Nursing care plan for Hematological disorders

Dr. Howaida Saati RN, PhD
Provide nursing managements for hematologic disorders

- Sickle Cell Anemia
- Leukemia
- Platelet Disorders/Hemophilia
- Bone marrow transplantation
Intended Learning Outcomes (ILOs)

- Anatomic and physiologic factors that affect hematologic system
- Assessment parameters of hematologic system
- Utilize critical thinking skills in the application of nursing process in the care of the patients suffering from anemia
- Identify the risk factors, and clinical manifestations of hematological disorders
- Demonstrate holistic care of a patient with hematological disorders.
Anatomic and Physiologic Overview

The hematologic system consists of the blood, the bone marrow

**Blood consists of:**
- Plasma = 55% of blood volume
- Erythrocytes (red blood cells [RBCs]), leukocytes (white blood cells [WBCs]), and thrombocytes (platelets) = 45% of blood volume
Blood Components

Red Blood Cells
- Erythrocytes: Make up 40% of the blood’s volume
- Produced in the bone marrow
- Contain hemoglobin, a protein that gives blood its red color and enables it to carry oxygen.

White Blood Cells
- Leukocytes: Fewer in number than RBCs (1:660)
- Fights infection, phagocytosis, allergic reaction, hypersensitivity reaction

Platelets
- Thrombocytes: cell-like particles smaller than RBCs and WBCs.
- Provide basis for coagulation to occur; maintains hemostasis by gathering at bleeding site and clumping together to form a plug that helps seal the blood vessel.
The formation of different types of blood cells from the stem cell. The stem cell differentiates into one of five types of blast (immature) cells, which then mature into red blood cells (erythrocytes), platelets (thrombocytes), or white blood cells (leukocytes).
Assessment of Hematologic Disorders

- Hematologic studies such as complete blood count (CBC)
- Bone Marrow Aspiration and Biopsy to document infection or tumor within the marrow
- Bone marrow is usually aspirated from the iliac crest and the sternum
Bone Marrow Aspiration
Bone Marrow Aspiration and Biopsy

Nursing care before:

- An antianxiety agent may be used
- Describe and explain the procedure and the sensations (pressure, sharp but brief pain) that will be experienced, risks, benefits
- A signed informed consent
During the procedure patient instructed to take deep breaths or use relaxation techniques.

There is a risk for infection and bleeding after the procedure.

Mild analgesic (e.g., acetaminophen) may be useful, or offered short-acting sedation (lorazepam or midazolam)
Bone Marrow Aspiration and Biopsy..... cont’d

- Position patients in the left or right lateral position
- Take observations before and immediately after the procedure and at 15-minute
- Observe patients throughout, and give further sedation as required
- Observe oxygen saturation levels after the procedure, as the sedative effect can cause hypoxia
- Assist the doctor with collecting and labelling the samples
- Apply a pressure dressing to the site
Bone Marrow Aspiration and Biopsy..... cont’d

• Observe the site for hemorrhage, hematoma and infection
• Observe patients for 1–4 hours after the procedure, depending on the amount of drug used and in line with local policy
• Document in the notes the procedure, the samples taken and the patient’s condition
• Educate patients on observing the wound site for infection and hemorrhage
• Give the patient an information leaflet, which will also indicate whom to contact should any complication occur
• Inform patients when the results will be available and who will provide this information
Red Blood Cells Disorders
Anemia

It is a condition in which the hemoglobin concentration is lower than normal, and fewer than normal erythrocytes within the circulation. As a result, the amount of oxygen delivered to body tissues is also diminished.

Anemia is not a specific disease state but a sign of an underlying disorder.
Classification of Anemia

**Hypo-proliferative:** resulting from defective RBC production.

**Bleeding:** resulting from RBCs loss.

**Hemolytic:** resulting from RBCs destruction.
Causes of Anemia

- Iron, folate, vitamin B12 deficiency
- Cancer, inflammation, decreased erythropoietin
- Bleeding from GI tract, trauma
- Autoimmune
Clinical Manifestations

At hemoglobin levels between 9 -11 g/dL

- Tachycardia on exertion
- Pallor
- Tachypnea
- Irritability
- Fatigue
- Dyspnea
- Chest pain, muscle pain or cramping
Diagnostic findings

Hemoglobin, hematocrit, reticulocyte count

RBC indices:
- Mean corpuscular volume (MCV)
- Red cell distribution width (RDW)

Iron studies

Serum iron level, total iron-binding capacity [TIBC], percent saturation, and ferritin
- Serum vitamin B12 and folate levels.
- Other tests include haptoglobin and erythropoietin levels.
- Bone marrow aspiration.
Complications

- Heart failure
- Paresthesia
- Delirium
- Angina in those with heart disease.
Medical Management

Management of anemia is directed toward correcting or controlling the cause of the anemia; if the anemia is severe, the erythrocytes that are lost or destroyed may be replaced with a transfusion of packed RBCs (PRBCs)
Nursing Management Assessment:

- Obtain a health history, perform a physical examination, and obtain laboratory values.
- Ask patient about extent and type of symptoms experienced and impact of symptoms on lifestyle; medication history; alcohol intake; athletic endeavors (extreme exercise).
- Ask about family history of inherited anemias.
Nursing Management
Assessment:

- Perform nutritional assessment: Ask about dietary habits resulting in nutritional deficiencies, such as those of iron, vitamin B12, and folic acid.
- Monitor relevant laboratory test results; note changes.
- Assess cardiac status (for symptoms of increased workload or heart failure): tachycardia, palpitations, dyspnea, dizziness, orthopnea, exertional dyspnea, cardiomegaly, hepatomegaly, peripheral edema
Nursing Management  
**Assessment:**

- Assess for GI function: nausea, vomiting, diarrhea, melena or dark stools, occult blood, anorexia, glossitis; women should be questioned about their menstrual periods (eg, excessive menstrual flow, other vaginal bleeding) and the use of iron supplements during pregnancy.

- Assess for neurologic deficits (important with pernicious anemia): presence and extent of peripheral numbness and paresthesias, ataxia, poor coordination, confusion.
Nursing Diagnosis

✓ Fatigue related to decreased hemoglobin.
✓ Altered nutrition, less than body requirements, related to inadequate intake of essential nutrients.
✓ Altered tissue perfusion related to inadequate blood volume.
✓ Noncompliance with prescribed therapy
Nursing Interventions

- Managing fatigue.
- Maintaining Adequate Nutrition.
- Maintaining Adequate Perfusion.
- Promoting Compliance With Therapy.
- Monitoring and Managing Potential Complications.
Hemolytic Anemias / Sickle Cell Anemia

Brief History in Saudi Arabia

- In 1963, sickle cell gene was first recognized in Saudi Arabia

- In Saudi Arabia the prevalence of sickle cell disease varies significantly in different parts of the country, the maximum prevalence was noted in the Eastern province, followed by the southwestern provinces

- Aconsanguineous marriage has been linked to the high incidence and prevalence of Sickle Cell Anemia (SCA), which, accounts more than 50%, with the rate of marriage

- between first cousins ranging from 40% to 50%.

- Sickle cell disease is also associated with significant mortality. The highest mortality rate was observed among children between 1 and 3 years of age and adolescents younger than 20 year
Sickle Cell Disease Control and Current Challenges in Saudi Arabia

- In 2003, the government of Saudi Arabia decided to implement a premarital screening program to decrease the incidence of the common hemoglobinopathies in Saudi Arabia, including sickle cell disease.

- A network of more than 1800 primary health care centers, 200 hospitals and a number of governmental and private organizations were involved in the screening and providing of health care services to the whole Saudi population.

- Marriage certificate can’t be given to couple with high risk who, had positive sickle cell trait/disease and were referred to a regional genetic counseling clinic.

- Almost 90% of the high-risk couples married each other despite being aware of the risk to have children with inherited haemoglobin disorders. Cultural pressure was reported as the main reason to proceed with marriage in the majority of cases.
Sickle Cell Disease Control and Current Challenges in Saudi Arabia

- Between 2004 and 2009 it has been found that there was no increase in the prevalence of sickle cell disease (among 1000 examined persons).

- More recent study performed at Marriage Center of Northern Border Region in Arar showed that more than 60% of the participants at-high risk marriages were cancelled their marriage proposals, which result in reducing the incidence of SCA and other genetic disease across the area.
It is a severe hemolytic anemia that results from inheritance of the sickle hemoglobin gene.

The “sickling crises” are intermittent.

Cold can aggravate the sickling process, because vasoconstriction slows the blood flow.
Hemolytic Anemias: Sickle Cell Anemia

- This gene causes the hemoglobin molecule to be defective.
- The sickle hemoglobin (HbS) acquires a crystal-like formation when exposed to low oxygen tension.
- ↓ oxygen level in venous blood can cause this change; consequently, the erythrocyte containing HbS loses its round, pliable, biconcave disk shape and becomes deformed, rigid, and sickle-shaped.
- These long, rigid erythrocytes can adhere to the endothelium of small vessels; when they adhere to each other, and ↓ blood flow to a region or an organ
- Oxygen delivery can also be impaired by an increased blood viscosity
Sickle Cell Anemia

Formation of sickled red blood cell

Sickle fibers

Sickled red blood cell

Normal red blood cell

(Redrawn from Raven PH, Johnson GE. Biology, ed 2, St. Louis, 1981, Mosby.)
Clinical Manifestations

- Jaundice usually obvious in the sclera.
- Tachycardia, cardiomegaly, dysrhythmias and heart failure.
- Pain, swelling of joints, and fever.
- Acute Chest Syndrome: fever, cough, tachycardia.
- Pulmonary hypertension.
- Hemoglobin values are 7 to 10 g/dL.
<table>
<thead>
<tr>
<th>Organ Involved</th>
<th>Mechanisms</th>
<th>Diagnostic Findings</th>
<th>Signs and Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spleen</td>
<td>Primary site of sickling → infarctions → ↓ phagocytic function of macrophages</td>
<td>Autosplenectomy; ↑ infection (esp. pneumonia, osteomyelitis)</td>
<td>Abdominal pain; fever, signs of infection</td>
</tr>
<tr>
<td>Lungs</td>
<td>Infection Infarction → ↑ pulmonary pressure → pulmonary hypertension</td>
<td>Pulmonary infiltrate ↑ sPLA2 (Secretory phospholipase A2)</td>
<td>Chest pain; dyspnea</td>
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<tr>
<td>CNS</td>
<td>Infarction</td>
<td>Cerebral vascular accident (stroke)</td>
<td>Weakness (if severe); learning difficulties (if mild)</td>
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<tr>
<td>Kidney</td>
<td>Sickling → damage to renal medulla</td>
<td>Hematuria; inability to concentrate urine; renal failure</td>
<td>Dehydration</td>
</tr>
<tr>
<td>Heart</td>
<td>Anemia</td>
<td>Tachycardia; cardiomegaly → heart failure</td>
<td>Weakness, fatigue, dyspnea</td>
</tr>
<tr>
<td>Bone</td>
<td>↑ Erythroid production Infarction of bone</td>
<td>Widening of medullary spaces and cortical thinning Osteosclerosis → avascular necrosis</td>
<td>Ache, arthralgias Bone pain especially hips</td>
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<td>Liver</td>
<td>Hemolysis</td>
<td>Jaundice and gallstone formation; hepatomegaly</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>Skin- peripheral vascular</td>
<td>↑ Viscosity/stasis → infarction → Skin ulcers</td>
<td>Skin ulcers; ↓ wound healing</td>
<td>Pain</td>
</tr>
<tr>
<td>Eye</td>
<td>Infarction</td>
<td>Scarring, hemorrhage, retinal detachment</td>
<td>↓ Vision; blindness</td>
</tr>
<tr>
<td>Genital</td>
<td>Sickling → vascular thrombosis</td>
<td>Priapism → impotence</td>
<td>Pain, impotence</td>
</tr>
</tbody>
</table>
Sickle Cell Crisis

**Painful sickle crisis**, which results from tissue hypoxia and necrosis due to inadequate blood flow to a specific region of tissue or organ.

**A plastic crisis** results from infection with the human parvovirus. The hemoglobin level falls rapidly and the marrow cannot compensate, as evidenced by an absence of reticulocytes.

**Sequestration crisis** results when other organs pool the sickled cells. The most common organ is spleen in children, and liver or lung in adults.
Sickle Cell Crisis

Risk factors:
- Inadequate fluid intake (Dehydration)
- Exposure to cold weather
- Exposure to emotional stress
- Doing strenuous activities
- Infection
- Exposure to low oxygen tension
Pulmonary Hypertension

It is a common sequela of sickle cell disease, and often the cause of death.

Diagnosing pulmonary hypertension is difficult because clinical symptoms rarely occur until damage is irreversible.

Diagnosis with Doppler echocardiography is useful in identifying patients with elevated pulmonary artery pressures.
Assessment and Diagnostic Findings

- The patient with sickle cell trait usually has a normal hemoglobin level, a normal hematocrit, and a normal blood smear.
- In contrast, the patient with sickle cell anemia has a low hematocrit level and sickled cells on the smear.
- The diagnosis is confirmed by hemoglobin electrophoresis.
Medical Management

Peripheral Blood Stem Cell Transplant PBSCT

May be not available because of either the lack of a compatible donor or because severe organ damage (eg, renal, liver, lung)

Pharmacologic Therapy

Hydroxyurea (Hydrea), a chemotherapy agent, effective in ↑ fetal hemoglobin (ie, hemoglobin F) levels in patients with sickle cell anemia and lead to ↓ incidence of painful episodes of sickle cell crisis, acute chest syndrome, and less need for transfusions.
Transfusion Therapy:
RBC transfusions is effective in ↓ episodes of sickle cell crisis, in an acute exacerbation of anemia, Transfusion therapy may be effective in preventing complications from sickle cell disease.

Also effective in preventing complications from sickle cell disease as; stroke, chronic heart failure, and pulmonary hypertension.
Medical Management

Transfusion Therapy:

- Poor venous access, which necessitates a vascular access device with risk of the following: Thrombosis
- Infections (hepatitis, human immunodeficiency virus [HIV])
- Alloimmunization (an immune response to antigens from donor cells) from repeated transfusions.
Medical Management

Supportive therapy:
- Pain management
- Adequate hydration oral / IV
- O2 therapy
- Folic acid
- Aspirin / Nonsteroidal anti-inflammatory drugs (NSAIDs) / Opioid analgesics (morphine)
- Nonpharmacologic approaches such as massage, physiotherapy
Nursing Process

Assessment:
- Monitor pain levels
- Assess swelling and fever
- Assessment of all body systems
- Assess signs of dehydration
- Assess patient for the presence of any infectious process
- Monitor the extent of anemia and compare it with the patient's baseline values
Nursing Diagnoses

- Acute pain related to tissue hypoxia.
- Deficient knowledge regarding sickle crisis prevention.
- Risk for powerlessness related to illness-induced helplessness.
- Risk for infection.
Collaborative Problems/Potential Complications

- Hypoxia, ischemia, infection, and poor wound healing leading to skin breakdown and ulcers
- Dehydration
- Cerebrovascular accident (CVA, brain attack, stroke)
- Acute and chronic renal failure
- Heart failure, pulmonary hypertension, and acute chest syndrome
- Poor compliance
- Substance abuse related to poorly managed chronic pain
Nursing Interventions

- Managing Pain
- Preventing and Managing Infection
- Promoting Coping Skills
- Minimizing Deficient Knowledge
- Monitoring and Managing Potential Complications
- Teaching patients self-care.
Nursing Interventions

- Monitors pain levels and administer prescribed analgesics
- Monitors intake and output and assess the patient for signs of dehydration
- Administer prescribed antibiotic andAssesses patient for the presence of any infectious process
- Assesses vital signs and oxygen saturation
Teaching/Instructions to Reduce the Chance of Another Crisis

Instruct the patient to:

- Maintain adequate fluid intake
- Avoid exposure to cold weather
- Manage / control emotional stress
- Avoid strenuous activities / exercises
- Avoid the crowded places to decrease the chance of getting infection
Leukemia

- It is a neoplastic proliferation of one particular cell type (granulocytes, monocytes, lymphocytes, or infrequently erythrocytes or megakaryocytes).

- Hematopoietic malignancy with unregulated proliferation of leukocytes

- The defect originates in the hematopoietic stem cell, the myeloid, or the lymphoid stem cell.
Leukemia

The leukemias are commonly classified according to the stem cell line involved, either lymphoid or myeloid.

Types:

- Acute myeloid leukemia.
- Chronic myeloid leukemia.
- Acute lymphocytic leukemia.
- Chronic lymphocytic leukemia.
A: Picture of bone marrow smear; Normal granulocytes and erythroblasts are evident.
B: Acute lymphoid leukemia (ALL); There is a marked proliferation of small lymphoblasts.
C: Acute myeloid leukemia (AML); There is a marked proliferation of large myeloblasts.
D: Chronic myeloid leukemia (CML); There is a marked proliferation of granulocytes at various stages of maturation.
Leukemia in Saudi Arabia

- Leukemia ranked third type of cancer among males and the sixth among females in Saudi Arabia.

- There were 693 cases accounted to 5.9% of all cancer cases diagnosed among Saudi nationals in 2014.

- Leukemia affected 392 (56.6%) males and 301 (43.4%) females with a male to female ratio of 130:100.

- The median age at diagnosis was 25 years in males (ranged between 0 and 104 years) and 31 years in females (ranged between 0 and 108 years).
Leukemia

Assessment and Diagnostic Findings:
Blood and bone marrow studies confirm proliferation of WBCs (leukocytes) in the bone marrow.
Nursing Process
Nursing Diagnosis of the Patient With Leukemia

• Risk for infection and bleeding due to bone marrow suppuration

• Impaired mucous membranes due to changes in epithelial lining of the GI tract from chemotherapy or prolonged use of antimicrobial medications

• Imbalanced nutrition, less than body requirements due to anorexia, mucositis, pain, and nausea and vomiting.

• Acute pain and discomfort related to mucositis, leukocyte infiltration of systemic tissues, fever, and infection

• Fatigue and activity intolerance related to anemia, infection,
Nursing Diagnosis of the Patient With Leukemia

• Diarrhea due to altered GI flora, mucosal denudation, and prolonged use of broad-spectrum antibiotics
• Impaired physical mobility due to anemia, malaise, discomfort, and protective isolation
• Self-care deficit due to fatigue, malaise, and protective isolation
• Anxiety due to knowledge deficit and uncertainty about future
• Disturbed body image related to change in appearance, function, and roles
• Grieving related to anticipatory loss and altered role functioning
Nursing Diagnosis of the Patient With Leukemia

• Potential for spiritual distress

• Risk for impaired skin integrity related to toxic effects of chemotherapy, alteration in nutrition, and impaired mobility

• Risk for deficient fluid volume related to potential for diarrhea, bleeding, infection, and increased metabolic rate
Collaborative Problems/Potential Complications

- Infection
- Bleeding/Disseminated intravascular coagulation (DIC)
- Renal dysfunction
- Nutritional depletion
- Mucositis
- Depression and anxiety
Nursing Interventions

Interventions related to risk of infection and bleeding

- Environment and Staff
- Dietary
- Patient care
- Hygiene
- Intravenous (IV) Therapy
- Minimize the risk for bleeding
Nursing Interventions

Interventions related to risk of infection and bleeding

Mucositis

- Provide frequent, gentle oral hygiene
- Use soft toothbrush, or sponge-tipped applicators for mouth care
- Rinse the mouth with Normal Saline
- Perform perineal and rectal care
Nursing Interventions cont’d

Improving Nutrition:

- Provide oral care before and after meals
- Administer analgesics before meals
- Provide appropriate treatment of nausea
- Provide small, frequent feedings with soft foods that are moderate in temperature
- Provide a low-microbial diet
Nursing Interventions cont’d

- Easing Pain and Discomfort
- Decreasing Fatigue
- Maintaining Fluid and Electrolyte Balance
- Managing Anxiety and Grief
Platelets Disorders
Hemophilia

It is a group of hereditary genetic disorders that impair the body's ability to control blood clotting or coagulation, which is used to stop bleeding when a blood vessel is broken.

Types of Hemophilia

Hemophilia A caused by genetic defect that results in deficient or defective factor VIII

Hemophilia B caused by genetic defect that results in deficient or defective factor IX
Hemophilia in Saudi Arabia

- Saudi Arabia: 1,896 patients with Hemophilia
- KFSH Riyadh: >150 Patients
- Department of Hematology Dammam: 54 patients
- KAUH: 40 patients
- Lack of public awareness
- Absence of national registry
- Under-diagnosis
Hemorrhage occurs into various body parts (large, spreading bruises and bleeding into muscles, joints, and soft tissues) after even minimal trauma.

Most bleeding occurs in joints (most often in knees, elbows, ankles, shoulders, wrists, and hips); pain in joints may occur before swelling and limitation of motion are apparent.

Chronic pain or ankylosis (fixation) of the joint may occur with recurrent hemorrhage; many patients are crippled by joint damage before adulthood.
Hemophilia: Clinical Manifestations

- Spontaneous hematuria and GIT bleeding.
- Hematomas within the muscle can cause peripheral nerve compression with decreased sensation, weakness, and atrophy of the area.
- The most dangerous site of hemorrhage is in the head (intracranial or extracranial).
Hemophilia

**Diagnostics Methods:**
Clotting factor measurement: Prolonged PTT, irregularities or absence of other clotting factors

**Medical Treatment:**
Factors VIII and IX concentrates are given when active bleeding occurs.

Plasmapheresis or concurrent immunosuppressive therapy may be required for patients who develop antibodies (inhibitors) to factor concentrates.
Hemophilia: Nursing Interventions

*Teach the patient to:*
- Avoid trauma
- Use soft toothbrush
- Avoid vigorous cough

Monitor vital signs (hypovolemic shock)
Assess for pain
Monitor for complications of blood transfusions
Infection Precautions (Neutropenia Precautions)

- Use private room
- Perform hand hygiene before entering patient’s room
- Provide low microbial diet
- Do not allow visitors with a cold or sore throat
- Perform daily total body hygiene
- Avoid enema, rectal temperature
Bleeding Precautions

- DO NOT GIVE IM INJECTIONS/INSERT FOLEY CATHETER
- NO RECTAL TEMPERATURE/NO RECTAL SUPPOSETORIES
- APPLY PRESSURE FOR 5 MINUTES AFTER VENIPUNCTURE
- USE STOOL SOFTENER
- USE ONLY ELECTRIC RAZORS FOR SHAVING
- AVOID ASPIRIN AND ASPIRIN CONTAINING MEDICATIONS
Blood Transfusion: Complications

- Allergic reaction
- Circulatory overload
- Bacterial contamination
Nursing Management for Transfusion Reactions

- Stop the transfusion. Maintain the IV line with normal saline solution
- Compare the vital signs with baseline
- Notify the physician of the assessment findings
- Notify the blood bank
- Send the blood container and tubing to the blood bank
Bone Marrow Transplantation (BMT)

- Used for hematologic cancers that affect the marrow or solid tumors, which are treated with a chemotherapy dosage that ablates the bone marrow.

- Types of BMT:
  - Autologous
  - Allogenic
  - (Syngeneic)

- All BMT procedures can be physically and emotionally difficult, so patients often require support and counselling.

- Patients are hospitalized for a few weeks while the bone marrow and blood cell count returns to normal.
Common Nursing Diagnoses

- Risk for infection
- Impaired oral mucosa
- Impaired tissue integrity
- Imbalanced nutrition
- Chronic pain
- Fatigue
- Disturbed body image
- Coping diagnoses and anticipatory grief
Nursing Interventions: Prevention of infection

1. Assess patient for evidence of infection

2. Report fever (38.3°C)

3. Obtain cultures and sensitivities as indicated before initiation of antimicrobial treatment (wound exudate, sputum, urine, stool, blood).

4. Initiate measures to minimize infection e.g.
   
   A. Importance of patient avoiding contact with people who have known or recent infection or recent vaccination.
   
   b. Instruct all personnel in careful hand hygiene before and after entering room.
   
   c. Avoid rectal or vaginal procedures (rectal temperatures, examinations
5. Assess intravenous sites every day for evidence of infection

6. Avoid intramuscular injections.

7. Avoid insertion of urinary catheters

8. Teach patient or family member to administer granulocyte (or granulocyte macrophage) colony-stimulating factor GCSF, when prescribed

9. Advise patient to avoid exposure to animal excreta
Improving Body Image and Self-Esteem

- Encourage independence and continued participation in self-care and decision making
- Patient is assisted to assume those tasks and participate in those activities that are personally of most value
- Any negative feelings that the patient has or threats to body image should be identified and discussed
- The nurse serves as a listener and counselor to both the patient and the family
Helping Patients Cope With Alopecia

- The nurse provides information about alopecia
- Supports the patient and family in coping with disturbing effects of therapy, such as hair loss and changes in body image
- The patient is encouraged to acquire a wig or hairpiece before hair loss occurs so that the replacement matches the patient's own hair
- Use of attractive scarves and hats
- Knowledge that hair usually begins to regrow after therapy is completed may comfort some patients, although the color and texture of the new hair may be different
BMT Complications

- Graft-versus-host disease (GVHD)
- Venous occlusive disease (VOD)
Graft-versus-host disease (GVHD) sings and symptoms

- In which the donor cells recognize the malignant cells and act to eliminate them.
- Skin rash or reddened areas on the skin (signs of aGvHD of the skin): Please report if your skin is itchy.
- Yellow discoloration of the skin and/or eyes, and abnormal blood test results (signs of aGvHD of the liver)
- Nausea, vomiting, diarrhea, or abdominal cramping (signs of aGvHD in the gastrointestinal tract)
- Increased dryness/irritation of the eyes (signs of GvHD of the eyes)
- To prevent graft-versus-host disease (GVHD), patients receive immunosuppressant drugs, such as cyclosporine (Sandimmune) or methotrexate
Venous occlusive disease (VOD) Signs and symptoms

- A vascular injury to the liver caused by high-dose chemotherapy, leading to hepatic outflow obstruction and portal hypertension, in the first 30 days or so after BMT, acute liver failure, and death

- Weight gain, an increase in abdominal circumference, hepatomegaly, right upper quadrant pain, ascites

- Elevated total and direct bilirubin levels.

- The onset of transfusion-refractory thrombocytopenia with no detectable cause is frequently noted as an early and suggestive sign

- Treatment generally includes supportive care including pain management and possibly diuretics
References

Sickle-cell Anemia and Consanguinuity among the Saudi Arabian Population


Cancer Incidence Report Saudi Arabia 2014