HEMATOLOGIC MALIGNANCIES: THE DISEASE, THE PATIENT AND YOU:
A SEMINAR FOR CASE MANAGEMENT NURSING

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EXPANDING OUR MINDS

- Increasing your knowledge
- Understanding your personal values which helps you to care for patients
- Finding ways to care for yourself that allows you to have the energy to care for your patients

“Looking sideways, or angling your lens slightly, allows you to see a different perspective”
GETTING IN TOUCH - EXERCISE

- Gather in small groups of 3-4
- Writing for 3 minutes
- Sharing for 5 minutes

1. Identify a time when you angled your lens slightly and you discovered something that surprised you?

2. Describe a time when you cared for an oncology patient. What impact did it have on you?
1. Participant will describe the disease processes of 3 major hematologic malignancies and analyze similarities and differences between them.

2. Participants will recognize typical disease progression for patients with hematologic malignancies and identify the role of the nurse throughout the disease trajectory.

3. Participants will explain the nature and application of bone marrow transplant as an element of the treatment process.

4. Participants will appreciate the impact of caregiving on nurses in this profession and recognize the needs for self renewal and balance.
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LEARNING MATRIX EXERCISE

 Use the Learning Matrix throughout the day to highlight the key points related to each hematologic malignancy.

 After completion of the Multiple Myeloma lecture we will gather in groups to share information and discuss the similarities and differences in Nursing care for patients with hematologic diseases.

 Report out to larger group
  - Similarities of the hematologic diseases
  - Each disease’s unique attributes
LEUKEMIA: STARTING WITH THE BASICS

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Clinical Nurse Specialist
Hem/Onc/BMT
Mr. M is a 74 year old man who presents with general malaise, body aches and fatigue over the past several months. He is found to be pancytopenic. WBC 0.8 Hgb 6.7 Plts 99K c/o anorexia with a wt loss of 10-15 lbs. History includes work at Dow chemical for 40 years with exposure to many chemicals.

BM bx reveals less than 10% normally functioning hematopoietic cells and 27% myeloblasts expressing antigens CD 13, CD33, CD117 and CD34. Awaiting cytogenetics for further in depth information.

T 100.9  P 87 RR 24  133/78  97% 02sat

Anticipate beginning chemo
- Alkalinized fluids and allupurinol for tumor lysis prophylaxis for impending chemo
- MUGA to evaluate cardiac function
- Blood, urine cultures, UA chest x-ray
- Blood transfusion
Leukemia means White Blood

A group of diseases originating in the bone marrow with hematopoietic cells causing an impairment of functional ability of all cells in the bone marrow.
TYPES OF LEUKEMIA

- Acute
  - Gets worse quickly
  - Malignant proliferation of blast cells
  - Blood cells are very abnormal, cannot do their job, multiply and crowd normal bone marrow cells
Types of Leukemia

- Chronic
  - Gets worse slowly
  - Abnormal cells continue to do their work but not efficiently.
  - Patients may not have symptoms at first
  - Proliferation of more mature cells
LEUKEMIAS GROUPED BY TYPE OF BLOOD CELL AFFECTED

- **Lymphoid cells** = Lymphogenous leukemia
  - (lymphogenous, lymphocytic, lymphoblastic)
- **Myeloid cells** = Myelogenous leukemia
  - (myelogenous, myelocytic, myeloblastic, granulocytic)
4 Common Types

- **CLL**
  - 16,060 new cases per year (2012)
  - More often seen in over 55
  - Almost never seen in children

- **CML**
  - 5,430 new cases per year (2012)
  - Seen mostly in adults

- **ALL**
  - 6,050 new cases per year (2012)
  - Most common type in children, also seen in adults

- **AML**
  - 13,780 new cases per year (2012)
  - Seen in adults and children
One cell in the line of maturation becomes malignant and stays locked at that phase of maturation. Clonal proliferation occurs at this phase and causes bone marrow to become filled with one certain type of immature cell.
RISK FACTORS

- Exposure to high levels of radiation
  - Atomic bomb explosions
  - Nuclear power plant explosion exposure (Chernobyl accident 1986)
  - Radiation treatment

- Chemicals
  - Benzene
  - Formaldehyde
  - Tobacco Smoke

- Chemotherapy
  - Alkalating Agents

- Genetic Diseases
  - Down’s Syndrome

- Human t-cell leukemia virus

- Myelodysplastic Syndrome (MDS)
Replacement of the marrow with the malignant population leads to suppression of the healthy cells.

Symptoms are of general failure of the bone marrow.

Decreased RBCs leads to complaints of anemia.
- Lethargy and decreased stamina
- Shortness of breath (SOB)

Decreased WBCs lead to infections.
- Pneumonia is a common presenting symptom as well as common terminal event.

Decreased platelets result in ease of bruising and bleeding.
- Petechia
- Bleeding from the gums
- Hemorrhage is another common cause of death
OTHER SYMPTOMS

- Joint and bone pain
- Night sweats
- Swelling in abdomen r/t hepatomegaly or spleenomegaly
- Swollen lymph nodes
- Weight loss
- Neuro symptoms (HA, vomiting, visual changes, seizures)
DIAGNOSTICS

- History and physical
- Lab work - initial labs and follow-up
- Immunophenotyping
  - Identification of proteins (antigens) on the cell surface.
- Cytogenetics
  - Examination of # and shapes of chromosomes for more specific diagnosis
Antigens on the cell surface are called “cluster of differentiation” = CD with an associated number. This distinguishes types of cells from each other:

- AML from ALL or leukemic lymphocytes from normal lymphocytes.

Example:
- CD7 and CD19 both found on leukemic lymphoblasts
- CD33 and CD13 both found on leukemic myeloblasts
- And many more
CYTOGENETICS

path.upmc.edu/cases/case171/cyto.html

www.hematogenix.com/.../tabid/70/Default.aspx
A variety of chromosomal abnormalities are known, and even continue to develop throughout the course of the disease.

Examples:
- t(15;17) translocation is common in promyelocytic leukemias (M3 leukemia)
- t(9;22) translocation seen in CML, which causes the development of BCR-ABL, the oncogene responsible for the occurrence of CML
Discovered in 1960 in Philadelphia

Hallmark sign of CML

Reciprocal translocation of BCR and ABL genes on chromosomes 9 and 22

9 is longer

22 is shorter (Ph chromosome)

Ph chromosome also found in a form of ALL that also responds to Gleevec
Acute myeloid leukemia with recurrent genetic abnormalities
   Acute myeloid leukemia with t(8;21)(q22;q22), \((AML1/ETO)\)
   Acute myeloid leukemia with abnormal bone marrow eosinophils and
   inv(16)(p13q22) or t(16;16)(p13;q22), \((CBFB/MYH11)\)
   Acute promyelocytic leukemia with t(15;17)(q22;q12), \((PML/RARa)\) and variants
   Acute myeloid leukemia with 11q23 \((MLL)\) abnormalities

Acute myeloid leukemia with multilineage dysplasia
   Following MDS or MDS/MPD
   Without antecedent MDS or MDS/MPD, but with dysplasia in at least 50% of cells in
   2 or more myeloid lineages

Acute myeloid leukemia and myelodysplastic syndromes, therapy related
   Alkylating agent/radiation-related type
   Topoisomerase II inhibitor-related type (some may be lymphoid)
   Others

Acute myeloid leukemia, not otherwise categorized
   Classify as:
   Acute myeloid leukemia, minimally differentiated
   Acute myeloid leukemia without maturation
   Acute myeloid leukemia with maturation
   Acute myelomonocytic leukemia
   Acute monoblastic/acute monocytic leukemia
   Acute erythroid leukemia (erythroid/myeloid and pure erythroleukemia)
   Acute megakaryoblastic leukemia
   Acute basophilic leukemia
   Acute panmyelosis with myelofibrosis
   Myeloid sarcoma
Acute Myelocytic - cell types
- M-0: Minimally differentiated
- M-1: Myeloblastic, without maturation
- M-2: Myeloblastic, with maturation
- M-3: Promyelocytic
- M-4: Myelomonocytic
- M-5: Monocytic
- M-6: Erythroleukemia
- M-7: Megakaryocytic
- MDS: Myelodysplastic Syndromes
Mr. B is a 58 year old man who reports feeling fatigued with decreased tolerance for exercise. Also c/o dizziness, SOB, and was found to be febrile. Work up revealed 22% blasts in the peripheral blood which prompted a BM bx that showed proliferation of myeloblastic cells consistent with AML.

BM bx showed positive CD5, CD13, CD34, and CD117. Able to rule out M3, but will await further cytogenetics to further classify the AML.

Diagnosis AML-M2  Induction chemotherapy 3+7 Daunarubicin and AraC
L1, childhood (pre B and T cell)
- Mature appearing lymphocytes
- Homogeneous cells

L2, adult (pre B and T cell)
- Immature appearing lymphocytes
- Heterogeneous cells, various shaped lymphocytes

L3, Burkitt’s type (B cell)
- Large uniform mature B cells
Rai and Binet Staging System

- Stage 0 - Lymphocytosis in marrow and blood
- Stage 1 - plus lymphadenopathy
- Stage 2 - plus spleenomegaly and/or hepatomegaly
- Stage 3 - plus anemia
- Stage 4 - plus thrombocytopenia
Chronic Phase
- Excessive proliferation and accumulation of mature granulocytes

Accelerated Phase
- Increased myeloid precursors (including blasts)

Blast Crisis
- Presence of at least 30% - 40% blasts or promyelocytes in bone marrow
- Resembles AML or ALL
Patient first presents with upper quad. Abd pain and is noted to have splenomegaly by ultrasound. CBC shows WBC 16.4 Hgb 10 plt 156 10% blasts in the peripheral blood. BM bx shows fully replaced marrow with 90% cellularity and presence of abnormal granulated myeloid cells.

Cytogenetic analysis shows t(9:22) in 4 out of 20 cells and t(8,12) in 16 out of 20 cells.

FISH analysis for BCR/ABL - 97% positive
Flow Cytometry for myeloid cells reveals positive CD13, CD33, CD117 and CD56

Started on Gleevec which normalized blood counts

Seen one month later was in the accelerated phase of CML and progressing through Gleevec. Was started on the study drug AMN-107 and progressed through

Started on Desatinib (super Gleevec) with positive results
Awaiting transplant - no sibling matches - will undergo Matched Unrelated Transplant (MUD)
**TREATMENT**

- **Induction**
  - Initial treatment of chemotherapy given at high doses to irradicate leukemia and achieve a complete remission

- **Consolidation**
  - One or two cycles of the same chemotherapy as used in induction given after remission occur

- **Intensification**
  - Given after remission occurs but often uses a higher dose of the same chemo or a different type to prevent resistance

- **Maintenance**
  - Chemotherapy that is continued to be given over months or years to reduce/eliminate persistent leukemic cells
CNS prophylaxis
- Chemotherapy agents used do not cross the blood brain barrier. Must administer IT chemo or do cranial radiation
  - Adults: cranial radiation only if CNS leukemia present
  - Children: most often used as standard treatment

BMT
- Increased disease free survival with Allo or MUD done in 1st CR
- Low intensity transplants are less toxic to elderly patients and provide a graft vs. leukemia effect that will work to eradicate disease
TREATMENT FOR AML

AML

Induction
- 7 + 3: Ara-C, Idarubicin or Daunorubicin (days 1-7 Ara-C, days 1-3 Ida or Dauno) - Cardiotoxicity
- BM bx day #14

Consolidation
- High dose Ara-C (HDAC) - monitor cerebellar function, avoid chemical keratitis, skin rash, hepatic dysfunction
- CR yes: consolidation
- CR no: repeat induction
APL- Acute Promyelocytic Leukemia

- Chemotherapy and ATRA (all-trans retinoic acid)
  - ATRA - encourages cell differentiation
  - Induces remission in 80-90% of patients
    - If CR, consolidation x 2: Ara-C, Anthracycline in addition to ATRA
    - If no CR, BMT, salvage chemotherapy
    - ATRA may be given over the next year as maintenance

- Arsenic and ATRA
  - Given to patients who cannot tolerate chemotherapy
Progenitor B-cell, T cell ALL

- **Induction** (adapted from regimes developed for high-risk childhood ALL)
  - Combinations of Vincristine, Prednisone, L-asperiginase, and Anthracycline result in CR of approximately 75%
  - Larson Protocol (induction, early intensification, CNS prophylaxis, late intensification, prolonged maintenance)

- **Consolidation**
TREATMENT FOR CML

- Chronic Phase
  - Hydrea or Busulfan - disease control
  - Alpha 2A interferon

- All phases
  - Gleevec halts the action of an abnormal, cancer-causing protein called BCR-ABL that is specific to CML
  - Gleevec blocks ATP which transfers energy to the cancer protein

- Imatinib
- Desatinib
- Nilotinib

Gleevec: HOW IT WORKS
Potential for infection related to Neutropenia

- monitor VS
- Assess changes in respiratory status
- Assess skin integrity and mucous membranes
- Assess of changes in genitourinary patterns
- Assess for signs and symptoms of sepsis
  - evaluate for early and late signs
- monitor labs
  - WBC, ANC
Nursing Management

- Potential for bleeding related to Thrombocytopenia (bleeding precautions for platelets < 50K)
  - Assess for bruising and petechiae
  - Assess mucous membranes, breaks in the skin
    - Mouth, gums, nose, rectum
  - Assess for changes in mental status
    - Alertness, orientation, headaches
  - Assess all body fluids and secretions
    - Melanoma, hematuria, hemoptysis, hematemesis
NURSING MANAGEMENT

- Potential for side effects related to Chemotherapy (nausea, vomiting, dehydration, mucositis, diarrhea)
  - Monitor VS
  - Monitor labs
  - Assess oral mucosa
    - lesions and plaque
  - Monitor I/O
  - Monitor daily weight
  - Record amount, color, frequency of emesis and stool
Observe for Oncologic Emergencies:
- Sepsis
- DIC
- Tumor Lysis Syndrome
REFERENCES

- http://www.cancer.org