Symptom Management

Myelosuppression
- The most common cause of treatment delays and dose reduction for patients undergoing cancer treatment.
- Hematopoiesis: the process when WBCs, RBCs and platelets are produced from pluripotent stem cells.
- Stem cells are largely found in the bone marrow.

- Time of effect is 10-14 days
- Nadir is the time period of predicable count suppression.
- Blood counts generally recover in 2-3 weeks.
- Disease can also cause myelosuppression. Leukemia or solid tumors that invade the bone marrow.
- Increased risks: prior chemo, the elderly, poor nutritional status, renal or hepatic dysfunction or patients with effusions.

Myelosuppressive Potential of Chemotherapy Agents
- Mild: altretamine, bleomycin, cladribine, dacarbazine, 5-fluorouracil, mitomycin C, pentostatin, plicamycin, streptozocin, vincristine, vinorelbine
- Moderate: amsacrine, chlorambucil, cisplatin, cyclophosphamide, etoposide, fludarabine, gemcitabine, idarubicin, ifosfamide, mechlorethamine, melphalan, 6-mercaptopurine, methotrexate, mitoxantrone, procarbazine, 6-thioguanine
- Severe: busulfan, carboplatin, carmustine, cytarabine, daclomycin, daunorubicin, hydroxyurila, lomustine, paclitaxel, docetaxel, vinblastine

Grading

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Leukopenia and Neutropenia
- These patients are at risk of developing infection – the most common cause of morbidity and mortality in cancer patients.
- Neutrophils move to site of infection and phagocytize organisms, have short life spans,
- Infections can occur from sources of outside of the body as well the body’s natural flora.
- The most common organisms are gram-positive (E.coli, Pseudomonas aeruginosa, Klebsiella pneumoniae)
- Patients with extended periods of neutropenia are treated with broad spectrum antibiotics causing risk of fungal infections. (Candida or Aspergilus)
- Viral infection can also occur. (HSV6, influenza)
• Nursing assessments
• Usual signs and symptoms of infection are diminished or absent. Fever of 100.5 is often the only sign. Patients may not seem very sick.
• Pay attention to subtle changes in mental and functional status.
• Assess oral cavity, sinuses, lungs, skin folds, puncture sites (IV, BMBx) and rectum.
• Pain may be the only indicator of infection.

management

• The single most important intervention is frequent and thorough hand washing by all those that come in contact with the patient.
• Avoid crowds, people with colds or flu, and children who have been recently vaccinated.
• Instruct on meticulous oral hygiene, bathe daily, avoid sharing anything that may harbor germs (dishes, silverware, towels).
• Neutropenic diet.
• Stay out of the dirt.

• Mortality rate from febrile neutropenia can be as high as 70% if antibiotics are not administered within the first 48 hours of a febrile episode.
• Cultures are obtained (blood, urine, suspected sites of infection).
• Imaging studies (CXR) obtained.
• Broad-spectrum antibiotics are started.
• Colony stimulating factors (filgastrim, pegfilgrastim).
• Filgrastim dosed at 5mcg/kg/day. Subq. Should not be started within 24 hours after chemotherapy. Pegfilgrastim is a long acting G-CSF.

Anemia

• Erythrocytes (RBCs)
• Life span is up to 3 months.
• Carry oxygen to body tissue.
• Compensatory mechanisms (increased heart rate, shunting of blood to vital organs).
• Symptoms: fatigue, dyspnea, chest pain, weakness, palpitations, syncope, headache, decreased cognition, pallor.
• Cancer patients often experience a "functional iron deficiency" have sufficient iron stores in the bone marrow but low serum levels.

management

• Transfusion: if symptomatic, chest pain in patients with cardiac or pulmonary disease is significant. Symptoms are greater with rapid blood loss.
• Erythropoietin: colony-stimulating factors (epoetin alfa and darbepoetin alfa)

• The definition of clinically significant anemia is being reexamined.
• Lower grades of anemia is expected as sequel of cancer and cancer treatment and treat only severe anemia. (<8 or symptomatic anemia)
• Assessment: assess lab, history of cardiac or pulmonary disease, ask about symptoms, but also consider other causes-bleeding, hemolysis, nutritional deficiencies, medications, anemia of chronic disease.
Thrombocytopenia

- Platelets
- are a vital part of hemostasis by sticking to blood vessel walls at the site of injury or leak and forming a plug. Also, assist with the conversion of fibrinogen to fibrin in formation of blood clots.
- Have a life span of 5-10 days,
- Thrombocytopenia is a circulating platelet count of <100,000

Assessment: review lab, assess for S&S of bleeding (bruises, petechiae, epistaxis, oozing from the gums, prolonged and/or heavy menses, melana, coffee ground emesis, hematuria)
- Observe puncture sites or cuts.
- Signs of intracranial bleed (headaches, blurred vision, disorientation, changes in mental status, changes in pupil size and reactivity to light).

Management

- Bleeding precautions
- Teach avoiding falls, contact sports, use stool softeners, avoid suppositories and enemas, use a soft tooth brush, avoid dental floss, no using scissors, razors or blades for grooming.
- Educate on use of anticoagulants, aspirin-containing drugs and NSIDS. Use water-based lubricants during sexual intercourse and abstinence with platelet count <50.

Management cont.

- Transfusions for patients who are actively bleeding, prophylactic transfusions prior to invasive procedures or to reduce the risk of bleeding when the platelet count falls below a predefined level. (typically <10)
- Consider transfusion in patients with fever
- Platelet resistance (development of anti-platelet antibodies) use single donor platelets
- Thrombopoietic growth factor: Oprelvekin (Neumega) not widely used, costly with little effect.

Myelosuppression has a psychosocial effect on patient’s lives.
Waiting for a fever or infection fear of bleeding.

Cancer Pain

- Approximately 30%-50% patient undergoing active treatment for solid tumors and 70%-90% of those with advanced cancer experience chronic pain.
- Pain does not predictably correlate with tissue injury thus the patient’s self report is the single most reliable indicator.
Cancer Pain Types

- Nociceptive pain originates from bone, joint, muscle, skin, connective tissue or viscera/ organs (liver, pancreas, or intestine). Usually described as aching or throbbing.
- Neuropathic pain originates from either the central or the peripheral nervous system. Usually described as burning, tingling, or electric shock-like pain. (phantom limb pain or neuropathy)

- Chronic: pain that persists or recurs frequently.
- Acute: pain occurs intermittently and has an anticipated end.
- Breakthrough: acute pain that occurs despite the use of ongoing analgesics.
- Pain syndromes, 75% of chronic pain syndromes are caused by the tumor itself, the remaining are associated with treatment toxicities or other comorbidity.

Tumor Related Pain Syndromes

- Acute syndromes: pathological fractures, bleeding into the tumor, superficial wounds or abscesses, headaches.
- Chronic syndromes: rostral retroperitoneal syndrome, malignant pelvi and perineal pain, peripheral mononeuropathies, polyneuropathies, plexopathy, radiculopathy, epidural spinal cord compression, phantom pain after amputation, tumor invasion into joints and soft tissue, hypertrophic osteoarthropathy, bowel, ureter, or bladder obstruction and hepatic distention

Cancer Treatment Pain Syndromes

- Radiation Therapy: oropharyngeal mucositis or esophagitis, enteritis, proctitis, brachial plexopathy after breast irradiation, skin reaction/irritation, bone pain after radiopharmaceuticals
- Chemo, Hormonal or Immunotherapy: oropharyngeal mucositis or esophagitis, IV line placement, peripheral neuropathy, bone pain, myalgias and arthralgias, 5-FU induced chest pain, infection and pain from bleeding and bruising.

Assessment

- Severity scales (numeric or picture). Assess before treating, after and on-going.
- Question: Where does it hurt? When? does it start? Is it worse at certain times of the day? What makes it better or worse? Have you tried anything in particular to relieve the pain? How do others know you are having pain? How does it affect your ability to do normal activities? How does it make you feel? What concerns do you have about taking pain medications?

Challenges to Assessment

- Health care professionals do not know more about the patient’s pain than the patient!
- Opioid-associated phenomena:
  - Addiction: a psychological dependence, compulsive drug use for purposes other than pain. Patient who take opioid meds for pain, regardless of dose are not addicted.
  - Physical dependence: physiologic adaptation of the body to opioids. Withdrawal symptoms occur if dc’d abruptly.
  - Tolerance: A decrease in one or more of opioid effects. (sedation, respiratory depression and analgia)
- Important: Less than 1% of patients who take opioids for pain become addicted.
Challenges cont.

- Cognitively impaired or unconscious patients. The nurse must watch for nonverbal indicators of pain (facial expression, restlessness, moaning, crying)
- Various ethnic groups express pain differently. In addition to using assessment tools we must work closely with the patient and their families.

Pharmacologic Therapy

- NSAIDS or acetaminophen
- Opioid Analgesics
- Adjuvant analgesics

Nonsteroidal Anti-Inflammatory Drugs

- Examples of NSAIDS: Aspirin, ibuprofen, ketoprofen, naproxen, celecoxib, choline magnesium, indomethacin, trisalicylate, roficoxib

NSADS use and action

- Used to treat mild pain caused by inflammation.
- Inhibits cyclooxygenase, an enzyme that catalyzes conversion of arachidonic acid to prostaglandin. Prostaglandins sensitize nerve receptors, resulting in pain.

NSAIDS Side Effects

- Heartburn, nausea, diarrhea, constipation, flatulence, epigastric and/or abdominal pain. Long-term use can lead to renal and hepatic toxicity, bleeding and gastric ulceration.
- Concurrent use with alcohol or steroids should be avoided.

Acetaminophen

- Use: Has minimal anti-inflammatory effects but can decrease pain from inflammation.
- Side effects: Liver toxicity. Caution use with patients with liver disease or combined with alcohol intake. Doses that exceed 4000mg/day can result in liver and kidney damage.
Opioids

- Examples: codeine, hydromorphone, levorphanol, methadone, morphine, oxycodone, meperidine, fentanyl,
- Used to treat moderate to severe pain when NSAIDS/acetaminophen are contraindicated.

Opioid Action

- Relieves pain by binding to opioid receptors, blocking substance P. Substance P, when released by damaged cells, sensitizes nerve receptors.
- No ceiling dose except when using meperidine. High doses or long-term use causes toxic metabolite accumulation, leaking to dysphoria, agitation and seizures.

Opioid side effects

- Constipation, sedation, nausea, pruritus, urinary retention, myoclonus, biliary spasm, respiratory depression.

- Pain control is best achieved and analgesic doses lower when pain is anticipated and prevented (prior to painful procedures, pain rounds).
- Around the clock dosing works best for patients with persistent, daily pain (continuous release oral agents, transdermal agents, IV or subq continuous infusions).
- Break through pain is best treated with immediate release analgesics.

Adjuvant Drugs

- Used to enhance analgesic effect of opioids, to treat specific pain types (neuropathic) or to treat other symptoms that make pain worse.
  Examples: chemotherapy (secondary effect by shrinking tumor), anti-depressants, anti-histamines, anti-anxiety drugs, amphetamines, anti-convulsants, steroids, bisphosphonates.

Anti-depressants

- Ex. Amitriptyline, Nortriptyline, Desipramine
- Use: Help to control tingling or burning from nerve injury caused by cancer or cancer treatment. Also, used to treat depression
- Side effects: dry mouth, sleepiness, constipation, orthostatic hypotension, blurred vision, urinary retention. Patients with heart disease may have arrhythmias.
**Anti-histamines**
- Examples: Hydroxyzine, Diphenhydramine
- Use: Helps to control nausea, insomnia and pruritus.
- Side Effects: drowsiness

**Anti-anxiety drugs**
- Examples: Diazepam, Lorazepam
- Use: Treats muscle spasms that accompany severe pain.
- Side Effects: May cause urinary incontinence, sedation.

**Amphetamines**
- Examples: Caffeine, dextroamphetamine, methylphenidate
- Use: Enhance effectiveness and decrease drowsiness of opioids.
- Side Effects: Irritability, tachycardia, decreased appetite.

**Anti-convulsants**
- Examples: carbamazepine, clonazepam, gabapentin, phenytoin
- Use: Helps control tingling or burning from nerve damage caused by cancer or cancer therapy.
- Side effects: Liver toxicity, bone marrow suppression. Gabapentin may cause sedation and dizziness.

**Steroids**
- Examples: dexamethasone, prednisone
- Use: relieves pain caused by bone mets, spinal cord an brain tumor (decreases swelling, inflammation)
- Side Effects: Edema, hyperglycemia, stomach irritation, rarely confusion, altered behavior and sleeplessness.

**Bisphosphonates**
- Examples: Pamidronate, Etidronate, Zoledronic acid.
- Use: to decrease pain from bone metastasis.
- Side effects: flu-like symptoms, renal toxicity, injection site erythema, electrolyte abnormalities.
Radiopharmaceuticals

- Examples: strontium 89, samarium 153
- Use: Are given systemically and are absorbed in area of high bone regeneration. Can be delivered to many painful bone metastases all at once.
- Side effects: may cause bone marrow suppression.

Invasive procedures

- Radiation
- Nerve blocks.

Gastrointestinal Symptoms

- Disruption of the GI system
- Mucositis and stomatitis describe oral cavity breakdown.
- Esophagitis is disruption or infection of the esophagus.
- Enteritis delineates erosion of the lining of the intestines.

- Assessment includes oral inspection for mouth sores, redness, thrush, tooth decay, dental hygiene, gum disease, halitosis.
- Ask about difficulty swallowing, dry membranes, blood in saliva or gums. Heartburn, indigestion, pain in chest area, painful swallowing, hiccups, abdominal distension, nausea/vomiting, constipation, diarrhea, blood in stool.

Causes/risk factors

- Chemotherapy, radiation, direct tumor invasion of the tissue.
- Antibiotics, compromised immunity, decreased platelets, all lead to breakdown.
- Risk factors include smoking, drinking alcohol, antimetabolites (5-FU, MTX,Ara-C) poorly fitting dentures, poor dental health, Hx of HSV, yeast, candida or any oral infection. Steroids and AIDS.

Role of the Nurse

- Focus on infection prevention, comfort and nutrition maintenance.
- Promote proper oral hygiene (high risk pts. should use saline rinses QID, use soft tooth brush BID and floss unless platelet are low.
- Treat pain with topical analgesia, IV medications.
- Encourage liquid supplements to promote adequate nutrition.
Nausea and Vomiting

- Causes serious complications, dehydration, electrolyte imbalances, esophageal bleeding and tears when prolonged.
- The vomiting center is located in the brain near the brain stem, near centers that regulate salivation and vasomotor response. Explains why salivation, respiration and heart rate all increase with nausea.
- The center receives stimulation through several different pathways.

- Vagal and sympathetic afferents that originate in the GI tract trigger the VC when gastric emptying is delayed.
- Afferents in the midbrain respond to intracranial pressure but also can be a learned response (anticipatory nausea).
- The vestibular system can trigger the VC through inner ear disturbances (motion sickness but some chemotherapy agents cause this experience).
- The chemotherapy trigger zone is also located in the brain. It is stimulated by toxins in the blood (actually neurotoxins that are released when chemotherapy drugs are present in the blood stream).
- The neurotransmitters involved are serotonin, dopamine, histamine, prostaglandins, and gamma-aminobutyric acid.

Emetogenic potential of common chemo drugs

- Very high: cisplatin, dacarbazine, mechlorethamine, melphalan (high dose) streptozocin, cytarabine (high dose).
- High: carmustine, cyclophosphamide, procarabazine, etoposide (high dose), semustine lomustine, daunorubicin, mitomycin C, ifosfamide, hexamethylnelanine.
- Moderate: doxorubicin, mitoxantron C, topotecan, 5-fluorouracil, irinotecan, milomycin C, ifosfamide, curtopatin, paclitaxel, daunorubicin, L-asparaginase, hexamethylnelanine.

Role of the nurse

- Encourage patients to take scheduled antiemetics and use prns before meals.
- Remove tray tops before entering the room, teach to avoid the kitchen during meal preparation. Offer cool foods or chilled supplements.

Treatment drugs

- Ondansetron, granisetron, dolasetron mesylate (serotonin, 5-HT receptor blocker)
- Dexamethasone (inhibits prostaglandin)
- Diphenhydramine, promethazine (inhibits histamine)
- Dronabinol (depresses CNS)
- Droperidol, haloperidol, perphenazine, prochlorperazine (inhibits dopamine)
- Metoclopramide (blocks dopamine, also stimulates the upper GI motility to increase gastric emptying).
- Scopolamine (blocks cholinergic impulsive-motion sickness)
- Lorazepam (depresses CNS)

Xerostoma

- Dry mouth, most common cause is salivary gland failure due to radiation damage, antihistamines, opioids.
- Causes discomfort but also may lead to difficulty eating and swallowing.
- Teach to use hard candies to moisten mouth and stimulate salivary gland production. Carry a water bottle for frequent sipping. Use nonalcoholic mouthwash, artificial saliva before meals, moisturizer on lips. Use gravies and sauces on foods to aid in chewing and swallowing.
Halitosis

- Bad breath, may be caused by disease that in the oral cavity, xerostoma, oral infections and poor oral hygiene.

Constipation

- Causes: dehydration, opioids, medications, hypocalcemia
- Role of the nurse: Obtain patient history, bowel history, Identify the cause, offer laxatives, encourage fluids.

Fatigue

- Often the most persistent and distressing symptom.
- Decreases QOL by reducing the patient’s ability to function during treatment and beyond.
- Assessment tool may be numeric or picture.

- Is fatigue related to recurrence or progression of disease?
- What is the treatment regimen?
- What medications is the patient taking? Include over the counter, herbal remedies
- Are there comorbidities (CHF, chronic lung failure, sepsis, endocrine dysfunction)
- What are the onset, duration and pattern of fatigue, as well as aggravating and alleviating factors?
- What extent does fatigue interfere with ability to function in usual activities.

- Medications that may cause fatigue: beta-blockers, opioids, antidepressants, antiolytics, antihistamines and antiemetics. May need dose adjustments.
- Treatment therapies include: exercise, attention and energy conservation.

Cognitive Impairment

- “Chemo-brain”
- May be result from cancer (primary brain cancer or mets) or from treatment.
- May be subtle or dramatic, temporary or permanent, stable or progressive.
- Risk factors: advancing age, history of neurologic or psychiatric illness, substance abuse, prior cancer treatment.
- Treatment includes restorative interventions, (use personalized relaxation techniques-walking in nature, tending garden, observing wildlife) to restore the ability to focus and maintain attention. Compensatory strategies to help organize information, maintain attention and encode information for future recall.
Dyspnea

- Shortness of breath, difficulty breathing, breathlessness or tight throat.
- Often underdiagnosed and poorly managed, has no reliable objective measure.
- Gold standard for assessment is patient reporting.

Causes

- Disease: primary lung cancer and mets, obesity, COPD, anemia, anxiety, cachexia, and CHF.
- Therapy-induced: surgical thoracotomy radiation fibrosis, chemo related pulmonary and cardiac toxicities (adria, bleo).
- Assess in time and/or relationship to activity and impact on QOL.
- Symptom that can causes the greatest distress for the caregiver.
- Perceived as a greater stressor in men than women but has a reported greater impact on functional performance in women than men.

Treatment

- Reduce ventilatory impedance (Smoking cessation, use metered dose inhalers, corticosteroid meds, manage pleural effusion, brachytherapy radiation with bronch.).
- Reduce ventilatory demand (sit in forward leaning position, elevate head during sleep).
- Improving respiratory muscle function (respiratory exercises against resistance by using a hand held device).
- Pulmonary rehab.

Anorexia and Weight Loss

- Often the first symptom of cancer
- Multi causes (direct result of tumor effects, cancer treatment side effects, complex systemic effects)
- Direct tumor effects (tumors that effect nutritional intake, effect digestion, absorption and metabolism).
- Treatment effects (medication causing constipation, nausea/vomiting.)

Nutritional needs are increased during cancer treatment due to cellular repair and healing.
- Dietary referral.
- Encourage calorie rich, protein dense diet, offer supplement.
- Promote several small meals a day.

Complementary & Alternative Therapies (CAMs)

- Complementary therapies have been scientifically tested but there is not a lot of evidence to support many of these.
- May be referred to as supportive care.
- Alternative therapies are used in place of conventional treatment (unproven, often advertised to cure cancer).
- Patients often pursue because of fear of side effects from conventional treatment, traditional or cultural practice and cost.
- Holistic approach refers to modalities that integrate the body-mind-emotion-spirit environment of a person.
• Herbs: alfalfa, aloe vera, astragalus root, black cohosh, capsicum, chamomile, cranberry, dandelion, echinacea, ephedra, evening primrose, feverfew, garlic, ginger, gingko, goldenseal, hawthorn, hop, kava kava, licorice, passionflower, red clover, St. John's wort

• Vitamins and dietary supplements: chondrotin, coenzyme q10, fish oil, glucosamine, vit. C, vit. E.

• Vitamin and mineral usage during treatment is controversial.

• Nurse must obtain complete list, investigate side effects, precautions and medication interactions.

Healing with physical power: chiropractic therapy, massage therapy, Qigong and Tai Chi, reflexology, rolfing (deep tissue manipulation), yoga.

Healing with the mind: biofeedback, humor therapy, hypnosis, meditation, music therapy, pet therapy, relaxation, storytelling.

• Healing with subtle energy: acupressure, acupuncture, aromatherapy, color therapy, feng shui, homeopathy, intuitive spiritual healing, magnetic therapy, prayer, reiki, therapeutic touch.

• Questions????

• Mr Allen describes his pain as a 7 on the verbal numeric rating scale. He has no evidence of tachycardia, hypertension, diaphoresis, or pallor. From these observations you conclude which of the following regarding MR Allen’s pain?

A. He is experiencing acute or intermittent pain,
B. He is experiencing chronic pain.
C. Because he does not appear to be in pain, further assessment is necessary before treating his pain.
D. His pain medication is adequate.
Fatigue associated with radiation changes is most often associated with all but which one of the following?
A. An accumulation of cell-destruction end products.
B. Increased energy requirements to repair damaged epithelial tissue.
C. Age, diagnosis, or stage of disease at diagnosis.
D. Pain, depression and weight loss.

According to research, which of the following nonpharmacologic measure is most effective in relieving fatigue?
A. Conservation of energy.
B. Motivational strategies to increase self efficacy beliefs.
C. Increasing the number of hours resting or sleeping.
D. Exercise

References:
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