Care of the Patient with Myelosuppression and Fatigue

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Objectives

- Identify causes, risk factors, signs & symptoms of myelosuppression and fatigue
- Discuss medical & nursing management as well as patient education for patients with myelosuppression and fatigue

CIRCULATING BLOOD CELLS LIFE SPAN

<table>
<thead>
<tr>
<th>Blood Cell</th>
<th>Life Span in Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythrocyte</td>
<td>120 Days</td>
</tr>
<tr>
<td>Platelets</td>
<td>7-8 Days</td>
</tr>
<tr>
<td>Neutrophil</td>
<td>7-12 Hours</td>
</tr>
<tr>
<td>Eosinophil</td>
<td>3-8 Hours</td>
</tr>
<tr>
<td>Basophil/mast cell</td>
<td>7-12 Hours</td>
</tr>
<tr>
<td>Monocyte/macrophage</td>
<td>3 Days</td>
</tr>
<tr>
<td>B Lymphocyte</td>
<td>Type depend</td>
</tr>
<tr>
<td>T Lymphocyte</td>
<td>Type depend</td>
</tr>
</tbody>
</table>

Myelosuppression

- Definition:
  - Reduction in production & maturation of all blood cell lines
  - Resulting in leukopenia, thrombocytopenia, & anemia in peripheral blood
- One of most common & potentially life-threatening clinical complications experienced by patients with cancer

Causes of Myelosuppression in Cancer Patients

- Cancer-induced
- Chemotherapy-induced
- Radiation therapy-induced

White Blood Cell (WBC) Count & Differential

<table>
<thead>
<tr>
<th>WBC Type</th>
<th>Relative Value</th>
<th>Absolute Value uL (mm$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutrophils (total)</td>
<td>50-70%</td>
<td>2,500 – 7,000</td>
</tr>
<tr>
<td></td>
<td>segmented (polys)</td>
<td>50-65%</td>
</tr>
<tr>
<td>bands</td>
<td>0-5%</td>
<td>0 – 500</td>
</tr>
<tr>
<td>Eosinophils</td>
<td>1-3%</td>
<td>100 - 300</td>
</tr>
<tr>
<td>Basophils</td>
<td>0.4-1.0%</td>
<td>40-100</td>
</tr>
<tr>
<td>Monocytes</td>
<td>4-6%</td>
<td>200-600</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>25-35%</td>
<td>1,700-3,500</td>
</tr>
</tbody>
</table>

Neutropenia

- Decreased number of circulating neutrophils
  - Neutrophils 1st line of defense against bacterial infection (localize & neutralize bacteria)
  - Normal range
    - 2,500 to 6,000 cells/mm$^3$
    - 50% to 60% of total number of WBC’s

Risk Factors for Neutropenia in Patients with Cancer

- Patient-related
  - Older clients
  - Comorbid diseases (diabetes, COPD, etc)
  - Poor nutritional status
- Disease-related
  - Myeloproliferative disorders
  - Invasion of marrow by metastasis
- Treatment-related
  - Myelosuppressive chemotherapy
  - Radiotherapy
  - Corticosteroids
Potential Consequences of Neutropenia

- Infection
- Sepsis and septic shock
- Death
- Delay in administering treatment on time or dose delay; dose reductions

Examples of Chemo Regimens with High Risk of Febrile Neutropenia (>20%)

- Bladder: MVAC
- Breast: Doc+Herceptin, dose dense AC-T, ATXotere, TAC
- Esoph/Gastric: DOC/Cisp/5FU
- Hodgkins: BEACOPP
- Kidney: Adria/Gem
- NHL: CFAR, ICE, RICE, MINE, CHOP, HyperCVAD+R
- Melanoma: DTIC/Gis/Vinblas, DTIC + IL2, IFN+ chemo
- MM: Modified HyperCVAD
- MDS: ATG, Decitabine
- Ovarian: Topotecan, Taxol, Taxotere
- Sarcoma: MAID
- Small Cell Lung: Topotecan
- Testicular: VeIP, VIP, BEP, TIP
- (and there are more Regimens for the 10-20% risk)


The ANC Predicts the Risk for Infection

<table>
<thead>
<tr>
<th>Absolute Neutrophil Count</th>
<th>Grade</th>
<th>Risk of Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within normal limits</td>
<td>0</td>
<td>No Risk</td>
</tr>
<tr>
<td>≥ 1,500 to &lt; 2,000</td>
<td>1</td>
<td>No significant risk</td>
</tr>
<tr>
<td>≥ 1,000 to &lt; 1,500</td>
<td>2</td>
<td>Minimal risk</td>
</tr>
<tr>
<td>&gt; 500 to &lt; 1,000</td>
<td>3</td>
<td>Moderate risk</td>
</tr>
<tr>
<td>&lt; 500</td>
<td>4</td>
<td>Severe risk</td>
</tr>
</tbody>
</table>

Assessing Neutrophils: The Absolute Neutrophil Count (ANC)

ANC = Total WBC x % of neutrophils (bands + segs)

Example:

WBC = 2,000/mm³
Segmented neutrophils = 55%
Band neutrophils = 1%

\[ \text{ANC} = 2,000 \times 0.56 = 1,120/\text{mm}^3 \]
**Absolute Neutrophil Count Calculation**

<table>
<thead>
<tr>
<th>WBC = 3,000/mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Segmented neutrophils = 20%</td>
</tr>
<tr>
<td>• Band neutrophils = 5%</td>
</tr>
<tr>
<td>• Eosinophils = 3%</td>
</tr>
<tr>
<td>• Basophils = 1%</td>
</tr>
<tr>
<td>• Lymphocytes = 71%</td>
</tr>
</tbody>
</table>

What is the ANC?

ANC = 3,000/mm³ X .25 = 750

What is the risk for infection?

My vision of the CBC:

- **Total WBC’s**: All of the Armed Forces
- **Army**: Neutrophils
- **Navy**: Lymphocytes
- **Marines**: Monocytes
Case Study:

<table>
<thead>
<tr>
<th>WBC</th>
<th>3.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>NE%</td>
<td>42.9</td>
</tr>
<tr>
<td>LY%</td>
<td>37.1</td>
</tr>
<tr>
<td>MO%</td>
<td>12.8</td>
</tr>
<tr>
<td>EO%</td>
<td>5.9</td>
</tr>
<tr>
<td>BA%</td>
<td>1.3</td>
</tr>
<tr>
<td>NE#</td>
<td>1.5</td>
</tr>
<tr>
<td>LY#</td>
<td>1.2</td>
</tr>
<tr>
<td>MO#</td>
<td>0.4</td>
</tr>
<tr>
<td>ED#</td>
<td>0.2</td>
</tr>
<tr>
<td>BA#</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Looking at this CBC, do you expect the Neutrophils to increase or decrease?

What will happen if you give a Neupogen injection?

Hint: Normal mono’s 0-12

Nursing Management of Neutropenia

- Identify patients at risk for neutropenia
- Infection prevention strategies
- Frequent assessment for infection
- Education patients & caregivers about neutropenia precautions
- Management of neutropenic fever

Nursing Management:

If an immunosuppressed patient is developing an infection, what would you expect to find on nursing assessment?

Signs of infection MAY NOT be present

Redness, inflammation, and drainage may be minimal or absent

Nursing Management: Continual Assessment for Infection

- Physical Assessment & review of labs
- Attention to common sites of infection
  - Respiratory tract, GI tract, GU tract, perineum, anus, & skin
- Access devices
  - Swelling, drainage, erythema, or redness
- Vital signs
  - Fever may be only response to infection
  - Fever is most common & important sign of infection
  - Temp. of 100.5°F is significant in client with ANC < 500/mm³
  - HR > 100 & ↓ BP, may be developing sepsis

Detecting Signs of Infection in Patients with Neutropenia

- Neutropenia: the often silent disorder
- ONLY sign of an infection may be FEVER:
  - Take temperature every 4 hours (inpatient)
  - Instruct patient to take temperature QOD or BID (home)
  - Report temperature > 100.4°F (38.0°C)
    (or institution standard)

ONS Putting Evidence Into Practice (PEP) Resource

- Green = GO!
  - Evidence supports the consideration of these interventions in practice
- Yellow = CAUTION!
  - Not sufficient evidence to say whether these interventions are effective or not
- Red = STOP!
  - Evidence indicates these interventions are ineffective or harmful

Recommended for Practice

- Hand Hygiene
  - Soap & water
  - Antiseptic hand rub
- Colony-stimulating factors
  - Chemotherapy with ≥ 20% risk of febrile neutropenia
- Influenza vaccine annually for all cancer patients
  - 2 weeks prior to or 3 months after immunosuppressive therapy
  - Do not allow visitors with symptoms of respiratory infections
- Environmental interventions
  - Windows closed
  - Contact precautions for known resistant organisms (MRSA, VRE)
Recommended for Practice

- Pneumococcal vaccine for all cancer patients
  - At least 2 wks prior to chemo, if possible
- Antifungal prophylaxis with quinolones for patients at high risk for infection
  - Hematologic malignancies
  - HSCT recipients
  - Expected neutropenia > 7 days
- Antifungal prophylaxis in high-risk patients
  - Acute leukemia, MDS
  - HSCT, patients with GVHD


Likely to Be Effective

- Private rooms to ↓ transmission of infection
- Flower & plant guidelines
  - Avoid fresh or dried flowers & plants due to risk of aspergillus
  - Plant care by staff NOT caring for patient
  - Change vase water Q 2 days, empty water outside patient room
- Animal encounters
  - Avoid contact with animal feces, saliva, urine, or solid litter box materials
  - Avoid direct & indirect contact with reptiles


Effectiveness Not Established

- Protective isolation
- Gowns, gloves, and/or masks are not indicated for healthcare worker or visitor routine entry into room
  - Should be used according to standard precautions (e.g. contact precautions)


Effectiveness Unlikely

- Low microbial diet for neutropenic patients
  - Basic food safety principles are prudent – avoiding uncooked or unwashed foods
- Laminar air flow
- Routine donning of gowns in high-risk units (e.g. HSCT unit)

Not Recommended For Practice

- Live attenuated vaccines
  - Flumist (intranasal attenuated influenza vaccine)
  - Varicella (chicken pox) vaccine, oral polio vaccine, & MMR vaccine
- Antifungal prophylaxis for neutropenic patients with solid tumors
- Gram + prophylaxis and fluoroquinolone in combination for antibacterial prophylaxis in afebrile neutropenic patients

Educate Patients & Caregivers to Recognize & Minimize Infection

- List measures to prevent infection
  - Managing environment, hygiene, diet, activity
- Identify signs & symptoms of infection
- Emphasize when to report
  - Fever or other signs/symptoms of infection
  - Be specific about whom and when to call
- Give specific oral & written instructions

Febrile Neutropenia

- ALWAYS A MEDICAL EMERGENCY
- Left untreated, may be fatal
- Sepsis is lethal in 47% of infected patients with neutrophil count <1000

Febrile Neutropenia: Definition

- Febrile neutropenia
  - Single temperature $\geq 38.3^\circ C$ orally or $\geq 38.0^\circ C$ over 1 hr
- Neutropenia
  - $< 500$ neutrophils/mcL or $< 1,000$ neutrophils/mcL and a predicted decline to $< 500/mcL$ over the next 48 hrs
Who’s at Risk?

- Older patients, 65 and over
- Previous Chemotherapy, Radiation
- Pre-existing neutropenia or bone marrow involvement with tumor
- Pre-existing conditions
  - Neutropenia, infection/open wounds, recent surgery
  - Poor performance status
  - Poor renal function
  - Liver dysfunction, elevated bilirubin


Assessing/Managing Neutropenic Patients with Fever

- Obtain blood cultures
- Culture suspected sites of infection
  - Urine, sputum, stool, IV catheter sites, wounds
- Chest x-ray
- Immediate institution of broad spectrum antibiotics
  - Initiate after blood cultures obtained
  - If unable to obtain other cultures (sputum, stool, urine) DO NOT hold antibiotics pending cultures
- Admission to hospital (ANC<1000)

Preventing Infection

- The single most important measure to prevent infection when caring for the neutropenic patient is HANDWASHING!!!

Preventing Infection

- Frequent hand washing
- Daily bathing
- Frequent mouth care
- Limit invasive procedures
  - Rectal temps, catheters, etc.
- Inspect IV sites
- Visitor hygiene
Thrombocytopenia

- Decrease in circulation platelets below 100,000/mm$^3$
- Normal platelet count 150,000 – 400,000/mm$^3$
- Life span of platelets – 8 to 10 days

<table>
<thead>
<tr>
<th>Platelet Count</th>
<th>Grade</th>
<th>Risk of Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within normal limits</td>
<td>0</td>
<td>No Risk</td>
</tr>
<tr>
<td>&lt; LLN – 75,000/mm$^3$</td>
<td>1</td>
<td>No significant risk</td>
</tr>
<tr>
<td>&lt;75,000 – 50,000/mm$^3$</td>
<td>2</td>
<td>Minimal risk</td>
</tr>
<tr>
<td>&lt; 50,000 – 25,000/mm$^3$</td>
<td>3</td>
<td>Moderate risk</td>
</tr>
<tr>
<td>&lt; 25,000/mm$^3$</td>
<td>4</td>
<td>Severe risk</td>
</tr>
</tbody>
</table>

Causes of Thrombocytopenia in Cancer Patients

**Disease-related**
- Myeloproliferative disorders
- Invasion of marrow by metastasis
- Coagulation disorders
  - Liver disease
  - DIC
- ITP or TTP

**Treatment-related**
- Chemotherapy
- Radiation therapy
- Infection – endotoxin release
- Medications
  - Aspirin
  - Heparin
  - Phenytoin (Dilantin)
  - Sulfonamides (Bactrim)

Clinical Consequences of Thrombocytopenia

- **Bleeding** – Internal or External
- **Refractory to platelet transfusions**

Nursing Assessment: Physical Exam

- Assess for Bleeding - rectum, nose, ears, oral cavity, menstrual
- **Skin**
  - Petechiae – lower extremities & pressure points
  - Ecchymosis
- **HEENT**
  - Gingival bleeding
  - Conjunctival hemorrhage & sclera injection
- **Neurological**
  - Changes in LOC
  - Restlessness, headache, seizures, pupil changes
Medical Management

- Platelet transfusion
- Platelet growth factor – IL-11 (Neumega)
- Hormonal agents (menstrual bleeding)

Recommended for Practice

- Platelet thresholds: keep at
  - 10,000: majority of patients
  - 20,000
    - minor procedures
    - bladder tumors, necrotic tumors, or highly vascular tumors likely to bleed
  - 40,000 – 50,000: patients undergoing invasive procedures
- Platelet transfusions
  - Active bleeding with thrombocytopenia
- Mesna for prevention of hemorrhagic cystitis

Platelet Transfusions

- Effectiveness of platelet transfusion variable, depends on:
  - Fever & infection: ↑ consumption platelets
  - Hypersplenism
    - Spleen: filters old and damaged cells from your bloodstream: overactive, removes blood cells too early and too quickly
  - Alloimmunization
    - Formation of antibodies to human leukocyte antigen (HLA) on platelet cells surface from contamination of white cells in platelet concentrate
  - Refractory to platelet transfusions

Effectiveness Not Established

- Platelet growth factors
  - Recombinant Interleukin-11 (Neumega)
- Menstrual bleeding: interventions to prevent or attenuate
  - Oral contraceptives, progesterone, etc.
Effectiveness Unlikely or Not Recommended For Practice
- No interventions as of May 2008
- Beware of herbal remedies

Prevention of Bleeding
What interventions are available to prevent and manage bleeding in patients with cancer?

Nursing Interventions: Minimize Bleeding
- Avoid invasive procedures (enemas, rectal temperatures, suppositories)
- Environment to avoid trauma
- Firm pressure to venipuncture sites for 5 minutes
- Avoid use of sharp objects (straight-edge razor)
- Implement bowel regimen to prevent constipation
- Discourage heavy lifting or valsalva maneuver
- Soft toothbrushes
- Monitor pad count (menstrual bleeding) and amount of saturation

Patient/Caregiver Teaching
- Avoid drugs that increase risk of bleeding
- Report to health care team bruising or bleeding
- Measures to decrease occurrence of bleeding
  - Wear shoes when ambulating
  - Use electric razor rather than straight-edge
  - Blow nose gently
  - High-fiber diet with fluids
### ITP: Idiopathic thrombocytopenic purpura

- **ITP** is a bleeding disorder in which the immune system destroys platelets and patients with the disease have too few platelets in the blood.
- ITP occurs when certain immune system cells produce antibodies against platelets.
- The antibodies attach to the platelets. The spleen destroys the platelets that carry the antibodies.
- Treatment: Prednisone, splenectomy, Promacta, NPlate

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### Anemia

- **Symptom** of abnormally low red blood cells (RBC's), quality of hemoglobin (Hgb), and/or volume of packed cells

<table>
<thead>
<tr>
<th>Hemoglobin (g/dl)</th>
<th>Grade</th>
<th>Severity of Anemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within normal limits</td>
<td>0</td>
<td>Normal</td>
</tr>
<tr>
<td>10 - normal</td>
<td>1</td>
<td>Mild</td>
</tr>
<tr>
<td>8 - &lt;10</td>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>6.5 - &lt; 8</td>
<td>3</td>
<td>Severe</td>
</tr>
<tr>
<td>&lt; 6.5</td>
<td>4</td>
<td>Life threatening</td>
</tr>
</tbody>
</table>


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### Causes of Anemia in Cancer Patients

- **Disease-related**
  - Slow or persistant blood loss
  - Malignancy of bone marrow
  - Tumor invasion of bone marrow
  - Impaired absorption, intake, or utilization of iron, folic acid, B12
  - Autoimmune disorders
  - Renal disease

- **Treatment-related**
  - Chemotherapy
  - Radiotherapy
  - Pharmacologic agents
    - Oral contraceptives (folate and B12)
    - Phenytoin (Dilantin)
    - Phenobarbital (Luminal)

---

### Incidence of Anemia Associated with Chemotherapy Agents

<table>
<thead>
<tr>
<th>Agent</th>
<th>Grade 1/2 (%)</th>
<th>Grade 3/4 (%)</th>
<th>Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisplatin</td>
<td>Not reported</td>
<td>11%</td>
<td>H &amp; N</td>
</tr>
<tr>
<td>Docetaxel</td>
<td>73-85 58-60</td>
<td>2-10 27-42</td>
<td>NSCLC Ovarian</td>
</tr>
<tr>
<td>5-FU</td>
<td>Not reported 50-54</td>
<td>11 5-8</td>
<td>H &amp; N Colorectal</td>
</tr>
<tr>
<td>Paclitaxel</td>
<td>93</td>
<td>7</td>
<td>Breast</td>
</tr>
<tr>
<td>Topotecan</td>
<td>Not reported 67</td>
<td>32 32</td>
<td>SCLC Ovarian</td>
</tr>
<tr>
<td>Vinorelbine</td>
<td>67-71</td>
<td>5-14</td>
<td>Breast &amp; Lung</td>
</tr>
</tbody>
</table>

Incidence of Anemia Associated with Chemotherapy Regimens

<table>
<thead>
<tr>
<th>Agent</th>
<th>Grade 1/2 (%)</th>
<th>Grade 3/4 (%)</th>
<th>Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisplatin - cyclophosphamide</td>
<td>43</td>
<td>9</td>
<td>Ovarian</td>
</tr>
<tr>
<td>CDDP-etoposide</td>
<td>59</td>
<td>16-55</td>
<td>SCLC</td>
</tr>
<tr>
<td>VIP</td>
<td>Not reported</td>
<td>52</td>
<td>SCLC</td>
</tr>
<tr>
<td>SFU-carboplatin</td>
<td>42</td>
<td>14</td>
<td>H &amp; N</td>
</tr>
<tr>
<td>CHOP</td>
<td>49</td>
<td>17</td>
<td>NHL</td>
</tr>
<tr>
<td>Paclitaxel-doxorubicin</td>
<td>78-84</td>
<td>8-11</td>
<td>Breast</td>
</tr>
<tr>
<td>Paclitaxel/Carbo</td>
<td>10-59</td>
<td>5-34</td>
<td>NSCLC</td>
</tr>
</tbody>
</table>

Assessment of Anemia

Central nervous system
- Debilitating fatigue
- Dizziness, vertigo
- Depression
- Impaired Cognitive Dysfunction

GI Symptoms
- Anorexia
- Nausea

Vascular System
- Low skin temperature
- Pallid skin, mucosa

Immune system
- Impaired T-Cell and macrophage function

Cardiorespiratory system
- Exertional dyspnea
- Tachycardia, palpitations
- Cardiac enlargement
- Increased pulse pressure, systolic ejection murmur

Genital tract
- Menstrual problems
- Loss of libido

Nursing Assessment: Subjective Symptoms

- Vary depending on the rapidity of onset, patient age, degree of anemia, & co-morbid illnesses
- Subjective symptoms include:
  - Weakness, dizziness, fatigue, decreased sexual desire
  - Dyspnea on exertion
  - Anorexia, headache
  - Difficulty concentrating, drowsiness in the elderly


Signs of Anemia

- Vary depending on the individual and degree of anemia
- Objective symptoms include:
  - Tachycardia, angina, palpitations, systolic ejection murmur
  - S3 or S4 gallop heart rhythms
  - Amenorrhea, impotence
  - Pallor
Nursing Assessment

- Monitor for complications related to anemia
  - Evidence of inadequate oxygenation
    - Pallor, ↓ capillary refill, prolonged redness
  - Postural BP's
  - Constipation or diarrhea related to iron supplements

Medical Management

- Identify underlying cause & correct, if possible
- Supplements
  - Iron, vitamins, folic acid, B12
- RBC transfusions indicated for
  - Symptomatic anemia (dyspnea, tachycardia) regardless of hematocrit
  - Active bleeding
  - Hemoglobin <8 g/dl
- Erythropoietin administration

Nursing Management

Patient/Caregiver Education

- Signs & symptoms to report
- Avoid sudden changes in position
- Assist with ambulation & self-care as needed
- Instruct to avoid hazardous activities, if syncopal episodes (e.g. driving)
- Balanced diet and/or supplements
- Energy conservation

How do you describe fatigue?
Fatigue: A symptom, reported by the patient versus a sign, that is observed by others
- Exhaustion
- Lethargy
- Listlessness/weariness
- Tiredness
- Apathy
- Mental Fatigue

Cancer-related fatigue
“a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning”
National Comprehensive Cancer Network (NCCN), 2008, p. FT-1

Fatigue- Assessment
- Most common symptom, 80-100%
  - 20-53% long term survivors
- Commonly occurs w/ other symptoms: pain, distress, anemia, sleep disturbances
- Physical Symptoms:
  - Shortness of breath, heart palpitations, general lack of energy/stamina, muscle weakness

Risk and Contributing Factors
- Anemia
- Hypothyroidism
- Hypogonadism
- Adrenal insufficiency
- Cardiomyopathy
- Pulmonary dysfunction
- Nausea
- Pain
- Fluid & Electrolyte imbalances
- Depressed mood
- Emotional distress
- Sleep disturbances
- Sedation secondary to medications
What causes Fatigue in Survivors?
- Anemia is NOT common in survivors
- Hypothyroidism, endocrine changes
- Most medical problems increase fatigue (pain, infection)
- Medications can increase fatigue
- Cardiac, pulmonary and vascular problems
- Poor nutrition
- Sleep disturbances
- Lack of physical activity
- Mental Health (56% depression; 46% anxiety)

Fatigue and Depression are not the same, but they can be hard to tell apart and one can lead to the other

Clinical measurement tools

**FATIGUE SCALE**
Select the number that best describes how you feel today.

NO FATIGUE | MILD FATIGUE | MODERATE FATIGUE | EXTREME FATIGUE | THE WORST FATIGUE
---|---|---|---|---
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

Recommended for Practice

- **Exercise!!!!!!!**
  - 3-5 hrs/week
  - Moderate intensity
  - Weight resistance better for fatigue
  - Unclear what is best for prevention
**Likely to Be Effective**

- Energy conservation and activity management
- Education
- Optimizing sleep quality
- Relaxation

**Benefits balances with harms**

- Correction of Anemia with ESA’s

**Effectiveness not established**

- Medications:
  - Paroxetine, donepezil, buproprion SR, venlafaxine, sertraline, targeted anti-cytokine therapy, levocarnitine, vitamins

- Adenosine 5’ triphosphate infusions, mistletoe, Essiac, Chinese medicinal herbs, omega 3 fatty acid supplementation, combinations of dietary supps and lipid replacement plus antioxidant supplementation

**Effectiveness not established**

- Structured rehabilitation
- Individual & group psychotherapy
- Cognitive-behavioral therapy for fatigue
- Cog-behav therapy for concurrent symptoms
- Expressive writing
- Hypnosis

- reiki, yoga, mindfulness based stress reduction, acupuncture, art, music or animal assisted therapy, distraction, combination therapy: aromatherapy, foot soak and reflexology
What I tell my patients:

- Fatigue is the best indicator that you need to MOVE
- Rebuild muscles to re-energize the body
- Eat!! If you don’t put gas in your car, it isn’t going to move. Think of your body as your (sports) car

Patient Education

- Exercise daily!!!! (PT referral prn)
- Rest when you need to
- Sleep well, eat well
- Labor saving devices (wheelchair/commodes)
- Discuss with provider

Summary: Myelosuppression and Fatigue

Did we?

- Identify causes, risk factors, signs & symptoms
- Discuss medical & nursing management as well as patient education for patients

Thank You