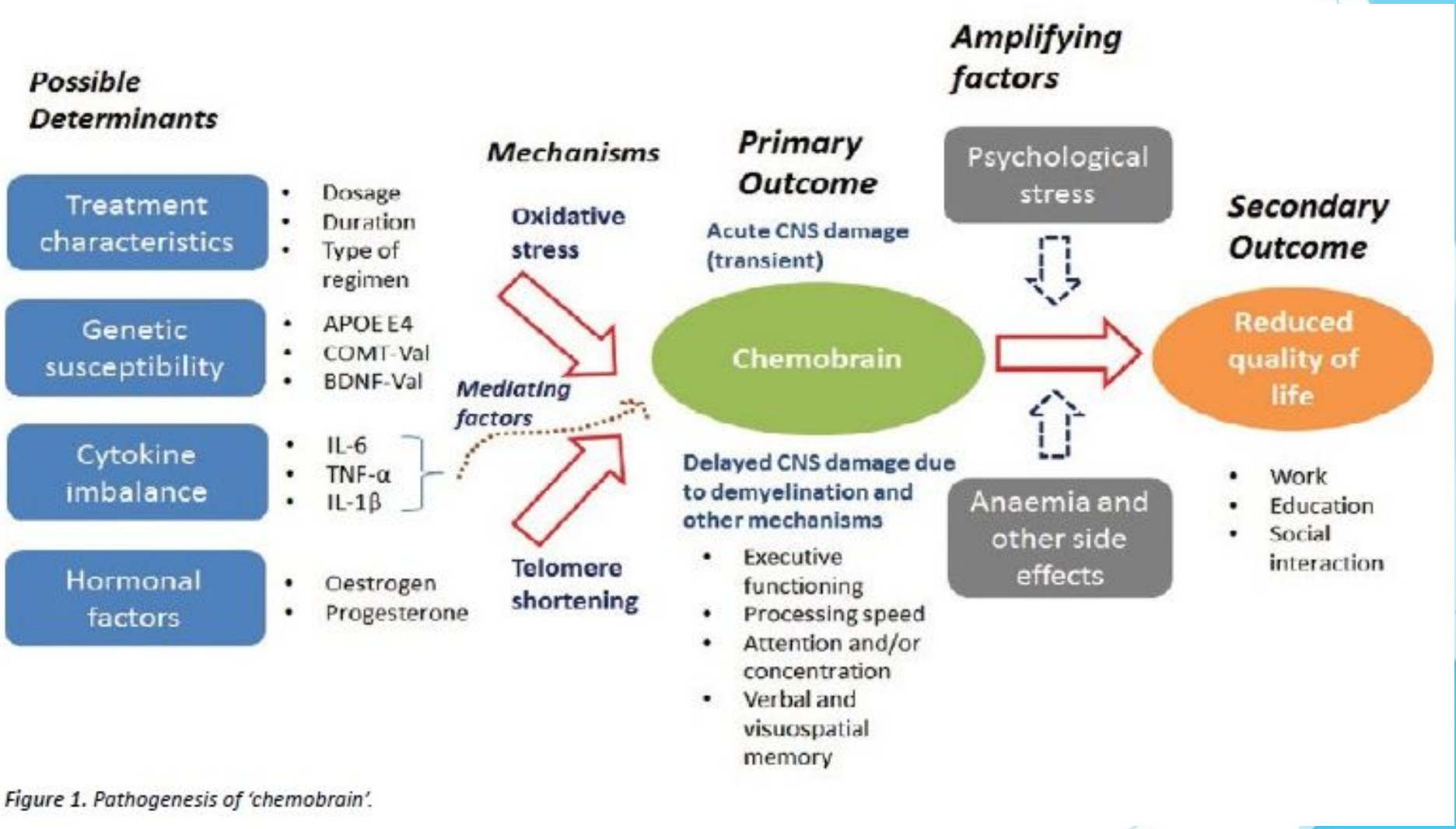


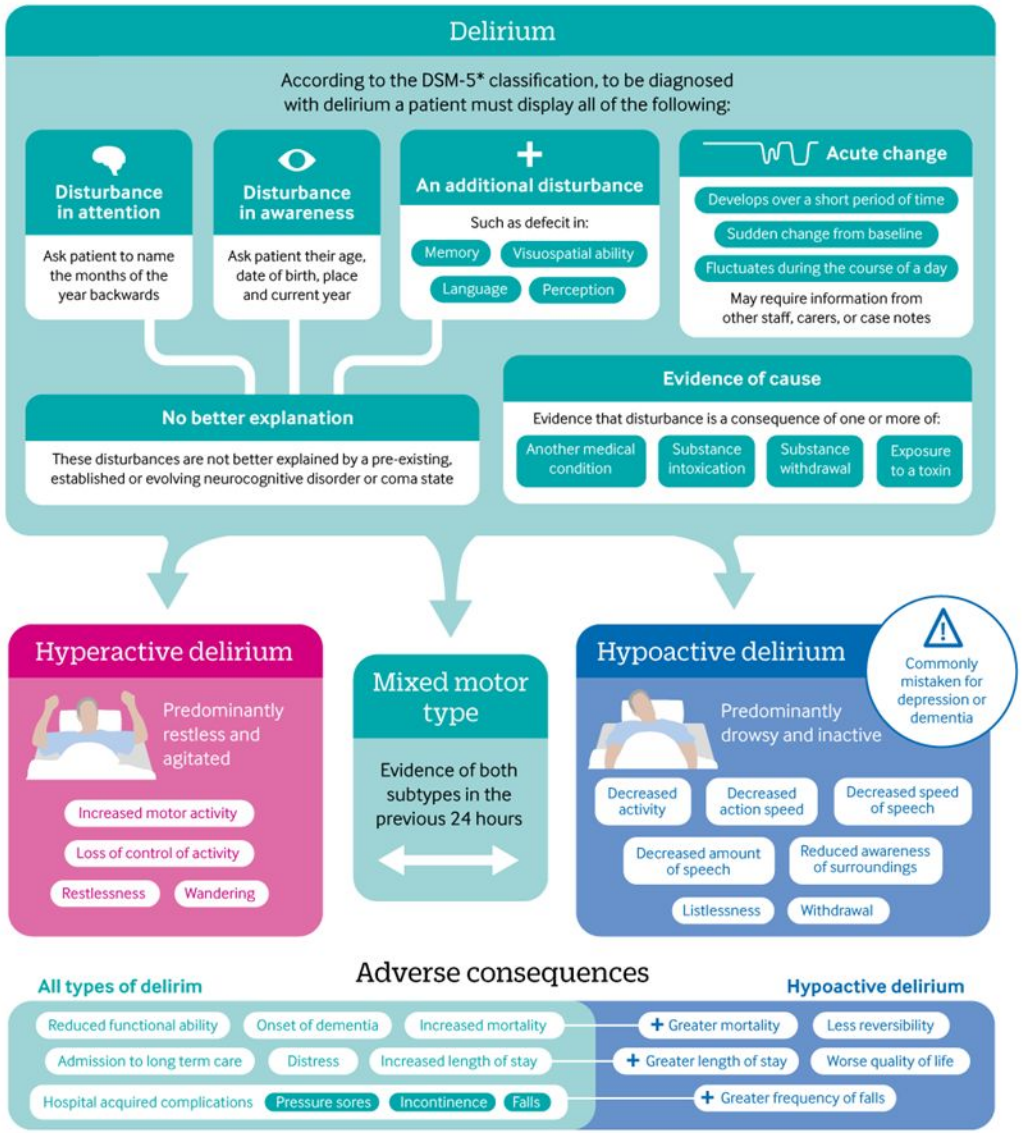
Figure 1. Pathogenesis of 'chemobrain'.

(Ho, 2015)

Visual summary

Quietly delirious

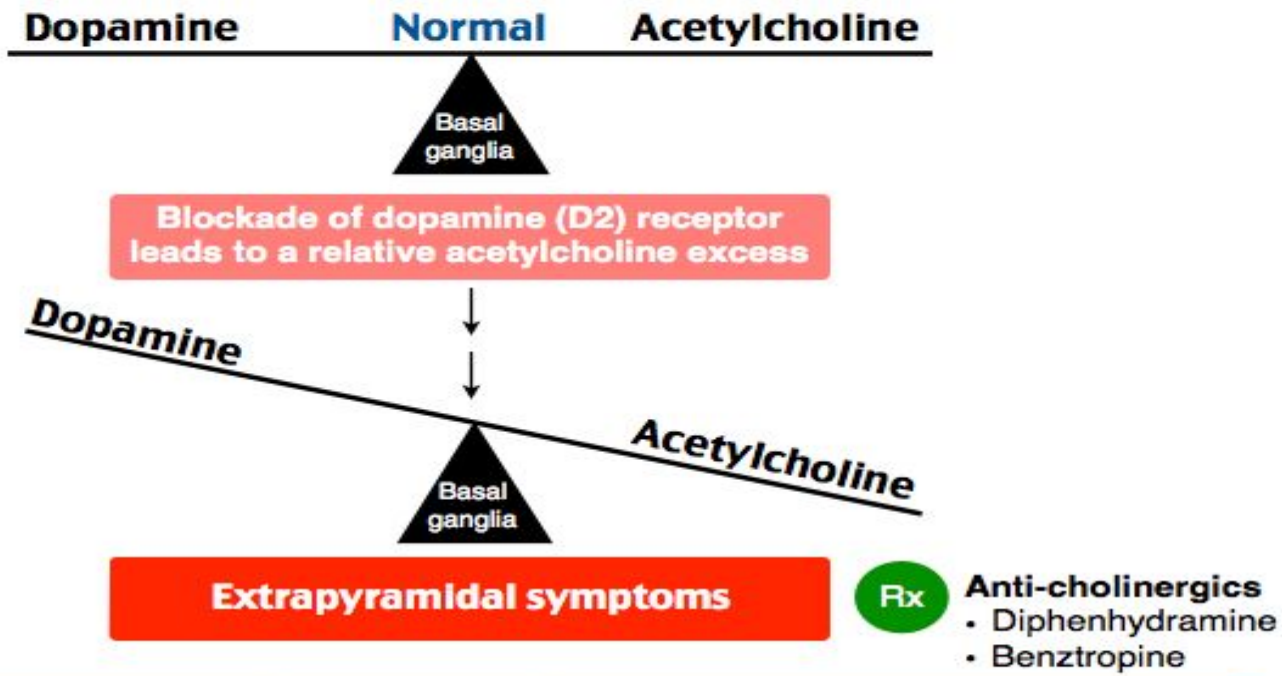
Hypoactive delirium can be more difficult to recognise than hyperactive delirium, and is associated with worse outcomes. This infographic summarises the main differences between the two forms of delirium.



* DSM-5 = Diagnostic and Statistical Manual of Mental Disorders (fifth edition)

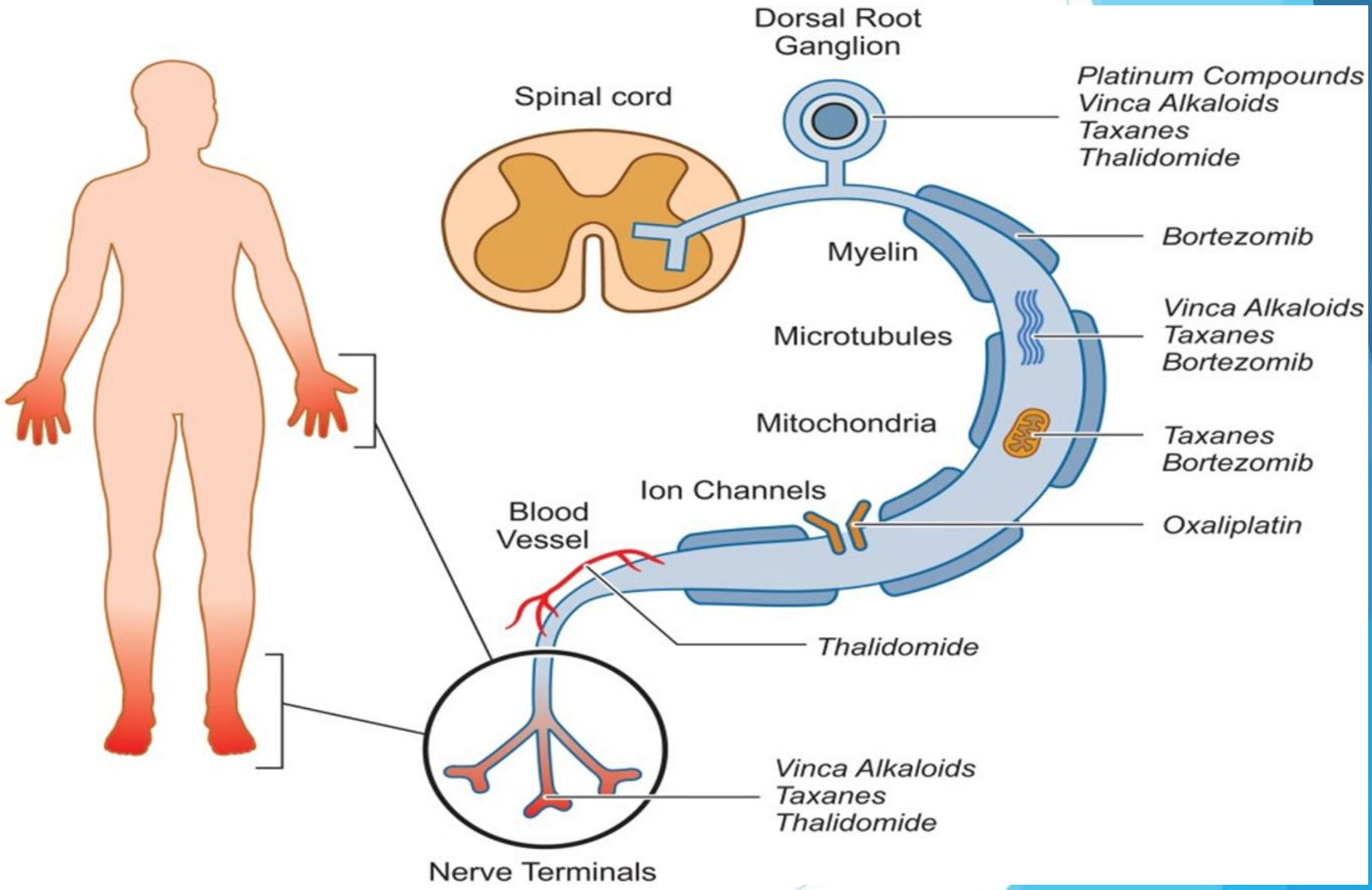
thebmj Read the full article online http://bmj.co/delirium

Extrapyramidal symptoms



Reaction	Onset	Features
Acute dystonia	Hours to days	• Spasm of tongue, neck, face and back
Parkinsonism	5 to 30 days	• Tremor • Shuffling gait • Drooling • Stooped posture • Instability
Akathisia	5 to 60 days	• Compulsive, repetitive motions • Agitation
Tardive dyskinesia	Months to years	• Lip smacking • Worm-like tongue movements • "Fly-catching"

NEUROLOGIC TOXICITY



ONS Oncology Nursing Society

CENTRAL CONNECTICUT CHAPTER

SLEEP DISTURBANCES

Often in combination with anxiety, fatigue and inactivity

Sleep disturbances are subjective sensation actual or perceived of disturbances in night-time sleep cycle

2 phases to the sleep wake cycle:

Rem and non rem (active vs restful), each lasts about 90 mins over a 7–8-hour period

If persistent disturbances, a polysomnography will detect breathing disorders or limb movement disorders

Genitourinary System

GENITOURINARY FACTORS:

Chemotherapy
- Cyclophosphamide, ifos, mtx, cisplatin, targeted agents (bevacizumab, sorafenib)

Infection
- Uti, pyelonephritis

Radiation
- Bladder or pelvis

Cancer progression
- Ureteral obstruction

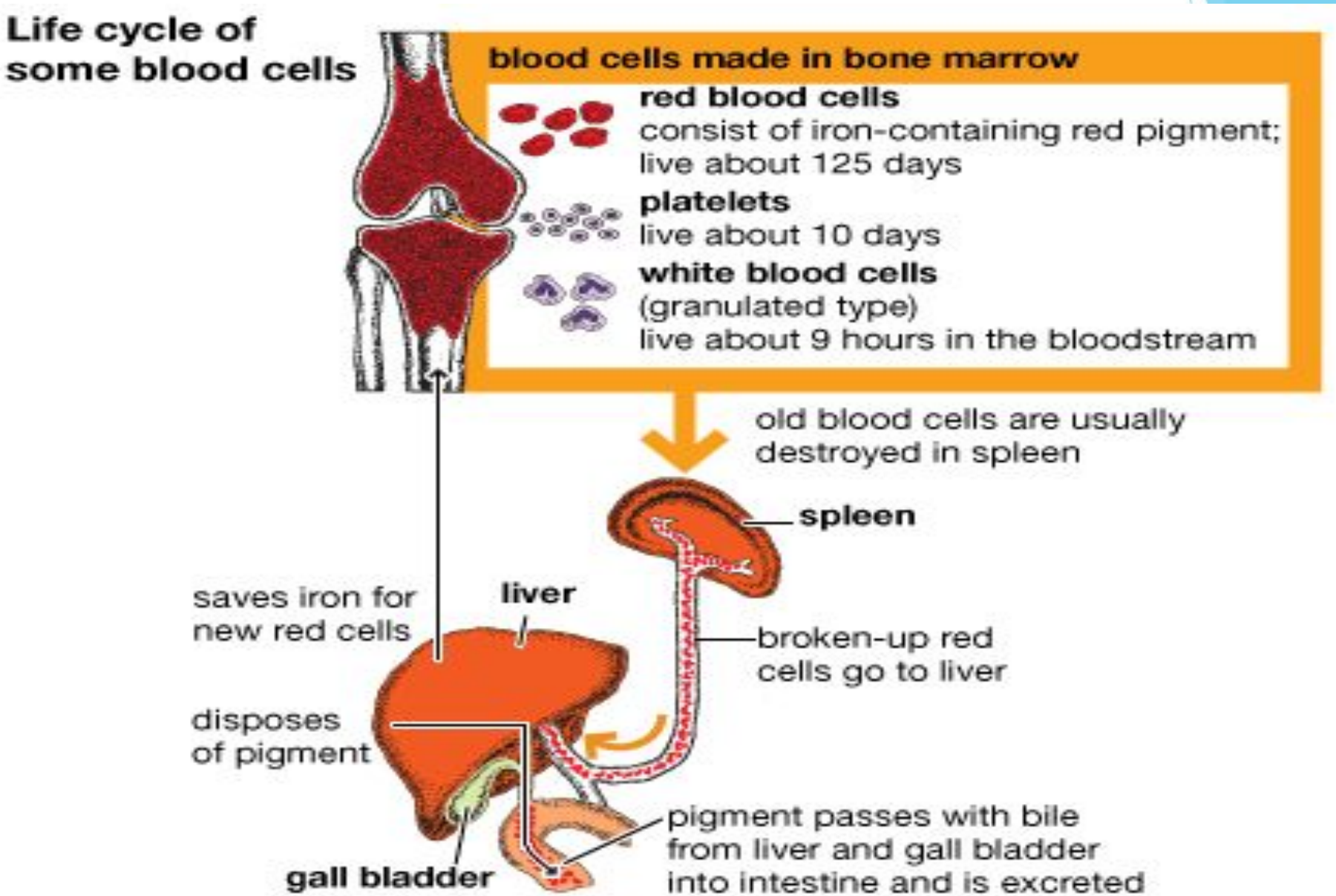
Metabolic abnormalities
- Hypercalcemia, hyperglycemia

Medications
- Opiates, bisphosphonates

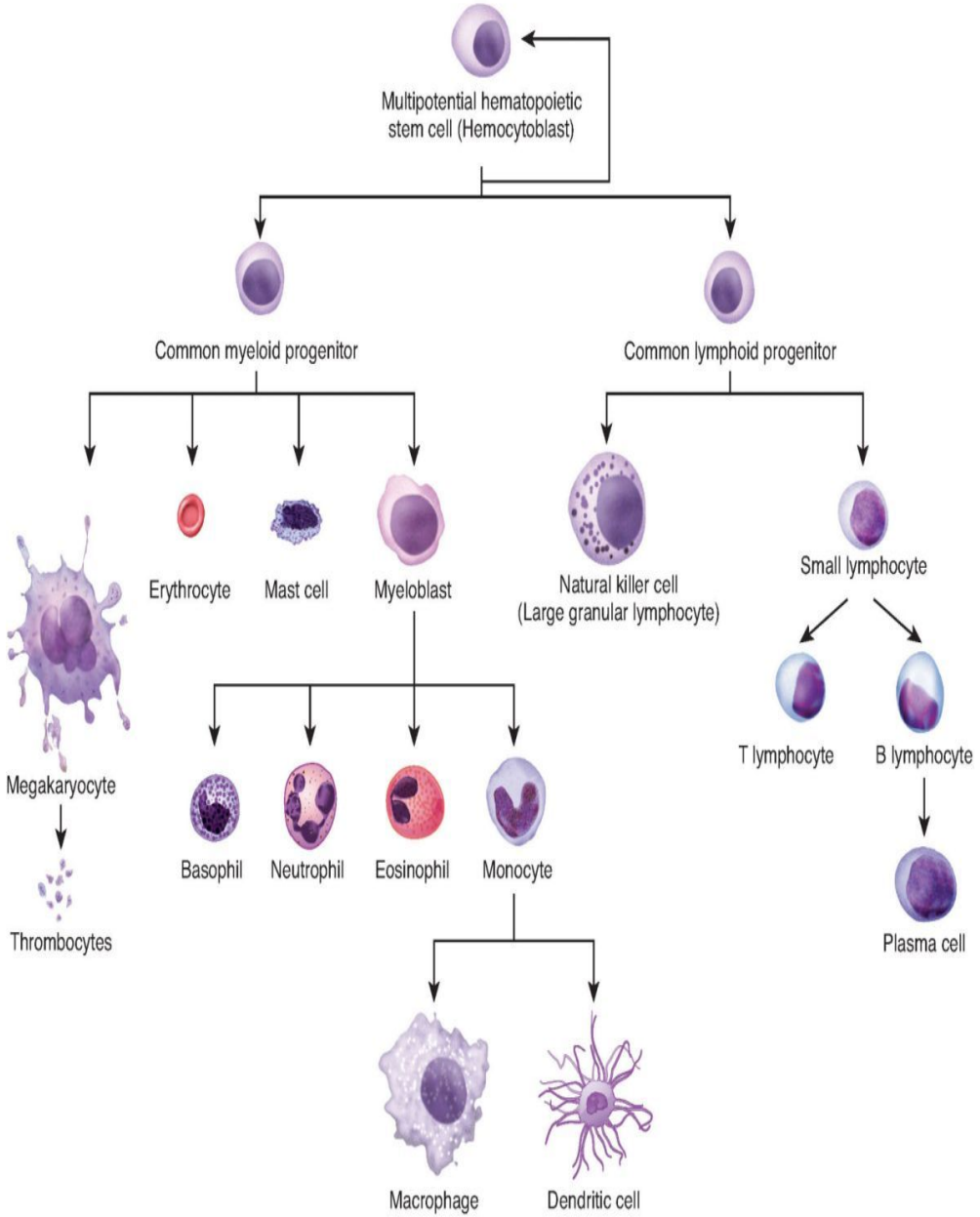
Stool impaction

Hematological System

HEMATOLOGIC:

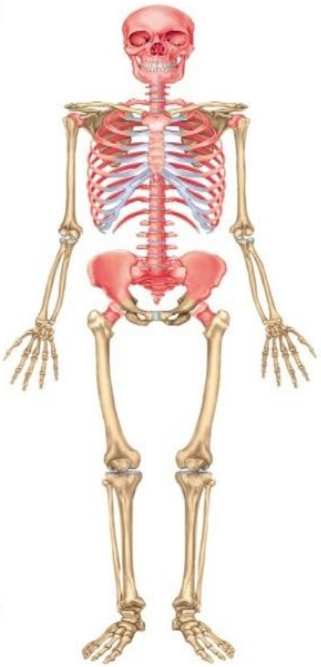


HEMATOLOGIC



SITES OF MARROW PRODUCTION

- **In children**
  - All bones with red bone marrow
  - Liver & spleen
- **In adults (after 20yrs)**
  - Ends of long bones like femur, humerus
  - Skull
  - Vertbrae
  - Ribs
  - Sternum
  - pelvis



ONS Oncology Nursing Society
CENTRAL CON
CHAPTER

CALCULATION OF ANC

Absolute Neutrophil Count

$$ANC = \frac{(\%neutrophils + \%bands) * WBC}{100}$$

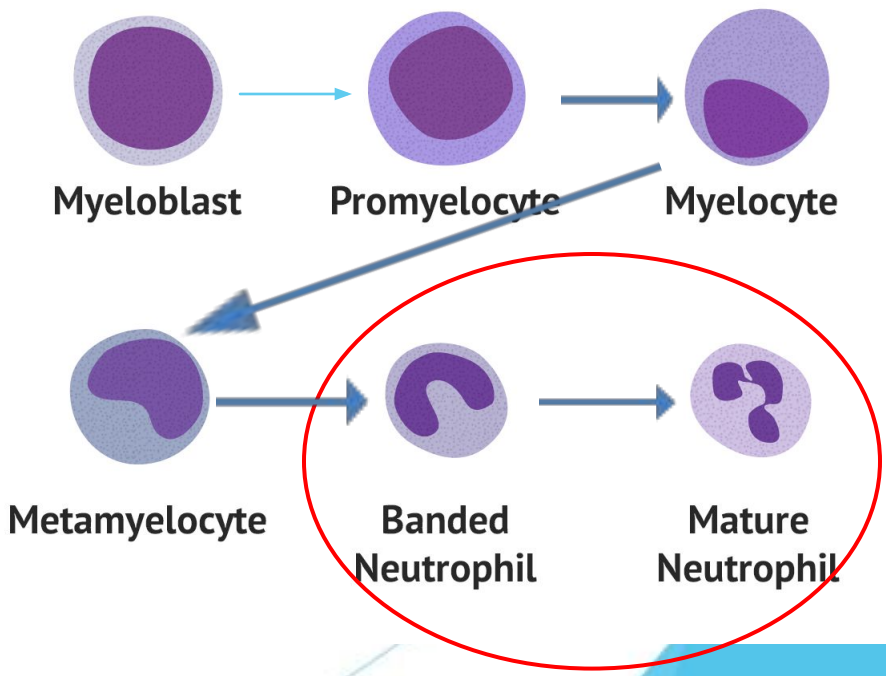
ONS Where Oncology Nurses Connect

Example #1

- Total WBC count = 1600
- Polys= 48
- Bands= 5

- Add polys and bands: 48 + 5 = 53
- Convert to a percentage: 53/100 = .53 = 53%
- Multiple total WBC count by percentage to find ANC: 1600 x 0.53

ANC = 848



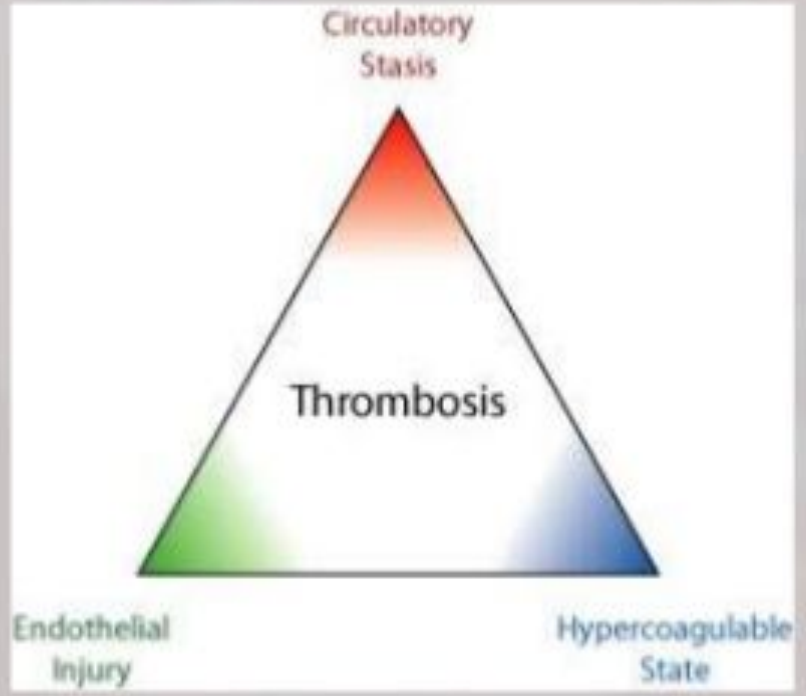
ONS Oncology Nursing Society
CENTRAL CONN
CHAPTER

VTE

Risk factors

Stasis
Immobility/cast/travel
Advanced age
Acute medical illness
Major surgery
Spinal cord injury
Obesity

Endothelial Damage
Major surgery
Trauma
Central venous catheterization



Hypercoagulability

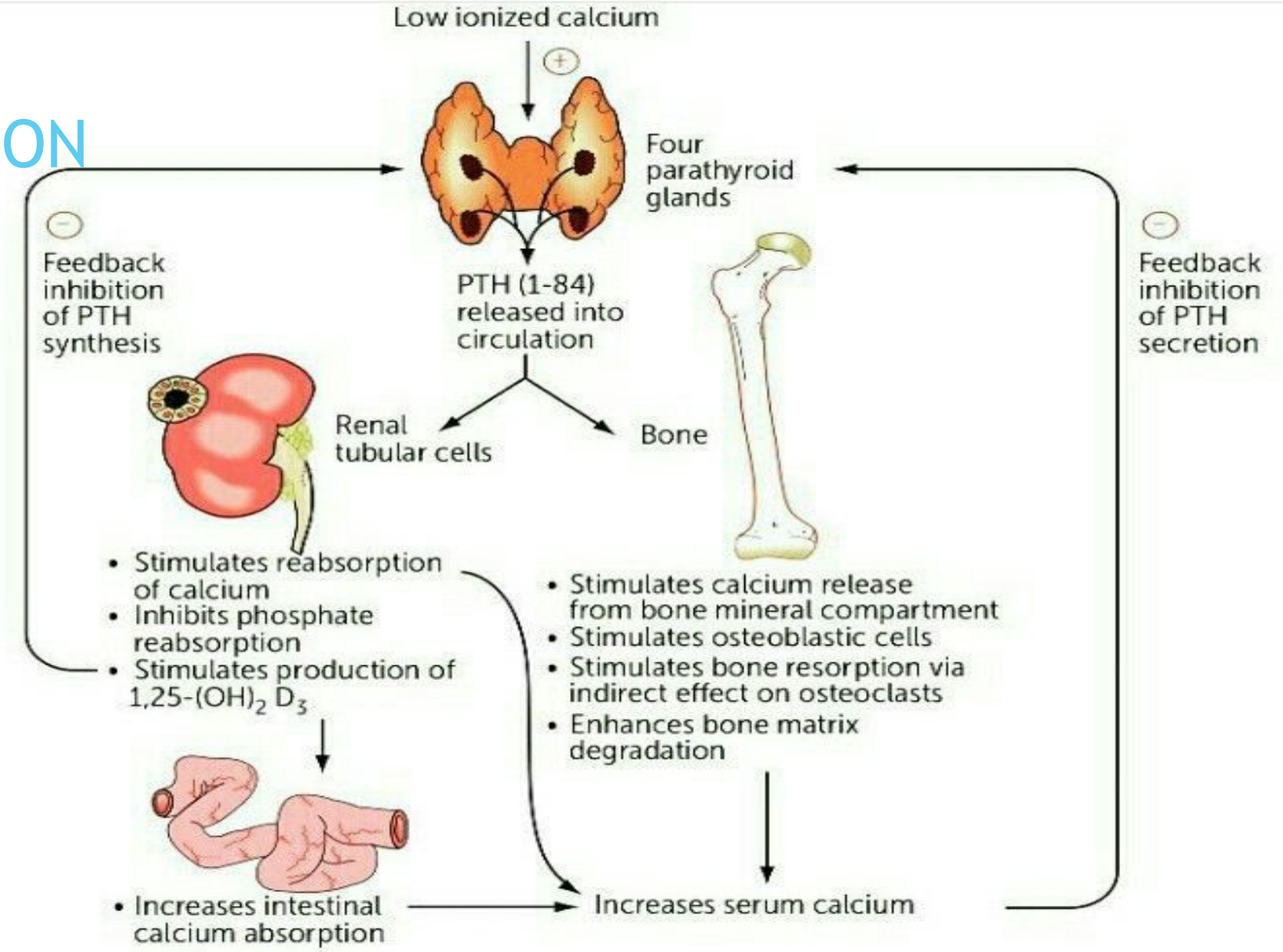
Hereditary Deficiencies:
- Antithrombin deficiency
- Protein C deficiency
- Protein S deficiency
- Factor V Leiden
- Prothrombin gene mutation
- Dysfibrinogenemia

Acquired:
- Cancer
- Pregnancy & postpartum period
- Oral contraceptives
- Hormone replacement therapy
- Polycythemia rubravera
- Smoking
- Anti phospholipid syndrome
- Chemotherapy

Risk for thromboembolism approximately doubles for each decade beyond age 60 years

Endocrine System

ENDOCRINE: CALCIUM REGULATION

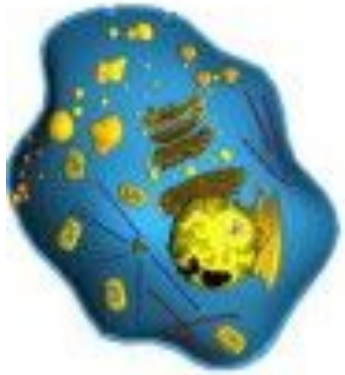


Calcium homeostasis

ONS Oncology Nursing Society

CENTRAL CONNECTICUT CHAPTER

MECHANISMS OF HYPERCALCEMIA



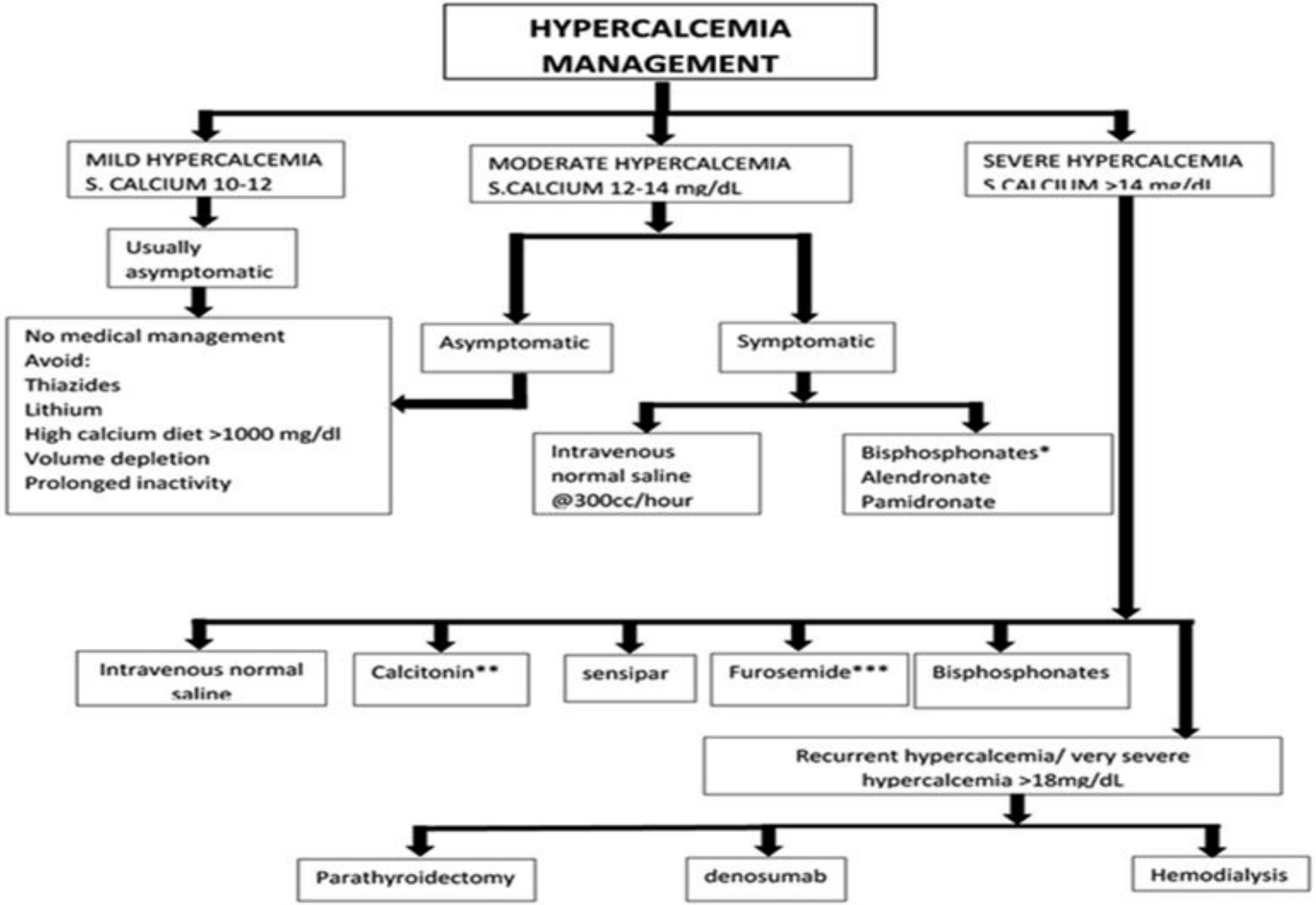
Cancer Cell

Mechanism of Hypercalcemia		Frequency & Tumor Types
PTHrP	Bone calcium release	80% Breast, lung, NHL
PTH	Bone calcium release	Rare case reports
$1,25(OH)_2D$	Intestinal calcium absorption	<1% Lymphomas
Osteolysis	Bone calcium release	20% Breast, lung, myeloma

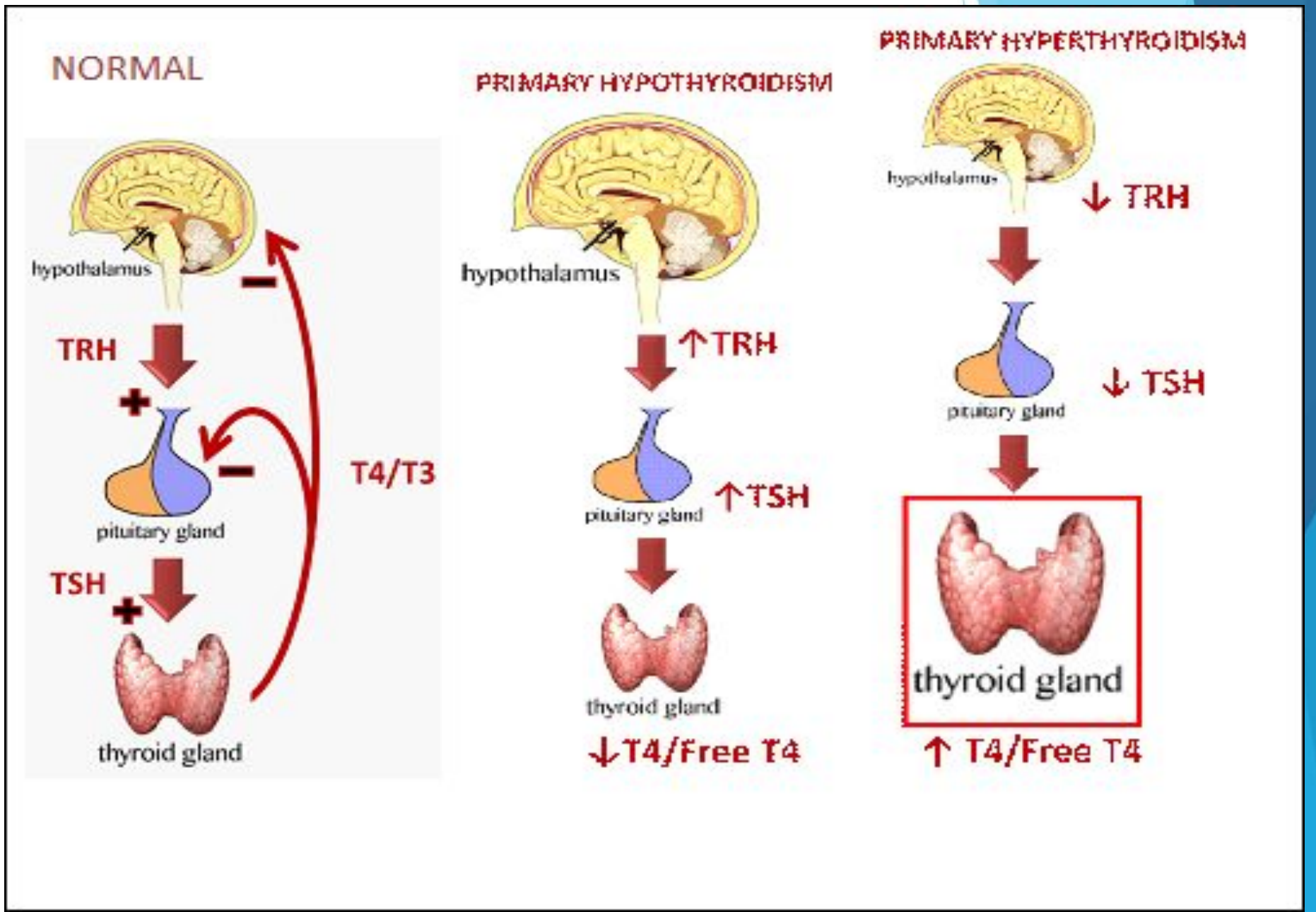
ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

EDGAR LERMA, TWITTER, 2018

MANAGEMENT OF HYPERCALCEMIA



ENDOCRINE: THYROID FUNCTION

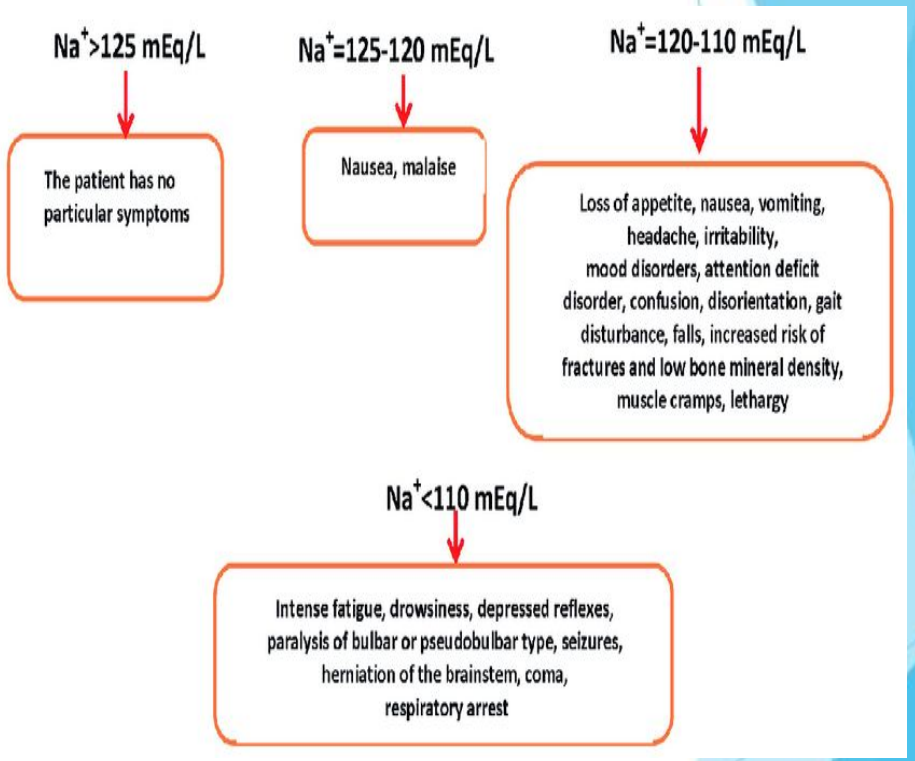


ONS Oncology Nursing Society

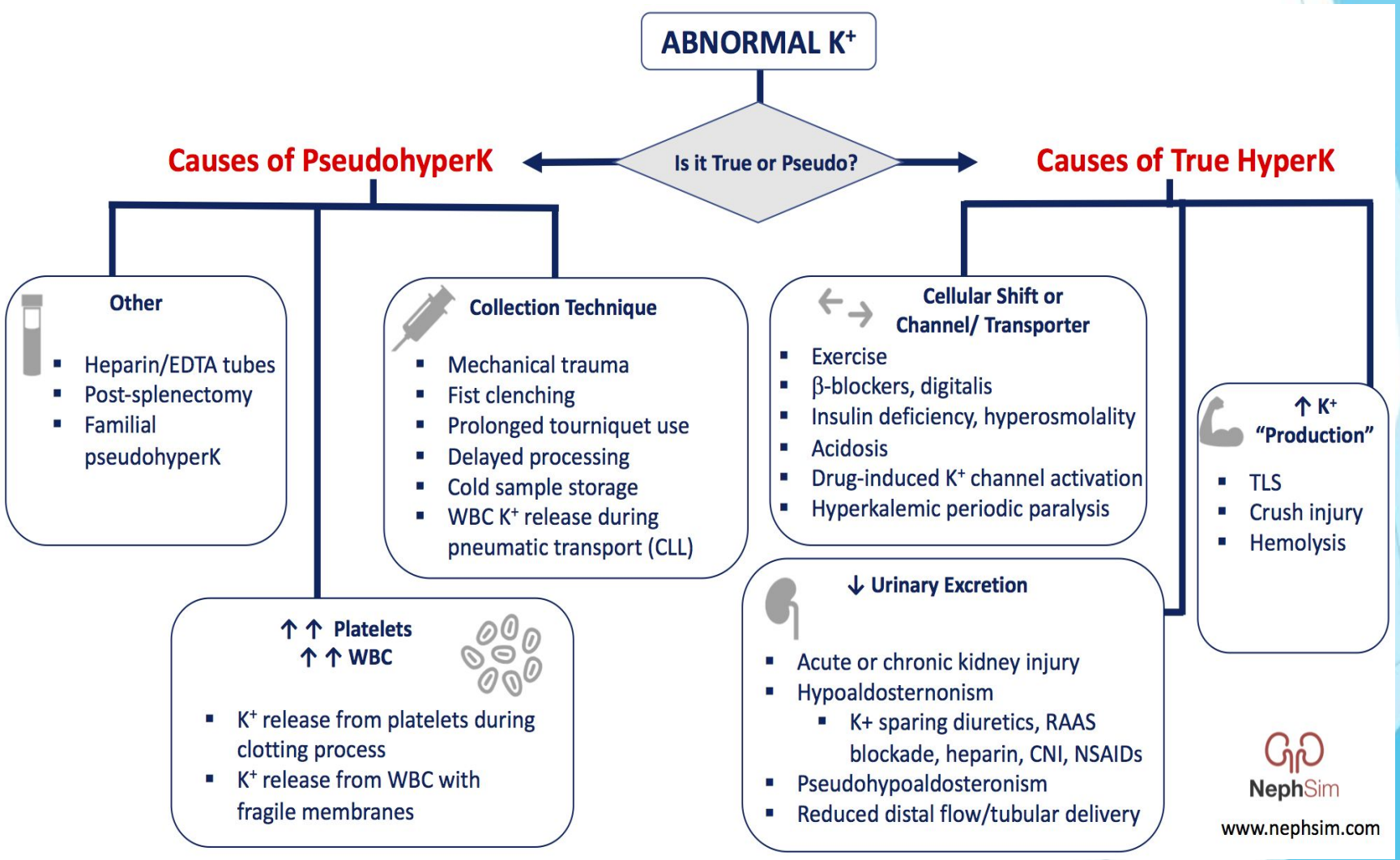
CENTRAL CONNECTICUT CHAPTER

ENDOCRINE: HYPONATREMIA

Type of hyponatremia	Causes
Euvolemic	SIADH Polydipsia Hypothyroidism Beer abuse
Hypervolemic	Edematous syndromes Cirrhosis Ascites Congestive Heart Failure Nephrotic syndrome Renal failure
Hypovolemic	Depletion of water and salts Gastrointestinal losses (vomiting) Diuretics Mannitol Adrenal insufficiency Nephropathy sodium-dispersing Cerebral salt wasting
Pseudohyponatraemia (hyperosmolar hyponatremia) Pseudohyponatraemia (laboratory artefact)	Hyperglycaemia Hypertriglyceridemia Multiple Myeloma



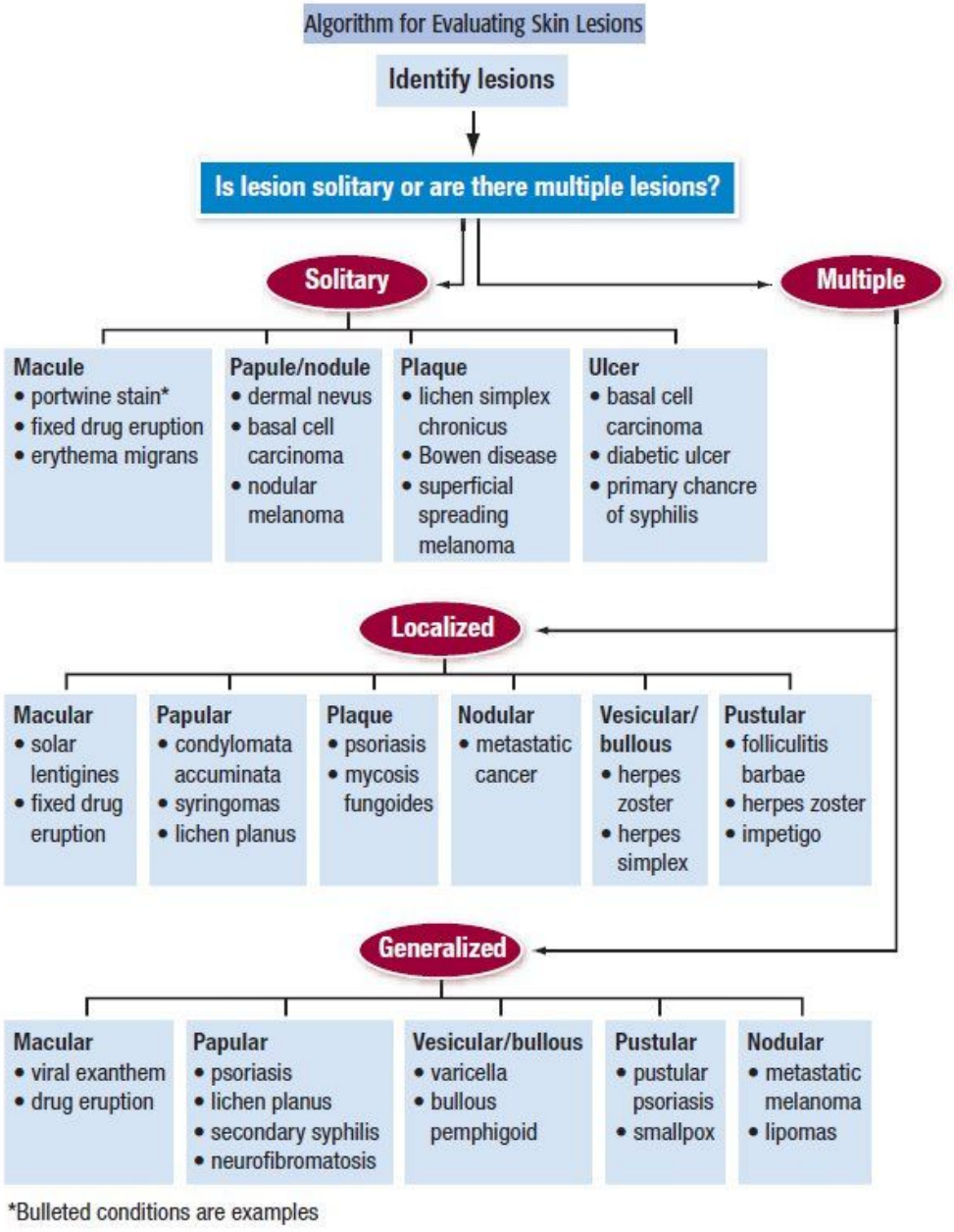
ENDOCRINE: HYPERKALEMIA



ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

Integumentary System

INTEGUMENTARY:RASH

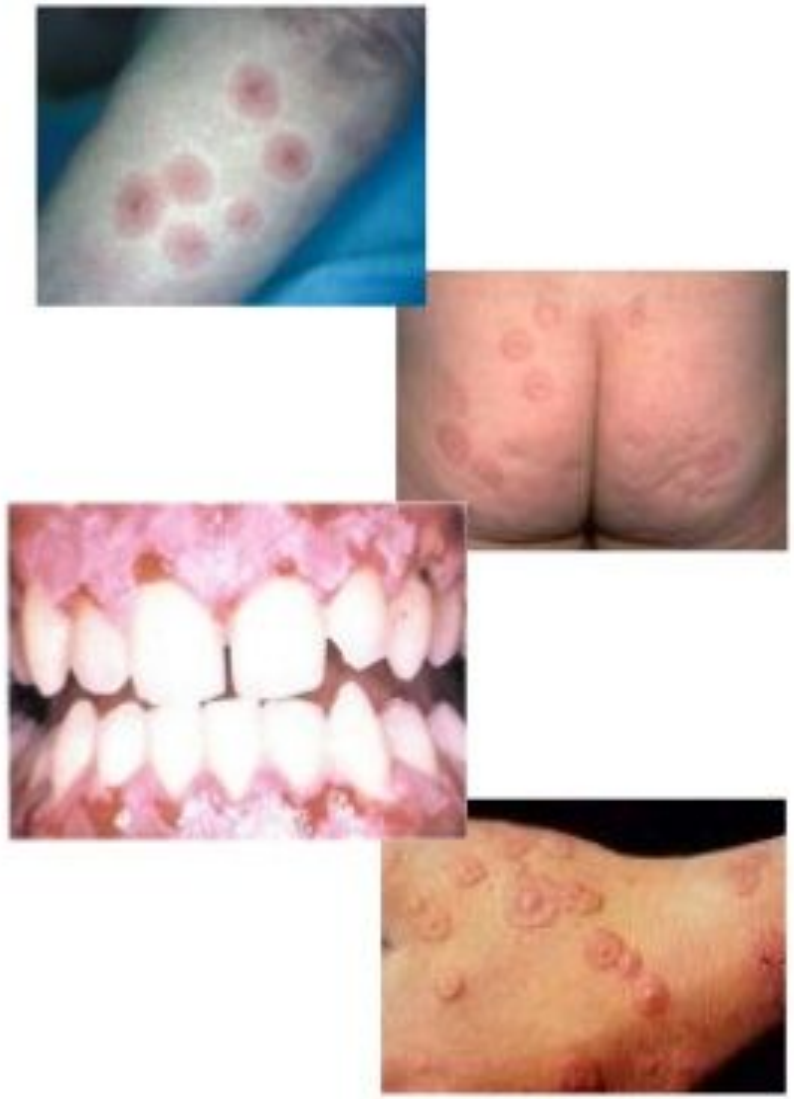


RASH ETIOLOGY TO CONSIDER

- EGFR INHIBITORS
- IMMUNOTHERAPY
- GEMCITABINE
- METHOTREXATE
- ALLOPURINOL
- ANTIBIOTICS
- SHINGLES

Hypersensitivity reaction

Erythema Multiforme



- Reaction of dermal vessels resulting in changes – papular and vesicobullous eruptions, TARGET-LIKE LESIONS!.
- Palms, soles, mucosal membranes
- If severe, "Stevens-Johnson Syndrome"
- Causes: 50% idiopathic. HSV, Strep, pregnancy, SLE, drugs (sulphonamides, phenytoin, barbituates, penicillin, allopurinol)
- Tx: Treat cause. Symptomatic care (analgesia, IV fluids if unable to drink etc)

PALMAR PLANTAR DYSETHESIA

Caused by cancer drugs affect the growth of skin cells or small blood vessels in the hands and feet. This causes symptoms that range from redness and swelling to problems walking. Repetitive activity such as walking, keyboard action, etc can make syndrome worse

Chemotherapy drugs:

Within first 2- 3 mos

- Capecitabine (Xeloda)
- Cytarabine (available as a generic drug)
- Docetaxel (Taxotere)
- Doxorubicin (available as a generic drug)
- Fluorouracil (5-FU)
- Floxuridine
- Idarubicin (Idamycin)
- Liposomal doxorubicin (Doxil)
- Paclitaxel (Taxol)

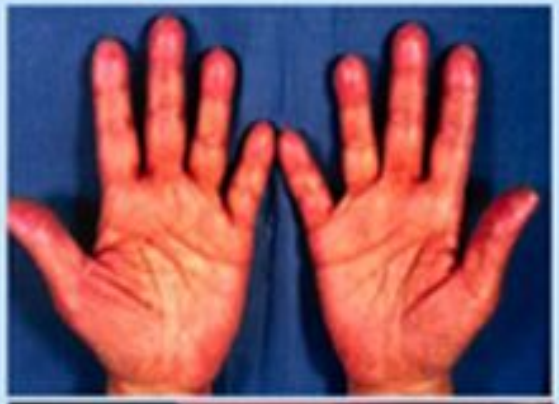
Targeted therapies

(within first 6 wks)

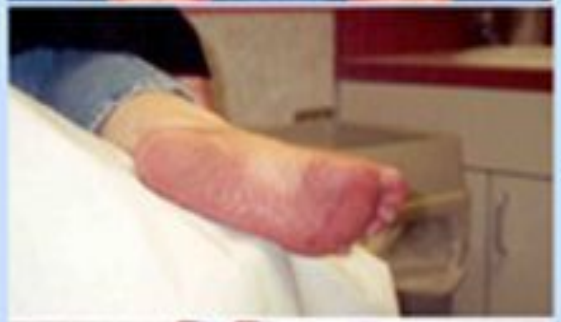
- Vemurafenib (Zelboraf)
- Axitinib (Inlyta)
- Cabozantinib (Cabometyx, Cometriq)
- Regorafenib (Stivarga)
- Sorafenib (Nexavar)
- Sunitinib (Sutent)
- Pazopanib (Votrient)

ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

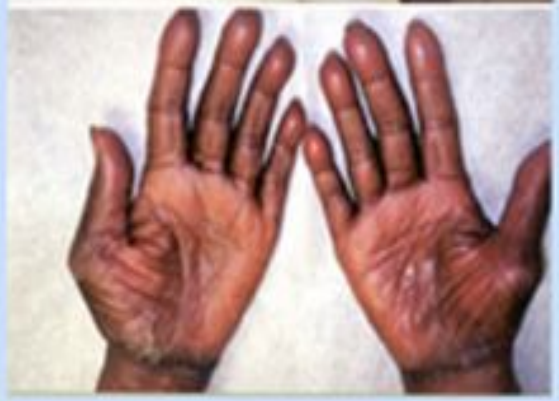
PPE (NCCN)



Grade 1
Numbness, dysesthesia or paresthesia, tingling, painless swelling or erythema, and/or discomfort of hands or feet not disrupting normal activities



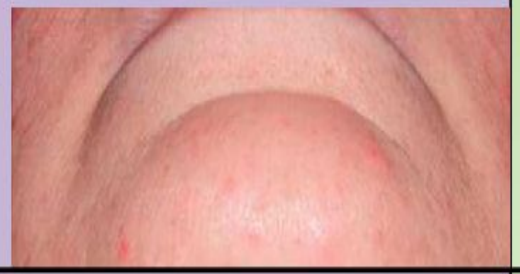
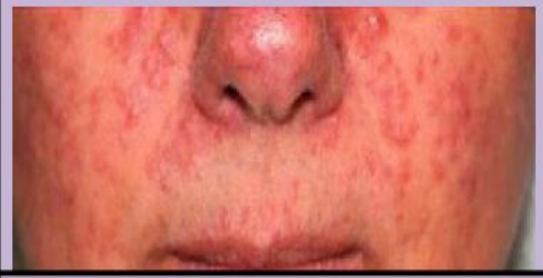
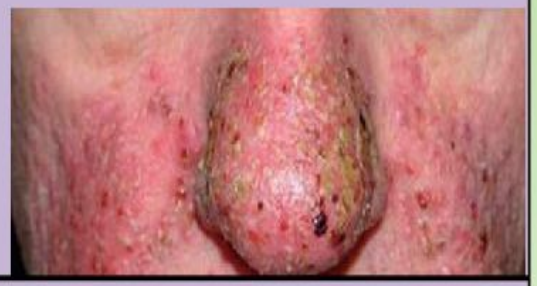
Grade 2
Painful erythema and swelling of hands or feet and/or discomfort affecting ADLs

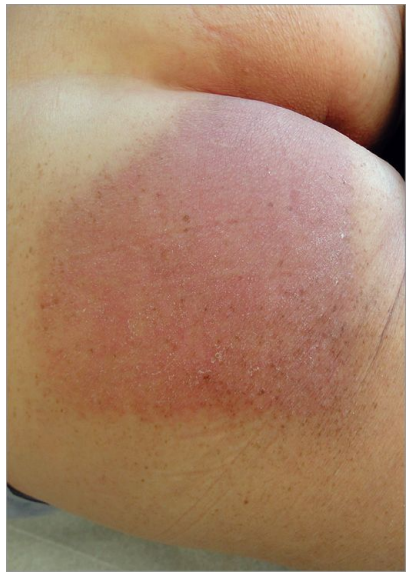


Grade 3
Moist desquamation, ulceration, blistering or severe pain of hands or feet, or severe discomfort preventing work or performance of ADLs

RASH

Severity

Mild	Moderate	Severe
		
☐ Hygiene measures ☐ Hydration ☐ Sun protection ☐ Topical antibiotic cream • Clindamycin • Erythromycin • Metronidazole	☐ Oral antibiotics: • Doxycycline/minocycline100 mg/12h • Alternative: azithromycin 250 mg 3 times weekly Cotrimoxazole 1 tablet/12 h ☐ Pustules: saline/boric acid compresses ☐ Infammation: topical corticosteroids • Severe eczema: systemic corticosteroids ☐ Refractory rash: oral isotretinoin (0.3 mg/kg/d) ☐ Pruritus: oral antihistamines	



Radiation sensitization and recall

Radiation interaction	Drug
Radiation sensitization and recall	Bleomycin
	Dactinomycin
	Daunorubicin
	Docetaxel
	Doxorubicin
	Etoposide
	5-Fluorouracil
	Gemcitabine
	Hydroxyurea
	Melphalan
	Methotrexate
	Paclitaxel
	Vinblastine
Photosensitivity	Dacarbazine
	5-Fluorouracil
	Methotrexate
	Mitomycin
	Vinblastine

Alley E. Green R, Schuchter. Cutaneous toxicities of cancer therapy. Curr Opin Oncol. 2002 Mar;14(2):212-6

CRYOTHERAPY

USEFUL BY CAUSING VASOCONSTRICTION

LIMITS DRUG EXPOSURE TO PERIPHERAL NERVES

LIMITS EXPOSURE TO DIVIDING CELLS IN SCALP AND MOUTH

STUDIES ARE SMALL, BUT PROMISING

SUCKING ON ICE DURING 5FU CAN LIMIT ORAL MUCOSITIS

SUCKING ON ICE DURING DOXORUBICIN CAN LIMIT ORAL MUCOSITIS

WEARING ICE FILLED GLOVES OR SOCKS CAN DECREASE TAXANE PERIPHERAL NEUROPATHY

ALOPECIA

TABLE 1: CYTOTOXIC AGENTS THAT CAN CAUSE HAIR LOSS[3,8,9,12]

Drug Class	Drug and Incidence of Hair Loss	
Antimicrotubules	Cabazitaxel (10%) Docetaxel (56%-76%) Eribulin (45%) Ixabepilone (48%) Paclitaxel (87%)	
Anthracyclines	Doxorubicin (n/a) Epirubicin (70%-96%) Idarubicin (25%-30%) Daunorubicin (>10%)	
Alkylating Agents	Cisplatin < 1% Bendamustine <1% Busulfan (17%) Carboplatin (2%-3%) Ifosfamide (83%-90%) Melphalan (n/a) Oxaliplatin (3%) Temozolomide (55%)	Frequency not defined Cyclophosphamide Lomustine Procarbazine Methchlorethamine Dacarbazine
Antimetabolites	Fluorouracil (dependent on rate/duration of therapy) Gemcitabine (15%-16%) Floxuridine (1%-10%) Capecitabine (6%)	
Targeted agents	Cetuximab Erlotinib Panitumumbab Sorafenib Vemurafenib	

ONS Oncology Nursing Society

CENTRAL CONNECTICUT CHAPTER

Scalp cooling

Meta-Analysis: Risk of Scalp Metastases with Scalp Cooling

- 23 full text articles
  - 10 quantified quantified the incidence of scalp metastasis with scalp cooling over time
- Results
  - Scalp cooling: 1,959 pts evaluated over ~ 43.1 mo.
    - Incidence rate of scalp mets: 0.61% (95% CI: 0.32% to 1.1%)
  - Non-scalp cooling: 1,238 pts evaluated over ~ 87.4 mo.
    - Incidence rate of scalp mets: 0.41% (95% CI: 0.13% to 0.94%)
    - P = 0.43 for the comparison

Rugo et al, BCRT 2017

Safety: DigniCap Study

- Toxicity included grade 1/2 headache.
- Three discontinued cooling, primarily from feeling cold.
- No patient has developed scalp metastases with a mean follow up from last chemotherapy administration of 12.9 months (range of 6.7 to 18 months).
- Follow-up continues annually
  - No scalp metastases at a median FU of over 3.5 years

ONS Oncology Nursing Society

CENTRAL CONNECTICUT CHAPTER

Musculoskeletal System

FUNCTIONAL ASSESSMENT TOOLS

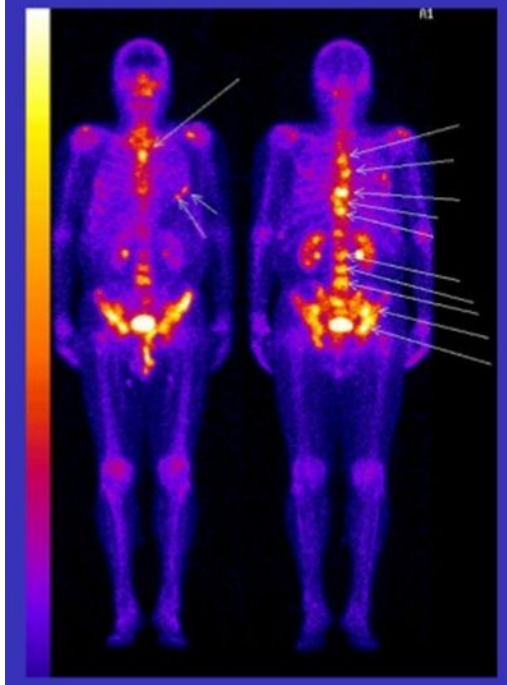
Karnofsky Performance Status (KPS)[2]	Eastern Cooperative Group Performance Status (ECOG)[2]
100: Normal; no evidence of disease	**0**: Fully active, no restriction in pre-disease performance
90: Minor signs or symptoms **80**: Normal activity with effort; some signs or symptoms	**1**: Restricted in physically strenuous activity but ambulatory and able to carry out light work
70: Cares for self; unable to carry on normal activity **60**: Occasional assistance required; capable of most self-care	**2**: Ambulatory; capable of all self-care but unable to work; up more than 50% of waking hours
50: Requires assistance, frequent medical care **40**: Disabled; requires special care/assistance	**3**: Capable of only limited self care; confined to bed/chair >50% waking hours
30: Severely disabled; hospitalization indicated **20**: Hospitalization necessary; requires active supportive care **10**: Moribund; progressing rapidly	**4**: Not capable of self-care; totally confined to bed/chair
0: Dead	**5**: Dead

MUSCULOSKELETAL

- Muscle weakness and loss in advanced cancer
- Bone metastases common in breast (73%), prostate (68%), and lung (36%)
- Osteoporosis common (10-fold) in cancer patients
- Bone loss and muscle weakness increase risk for falls, fracture, death

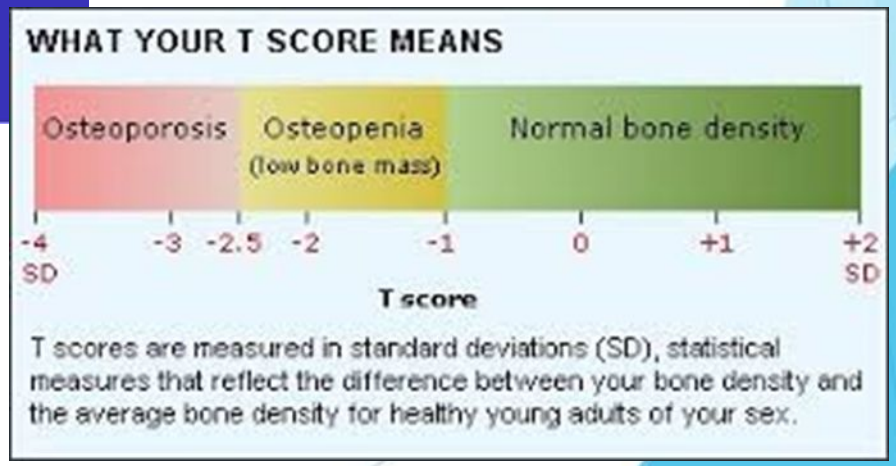
BONE DIAGNOSTICS

BONE SCAN



A radionuclide bone scan is much more sensitive for detecting metastases than plain films. Not only are more lesions detected, but it is also an easier examination for the patient than a radiographic skeletal survey, which involves taking numerous films. Approximately 30% of metastases
seen on a bone scan will not be visible on plain films.

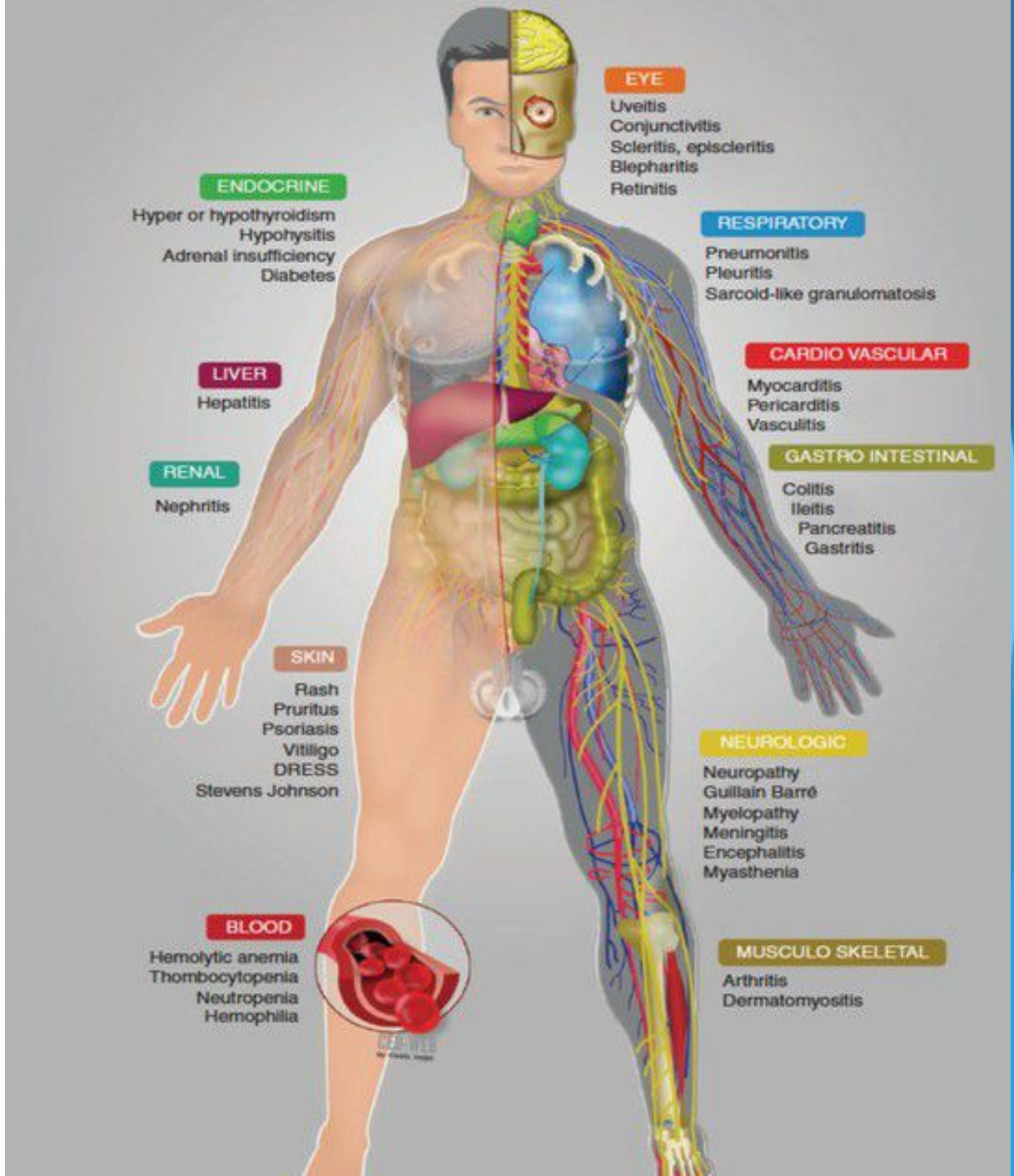
BONE DENSITY



ONS Oncology Nursing Society
CENTRAL CONNECTICUT CHAPTER

Immunotherapy

IMMUNOTHERAPY SIDE EFFECTS



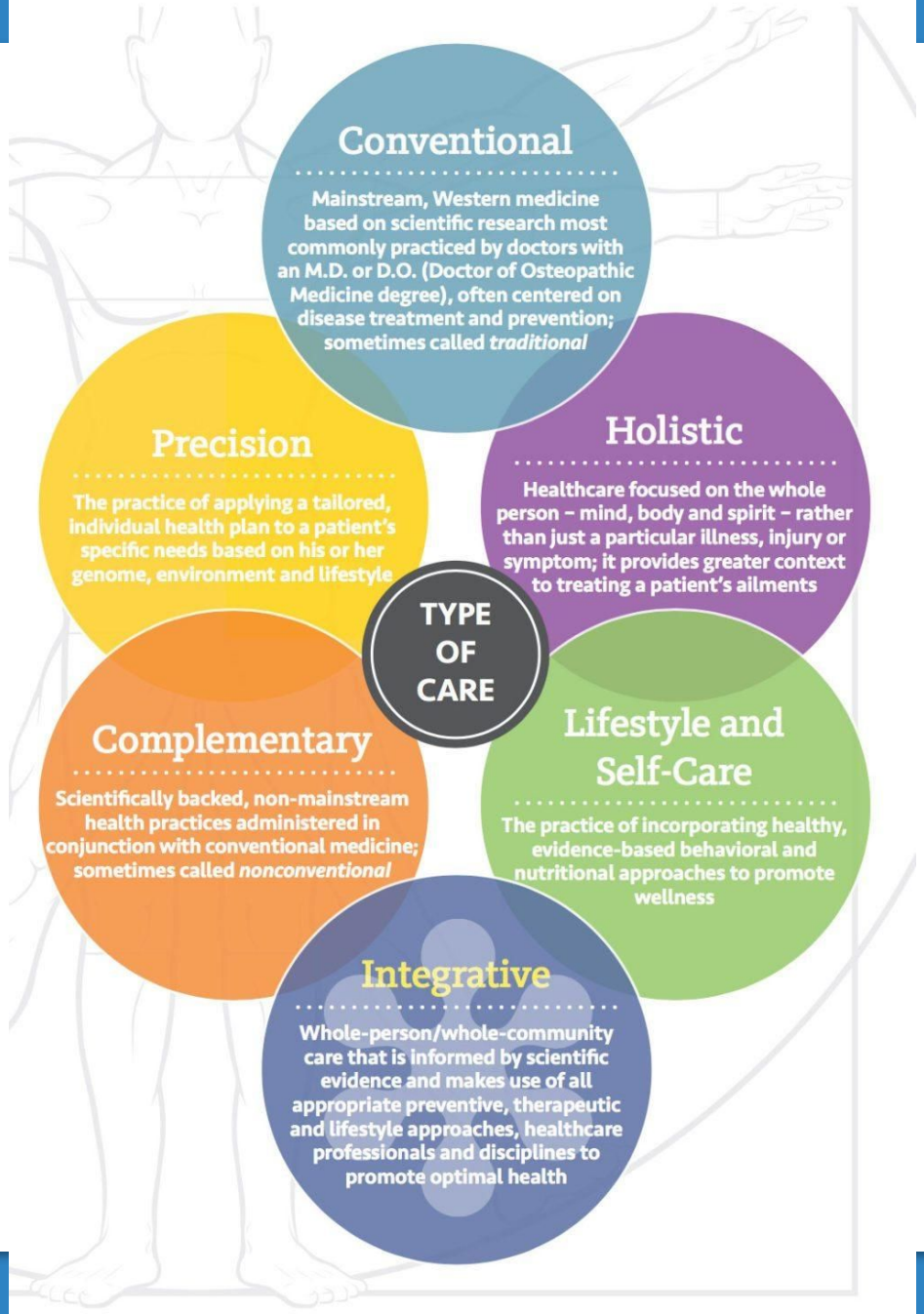
ONS Oncology Nursing Society

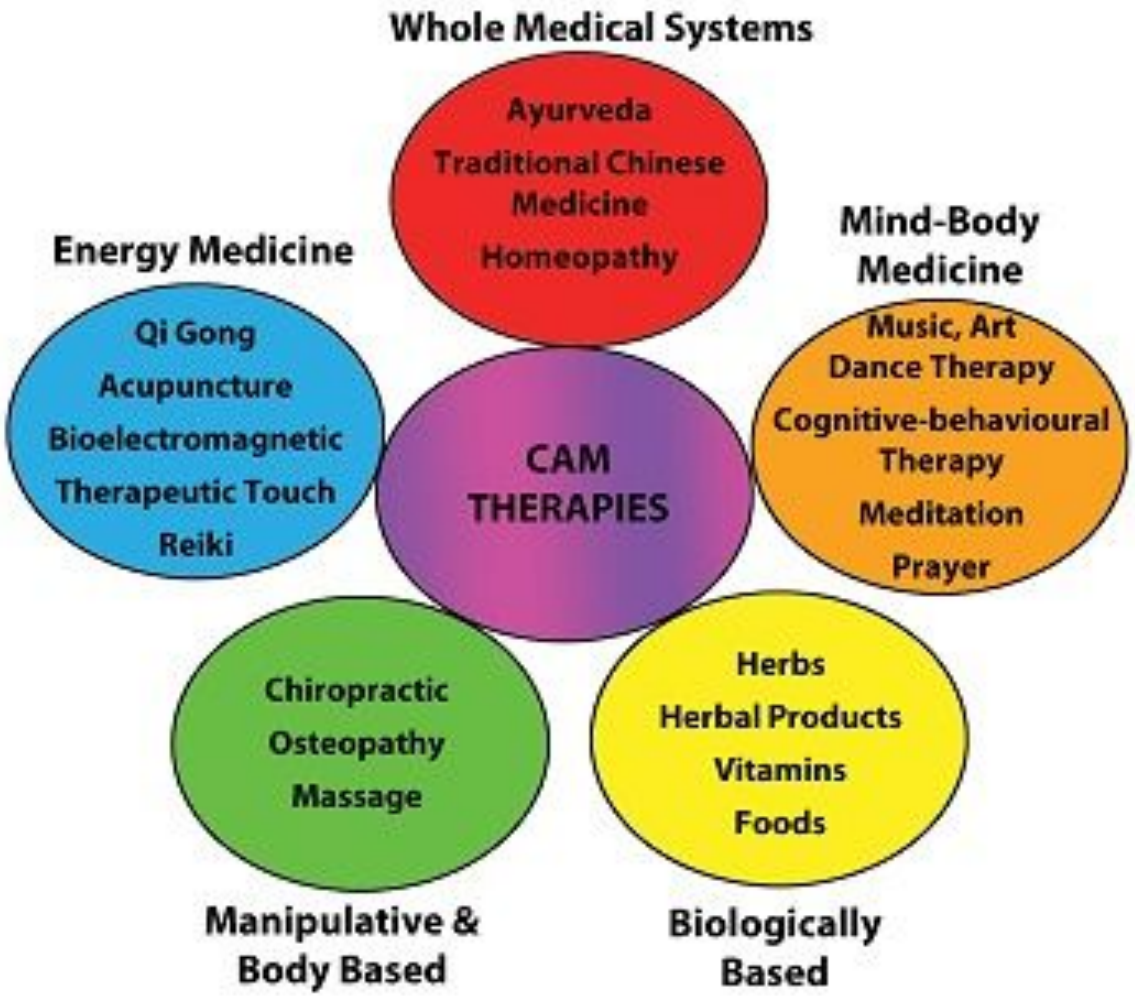
CENTRAL CONNECTICUT CHAPTER

Holistic Care

WELL BEING

- Sleep
- Fatigue
- Emotional adjustment
- Altered body image


Conventional
Mainstream, Western medicine based on scientific research most commonly practiced by doctors with an M.D. or D.O. (Doctor of Osteopathic Medicine degree), often centered on disease treatment and prevention; sometimes called *traditional*
Precision
The practice of applying a tailored, individual health plan to a patient's specific needs based on his or her genome, environment and lifestyle
Holistic
Healthcare focused on the whole person – mind, body and spirit – rather than just a particular illness, injury or symptom; it provides greater context to treating a patient's ailments
TYPE OF CARE
Complementary
Scientifically backed, non-mainstream health practices administered in conjunction with conventional medicine; sometimes called *nonconventional*
Lifestyle and Self-Care
The practice of incorporating healthy, evidence-based behavioral and nutritional approaches to promote wellness
Integrative
Whole-person/whole-community care that is informed by scientific evidence and makes use of all appropriate preventive, therapeutic and lifestyle approaches, healthcare professionals and disciplines to promote optimal health



http://nccam.nih.gov/health/whatiscam/overview.htm

COMPLIMENTARY AND ALTERNATIVE MODALITIES (CAM)

Overview of Complementary and Alternative Medicines[1,2]	
Category	**Characteristics of Treatment**
Body-Based Manipulative Practices	Manipulation of soft tissue in an effort to affect the muscular and nervous system. Therapy includes massage, exercise, and reflexology.
Biological/Herbal Therapies	Vitamins, botanicals, and amino acids used to supplement the diet that are not considered conventional, and are not solely part of a diet or meal.
Alternative Medical Systems	Involves the use of non-traditional Western medicine. Practices include: Ayurvedic medicine, homeopathic therapies, traditional Chinese medicine, and acupuncture.
Mind-Body Therapy	Enhances the connection between bodily function and the mind. Such therapies include: meditation, tai chi, hypnosis, or yoga
Energy Therapy	Manipulates "bioenergy" to provide therapeutic results through light touch, positive expectations, and mind-body interaction. Examples include Reiki, qi gong, healing touch, and magnetic field therapy

HERBAL PRECAUTIONS

Farinu, 2019

Herbal product	Cancer drug	Study type and description	Findings	References
Echinacea	Etoposide	Case report	Taking echinacea with etoposide was found to significantly decrease the platelet nadir (16×10^3/L) when compared to the nadir of etoposide alone (44×10^3/L)	(13)
Echinecea	Docetaxel	Prospective study in 10 cancer patients	Echinacea did not cause significant alteration in the pharmacokinetics of docetaxel	(14)
Garlic	Docetaxel	Prospective, patient controlled, pharmacokinetic	Garlic was found to decrease docetaxel clearance. Although this decrease was non-statistically significant, it could potentially increase adverse effects due to accumulation of docetaxel	(15)
Ginseng	Imatinib	Case report	Patient taking imatinib for 7 years started having symptoms of hepatotoxicity after beginning to consume ginseng. Hepatotoxicity resolved upon discontinuation of ginseng	(16)
Grapefruit juice	Docetaxel	Case report	Grapefruit juice was found to increase the AUC and terminal half-life of docetaxel, while decreasing clearance of docetaxel	(17)
Grapefruit juice	Nilotinib	Open label, randomized, 2 period crossover	Grapefruit juice was found to increase the AUC and peak concentration of nilotinib but did not affect the elimination half-life	(18)
Milk thistle	Irinotecan	Pharmacokinetic study	Milk thistle was found to cause a statistically insignificant decrease in irinotecan clearance, making it unlikely to cause a clinical impact	(19)
St John's wort	Docetaxel	Pharmacokinetic study	St John's wort was found to cause a significant decrease in plasma docetaxel concentration	(20)
St John's wort	Irinotecan	Unblinded, randomized crossover study	St John's wort caused a decrease in plasma concentrations of active metabolite (SN-38) by 42%	(21)
St John's wort	Imatinib	Open label, crossover pharmacokinetic study	St John's wort decreased plasma concentration of imatinib by 32% and decreased the half-life of imatinib by 21%	(22)
St John's wort	Imatinib	2 period, open-label, fixed sequence study	St John's wort increased clearance of imatinib by 43%, and decreased its plasma concentration by 30%	(23)

REFERENCES:

- Bossi P, Antonuzzo A, Cherny NI, et al. Diarrhoea in adult cancer patients: ESMO Clinical Practice Guidelines. *Ann Oncol*. 2018;29(Suppl 4):iv126-iv142. doi:10.1093/annonc/mdy145
- Brant, J. (Ed.). (2020). *Core curriculum for oncology nursing* (6th ed.). St. Louis, MO: Elsevier.
- https://www.cancernetwork.com/view/managing-nausea-and-vomiting-patients-cancer-what-works
- https://ctep.cancer.gov/protocoldevelopment/electronic_applications/docs/ctcae_v5_quick_reference_8.5x11.pdf
- Crombeen AM, Lilly EJ. Management of dyspnea in palliative care. Curr Oncol. 2020 Jun;27(3):142-145. doi: 10.3747/co.27.6413. Epub 2020 Jun 1. PMID: 32669923; PMCID: PMC7339837.
- Ho, K. Insights into the mechanism of 'chemobrain': deriving a multi-factorial model of pathogenesis. 2015.
- Hosker C, Ward D. Hypoactive delirium. *BMJ*. 2017;357:j2047. Published 2017 May 25. doi:10.1136/bmj.j2047
- Navari RM, Aapro M. Antiemetic Prophylaxis for Chemotherapy-Induced Nausea and Vomiting. *N Engl J Med*. 2016;374(14):1356-1367. doi:10.1056/NEJMra1515442
- Reagan P, Pani A, Rosner MH. Approach to diagnosis and treatment of hypercalcemia in a patient with malignancy. *Am J Kidney Dis*. 2014;63(1):141-147. doi:10.1053/j.ajkd.2013.06.025
- Rugo HS, Melin SA, Voigt J. Scalp cooling with adjuvant/neoadjuvant chemotherapy for breast cancer and the risk of scalp metastases: systematic review and meta-analysis. *Breast Cancer Res Treat*. 2017;163(2):199-205. doi:10.1007/s10549-017-4185-9
- Thompson JA, Schneider BJ, Brahmer J, et al. Management of Immunotherapy-Related Toxicities, Version 1.2022, NCCN Clinical Practice Guidelines in Oncology. *J Natl Compr Canc Netw*. 2022;20(4):387-405. doi:10.6004/jnccn.2022.0020