Advanced Oncology Certified Nurse Practitioner

REVIEW COURSE 2024

October 10-12, 2024 | Houston, TX

MDAnderson Cancer Center

Making Cancer History*

Gastroenterology, Hepatology and Genitourinary Toxicities related to Cancer treatment and its management



Objectives

- Understand the common Gastrointestinal (GI)/hepatology/genitourinary (GU) toxicities related to cancer treatment
- Understand the role of advance practice provider in managing the GI/GU/hepatology toxicities related to cancer treatment



GI Toxicities

- Esophagitis
- Cancer Related Anorexia cachexia Syndrome
- Nausea/Vomiting
- Mucositis
- Constipation
- Diarrhea



Esophagitis

Pathophysiology:

- Thinning of epithelial mucosa
- Invasion of bacteria, viruses, fungus

Signs and Symptoms:

- Odynophagia (pain with swallowing)
- Dysphagia (difficulty swallowing)
- Heart Burn
- Epigastric/retrosternal pain
- Candidiasis 2 white lesions/plaques
- "cotton feeling" in mouth



Common Terminology Criteria for Adverse Events:

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
0	 Asymptomatic Clinical or diagnostic observations only Intervention not indicated 	 Symptomatic Altered eating/swallowing Oral supplements indicated 	 Severely altered eating/swallowing Tube feeding, TPN or hospitalization indicated 	 Life threatening consequences Urgent operative intervention indicated 	• Death
0			0		
			Esophagitis	clin-management-immune-mediated-colitis	s-web-algorithm.pdf

Esophagitis

Treatment:

- Based on severity of symptoms and assessment
- Prevention with magic mouth wash and salt/soda rinses
- Antifungals
- Nystatin or fluconazole
- Antivirals
- acyclovir or ganciclovir
- Antibacterial



Cancer- Related Anorexia Cachexia Syndrome (CACS)

Signs and Symptoms:

- Taste bud changes
- Alerted eating patterns
- Food aversion
- Weight loss

Assessment/Diagnosis:

- Nutritional Screening
- Labs
- Albumin
- Protein
- Transferrin
- Weight and height changes
- Muscle wasting
- Presence of edema
- BMI



CACS

Treatment:

- Encourage small, frequent meals
- Nutrition consult/Dietitian
- Pharmacologic interventions
- corticosteroids
- megestrol acetate
- Enteral and parenteral nutrition
- Parenteral reserved for patients with GI dysfunction
- Nonpharmacologic tx
- Avoiding strong odors
- Cooling food
- Avoiding strong spices or herb



- Pathophysiology:
- Serotonin is released from GI tract which sends signals via the afferent pathway to the 5hydroxytrptamin (5-HT) receptor
- Chemoreceptor trigger zone in the brain is then stimulated, resulting in signals being sent to the vomiting center to initiate vomiting
- Other receptors involved include dopamine, histamine, substance P



Signs and Symptoms:

- Nausea: "wavelike" feeling occurring in the stomach or back of the throat that may be accompanied by vomiting
- Retching: rhythmic contraction of the esophagus, diaphragm and abdominal muscles in attempt to eject stomach contest
- Dry heaves: retching without vomiting is know as dry heaves



Assessment/Diagnosis:

- Self reporting
- Diagnostic testing to assess for hydration status
- Vital signs, weight
- Renal function
- Electrolytes
- Hepatic function
- Imaging
- Endoscopy
- MRI of brain if indicated



Treatment:

- Low emetogenic agents:
- Single agent: Steroids, metoclopramide or 5-HT3 antagonist
- Moderate emetogenic agents: Combination of 5-HT3 antagonist, a steroid, plus or minus neurokinin-1 (NK) 1 antagonist, plus or minus anxiolytic agents
- High emetogenic agents: Combination of 5-HT3 antagonist, a steroid, and a NK1 antagonist, plus or minus anxiolytic and proton pump inhibitor, antipsychotic agents (eg: olanzapine)
- Anticipatory nausea anxiolytic agent
- Nonpharmacologic prevention : Ginger, relaxation, hypnosis, music therapy, acupuncture



- Two most significant factors radiation for head and neck cancer and SCT
- Affects the entire GI tract from the mouth to anus
- Severe pain and affect the quality of life
- Poor Oral nutrition leads to nutritional deficiency and may need parenteral nutrition







Signs and Symptoms:

- Tender, reddened areas in the mouth
- Progresses to painful ulcerations
- Nausea
- Vomiting
- Diarrhea

Assessment and Diagnosis:

- Patient self assessment
- Assessment tools
- Oral Assessment Guide: voice, swallowing, lips, tongue, saliva, mucous membranes, gingiva and teeth
- • Monitor nutritional intake



Treatment:

- Prevention
- Good oral hygiene
- Bland rinses to remove debris and bacteria
- Pain Control
- Topical anesthetics and analgesics
- Nonsteroidal anti-inflammatory drugs
- consider opioids if not controlled Oral cryotherapy
- Ice chips swished around every 30 minutes
- Cryotherapy is Shown to beneficial with 5-fluorouracil, high dose melphalan and bolus edatrexate
- Keratinocyte Growth Factor (Kepivance) for patients undergoing autologous SCT with a conditioning regimen
- Oral glutamine, Honey for prevention in H& N cancer patient undergoing chemotherapy and radiation.



Pathophysiology:

- Small intestine absorbs nutrients
- Contents stay in the small bowel for 2-4 hours
- Large intestine absorbs water and forms stool
- Contents stay in the large intestine for 24-48 hours
- Abdominal muscles help to move stool to the rectum
- Decreased mobility, medications, or fluid/electrolyte imbalances effect normal function of the bowels



Risk Factors:

- Certain chemotherapy agents
- Vinca alkaloids -vincristine, vinorelbine and vinblastine
- Oxaliplatin
- Taxanes
- Lead to decreased peristalsis by causing neurologic toxicities which effect the smooth muscle of GI tract
- Opioid Induced Constipation- Work on the MU receptors slowing peristalsis
- Damage to spinal cord from T8-L3 nerves that innervate bowel
- Decreased mobility, fiber intake, and dehydration
- Certain Medications-Antiacid containing calcium, iron supplements

Signs and Symptoms:

- Small, hard bowel movements
- Leakage of soft, liquid stool that look like diarrhea
- Stomachache or cramps
- Frequent gas or belching
- Feeling bloated or full



Diagnosis and Assessment:

- Small, hard bowel movements
- Leakage of soft, liquid stool that look like diarrhea
- Stomachache or cramps
- Frequent gas or belching
- Feeling bloated or full



Treatment:

- Prevention: increase fluids, fiber & activity
- Attempt to determine cause
- Bisacodyl 10-15mg TID
- goal is non forced BM every 1-2 days
- Add another laxative such as polyethylene glycol, lactulose, sorbitol, magnesium citrate
- Consider metoclopramide
- Treat contribution factors like DM, hypercalcemia, hypokalemia, hypothyroidism etc.
- Discontinue/reduce medication contributing constipation
- Opioid induced constipation- use osmotic and stimulant laxatives. Consider mu-opioid like methylnaltrexone bromide
- If obstruction- needs referral



Pathophysiology:

Osmotic Diarrhea

- Secondary to injury to gut, dietary factors, and digestive problems
- Water is pulled into the bowel from osmotic pressure of unabsorbed particles

Malabsorptive diarrhea:

• Mucosal integrity of the bowel is altered

Secondary diarrhea:

• Intestines secrete more fluids and electrolytes than can be absorbed



Signs and Symptoms:

- Liquid stools
- Increase in the number of stools
- Abdominal pain/cramping
- Abdominal tenderness



Risk Factors:

- Chemotherapy
- Capecitabine, dacarbazine, dacinomycin, 5-fluorouracil, irinotecan and paclitaxel
- Radiation
- Targeted agents
- Tyrosine Kinase Inhibitors (-nibs), Angiogenesis Inhibitors, (lenolamide), mTOR kinase inhibitors (temsirolimus)
- Immunotherapy- covered in another lecture



Diagnosis and Assessment:

- CTCAE to evaluate severity
- Stool studies
- CBC and CMP
- Abdominal imaging
- Endoscopy



Diarrhea- CTCAE Grading

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
 Increase of < 4 stools per day over baseline mild increase in ostomy output compared to baseline 	 Increase of 4-6 stools per day over baseline moderate increase in ostomy output compared to baseline Limiting instrumental ADLs 	 Increase of > 7 stools per day over baseline Hospitalization indicated Severe increase in output compared to baseline Limiting self care ADLs 	 Life-threatening consequences urgent intervention indicated 	death



Treatment:

- Loperamide per package instruction- 4mg after first loose stool, then 2mg after each episode of diarrhea; no more than 16mg/day
- Irinotecan diarrhea Acute (occurs within 24 hours of infusion) atropine as premed
- Late diarrhea treated with aggressive loperamide
- Fluorouracil loperamide
- Octreotide injections
- Eliminate sugar alcohols often found in "sugar free" foods
- Diet modifying fiber, dairy, caffeine, and fatty foods
- C- diff stop oral antibiotics; metronidazole and/or vancomycin





Liver Toxicity

Pathophysiology:





Hepatic Toxicity Signs and Symptoms:

- Edema
- Pruritus
- Jaundice
- Malaise
- Headache
- Anorexia
- Ecchymosis
- Lower grade fever
- Muscle aches
- Joint aches
- Changes in urine and stool color

Hepatic Toxicity Risk Factors and Etiology

- Chemotherapy or Radiation
- Herbal Supplements
- Acetaminophen
- Comorbidities
- Hepatitis infections
- HIV
- Cirrhosis
- NASH
- ETOH and drug use
- Tumor involvement of liver

Hepatic Toxicity Chemotherapy & Hormonal Agents:

- Tamoxifen NASH ٠
- Asparaginase** (highest risk) •
- Busulfan .
- Cytarabine •
- Etoposide ٠
- Floxuridine ٠
- Fluorouracil .
- Interferon alpha ٠
- Lomustine ٠
- Mercaptopurine ٠
- Methotrexate .
- Mithramycin ٠
- Streptozocin •
- Vincristine ٠
- Supporting medication Acetaminophen, Amoxicillin-clavulanic acid, chlorpromazine... ٠



Diagnosis and Assessment:

- History & Physical Exam
- Labs

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- Imaging ultrasound, CT abdomen, MRI abdomen
- Liver biopsy



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Hepatocellular Damage	Seen In	Comments
Liver Injury		
ALT (previously known as SGPT) AST (previously known as SGOT)	 Mild elevations in fatty liver, NASH, chronic viral hepatitis, DILI, chronic hepatitis C Moderate elevations with DILI, hepatitis C, acute and chronic hepatitis, autoim- mune disease Highest elevations in viral-, drug-, or toxin-induced damage More specific for alcohol abuse, MI 	Highest concentrations in liver; most cost-effective AST:ALT < 1 = viral hepatitis AST:ALT > 1 = liver metastases or liver congestion from chemotherapy Elevated ALT, normal ALP and GGT = hepatitis Elevated ALP and GGT and normal ALP = billiary cirrhosis AST:ALT > 2 = alcoholic liver disease
Obstruction	_	AST/ALT > 300 u/L acute biliary obstruction, rapid peak and decline in lab values over 24–72 hours
ALP	Highest levels seen in cholestatic dis- ease	More diagnostic when used with other findings
Bill	Biliary cirrhosis, hepatic failure, pro- longed fasting, hemorrhage, hemolytic diseases, pernicious anemia	-



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Hepatocellular Damage	Seen In	Comments
Liver Synthesis F	unction-extent of injury or function of liver	r
Albumin	Ascites, cirrhosis, nephritic syndrome, protein-losing enteropathy, burns	Most Important plasma protein made by the liver Tells more about the severity of liver disease but is affected by protein loss in urine or gastrointestinal tract
PT	Liver failure Indicates deficiency of ≥ 1 liver synthe- sized factor	Frequent fluctuations in levels, so ideal monitoring tool INR and increased bill = poor prog- nosis in nonacetaminophen acute liver failure and poor prognosis in severe alcoholic hepatitis; jaundice also adds to confirmation of prog- nosis
INR	More specific for vitamin K deficiency; also seen in DIC and with warfarin ther- apy	-

Table 13-8. Laboratory Values Seen in Hepatotoxicity (Continued)

Advanced Oncology nursing certification review and resource manual (2021

Sinusoidal Obstructive Syndrome (SOS)

- Occurs days to weeks after hemopoietic cell transplant
- Prevention with ursodeoxycholic acid (gallstone dissolution agent)
- Presents as weight gain, painful hepatomegaly, ascites, jaundice leads to multi organ failure and death
- Monitor labs, consider abdominal ultrasound and bx
- If mild, manage with supportive measures (paracentesis, avoiding hepatotoxic agents, maintaining euvolemia)
- If severe, consider defibrotide (antiplatelet agent)



Treatment:

- Removal of the offending agent
- Treating the cause of liver injury
- Referral to gastroenterologist



Genitourinary Toxicities

- Sexual Dysfunction
- Reproductive Dysfunction
- Hemorrhagic Cystitis



Signs and Symptoms:

- Decreased libido
- Hot flashes
- Difficulty becoming aroused
- Difficulty achieving orgasm
- Vaginal dryness/discharge
- Dyspareunia (pain with intercourse)
- Erectile dysfunction
- Psychosocial complaints of body image, anxiety about relationships, decreased femininity/masculinity



Risk Factors/Etiology:

- GU Surgeries like prostatectomy, oophorectomy
- Radiation
- Pharmacologic treatments
- Chemotherapy secondary to nausea/vomiting/fatigue
- Androgen deprivation therapy
- Aromatase inhibitors



- Semen analysis
- Testicular biopsy
- Luteinizing hormone*
- Testosterone assays
- Postejaculate urinalysis
- Follicle-stimulating hormone*

- Human chorionic gonadotropin
- Gonadotropin-releasing hormone stimulation testing
- Cultures for infection or sexually transmitted infections
- RigiScan[®] (TIMM Medical Technologies, Inc.) (determines the extent of erectile dysfunction)

Figure 13-2. Diagnostic Tests in the Workup of Sexual Dysfunction in Men

Sexual dysfunction

Diagnosis and Assessment:

- Physical assessment
- Labs -hormonal tests, glucose, thyroid levels GnRh stimulation
- Semen analysis



Men

Erectile Dysfunction

- Sildenafil, Vardenafil, Tadalafil
- Vacuum Devices
- Vasodilator Injections
- Penile Prosthesis

Women

Altered Libido

- Hormonal Manipulation (estrogen,
- testosterone)

Vaginal Dryness

- Lubricant, estrogen therapy **Hot Flashes**
- Belladonna, ergotamine, Phenobarbital, Vitamin E, or Venlafaxine
- Vaginal Stenosis, fibrosis, scarring
 Vaginal dilaters
- Dyspareunia
- Analgesics, Kegal exercise



Signs and Symptoms:

- Amenorrhea
- May also report "menopausal symptoms"
- Hot flashes
- Mood variations



Risk Factors:

- Chemotherapy with alkylating agents
- Whole body irradiation secondary to hematopoietic stem cell transplant
- Preexisting infertility
- Advancing age
- Treatments affecting the reproductive organs



Diagnosis and Assessment:

- Physical examination
- Labs
- FSH, LH, prolactin, estradiol/testosterone
- Semen analysis



Treatment:

- Embryo cryopreservation
- Unfertilized oocyte preservation*
- Ovarian tissue cryopreservation*
- Ovarian suppression with GnRH analogs*
- Oophoropexy
- Gonadal shielding
- Sperm cryopreservation



Chemotherapy and radiation induced hemorrhagic cystitis

- Sterile cystitis characterized by frank hematuria
- Chemotherapy- Infosfamide, cyclophosphamide
- Late side effects from pelvic radiation

Presentation

• Mild to severe hematuria, bladder irritation

Management

- IV normal saline 250 cc/her, plus furosemide to have 150 cc per hou
- Mesna for patient with SCT and receiving cyclophosphamide and infosfamide

Hemorrhagic Cystitis

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Chemotherapeutic drugs causing hemorrhagic cystitis

Agents	Effect	Caveats
Cyclophosphamide, Ifosfamide	Hemorrhagic cystitis	Uroprotection with mesna, saline and continuous bladder irrigation
Busulfan	Hemorrhagic cystitis	Seen with prolonged systemic therapy; long delay of onset
Thiotepa	Irritation and rarely hemorrhagic cystitis	Intravesical
Doxorubicin	Reversible hemorrhagic cystitis in 20 to 30%	Intravesical
Mitomycin	Cystitis in 15%	Intravesical
Fludarabine	Rare hemorrhagic cystitis	
Chlorambucil	Rare cases of sterile cystitis	
Cabazitaxel	Hemorrhagic cystitis in 17%; severe (grade 3 or 4) in 2 to 3%	
Dacarbazine, temozolomide	Rare hemorrhagic cystitis	

https://www.uptodate.com/contents/chemotherapy-and-radiation-related-hemorrhagic-cystitis-in-cancerpatients

Hemorrhagic Cystitis

Diagnosis and Assessment:

- Urine sample UA, urine culture, and urine cytology
- Cystoscopy
- CT Urogram



Case Studies and Questions



Which of the following are considered common side effects related to radiation therapy for breast cancer?

- a. Fatigue and infection
- b. Fatigue and skin reaction
- C. Alopecia and pancytopenia
- D. Anemia and thrombocytopenia



A common side effect of irinotecan is

a)Cardiomyopathy

- b)Peripheral neuropathy
- c) Persistent, delayed diarrhea
- d)Severe nausea and vomiting



The APN is doing medication teaching for a patient who has just been started on selective serotonin reuptake inhibitors for cancer related depression. What side effects will the APN review with the patient related to SSRIs?

A) Agitation, gastrointestinal disturbance, and sexual

dysfunction

- B) Agitation, gastrointestinal disturbance, and cognitive dysfunction
- C) Agitation, genitourinary disturbance, and cognitive dysfunction
- D) Agitation, genitourinary disturbance and neuropathic



The patient presents to the APN with edema, muscle and joint aches, pruritus, ecchymosis, headache and low-grade fever. The patient has completed chemotherapy for breast cancer and has been on Tamoxifen for more than 6 months. Which laboratory test result would the APN expect to be abnormal?

- A) CBC
- B) ALT and AST
- C) Albumin
- D) Creatinine



Most common virus associated with oral mucositis in a patient who has received stem cells is

- A) Cytomegalovirus
- B) Epstein-Barr virus
- C) Herpes simplex Virus
- D) Human immunodeficiency virus- 6



Late effects of radiation therapy to the colorectal area include

- A) Fatigue
- B) Fatigue and sexuality issues
- C) Enteritis and sexuality issues
- D) Enteritis and delayed immunosuppression



A patient with colorectal cancer is receiving concomitant 5-fluoiracil and radiation therapy. Which of the following is important teaching strategy to explain to this patient?

A) Diarrhea typically occurs toward the end of treatment and generally is not a problem for most patients

B) Constipation typically occurs toward the end of treatment and generally is not a problem for patients

C) Diarrhea typically occurs one to two weeks into treatment and the amount and duration of diarrhea should be assessed routinely

D) Constipation typically occurs one to two weeks into treatment and the patient should contact the health care provider, as this is serious



- Which of the following statement regarding sexuality is true?
- A) Changes in the body are the only predictors of sexual self- image
- B) A person is considered asexual if he or she is not able to engage in intercourse
- C) The emotional responses to body image changes such as mastectomy are consistent among all patients
- D) Emotions such as fear, anxiety, and depression can exacerbate feelings of loss related to changes in body image



The APN is meeting with a patient who is starting treatment for breast cancer. Which of the following conveys the importance of sexual health and encourages the patient to ask questions at any time?

- A) "I can have the physician see you if you have any questions about your sexual health"
- B) "Is there any thing that I have not reviewed with you that you would like to know? "
- C) "If you have any questions about infertility related to your breast cancer treatment, I can give you a referral to a fertility specialist."
- D) "Do you have any questions or sexual concerns that you would like to discuss? This is an important topic and no question is silly or off limits."



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Thank you!

Email address asaji@mdanderson.org

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