CHAPTER 1

Hematologic and Immunologic Issues

ANATOMIC POINTERS

In the hematologic system, blood performs a variety of essential functions. It continuously transports oxygen, nutrients, hormones, antibodies, and other substances around the body for use. It also carries cellular-metabolism wastes to sites where they are transformed or eliminated from the body. While circulating through the vascular system, blood helps regulate fluid, electrolyte, and acid-base balance. It can also protect the body with its clotting capability and by fighting infections.

The two major components of the blood are plasma and blood cells. Plasma is the liquid portion of the blood. It consists primarily of water, but also includes proteins (e.g., albumin, globulin), clotting factors (e.g., fibrinogen), electrolytes, nutrients, wastes, and other substances. Within the vascular system, the protein albumin plays an important role in maintaining fluid balance. The presence of sufficient albumin in the plasma creates an osmotic force (colloidal or oncotic pressure) that offsets the hydrostatic pressure and pulls fluid into the vascular system.

The blood cells include erythrocytes (red blood cells [RBCs]), leukocytes (white blood cells [WBCs]), and thrombocytes (platelets). These cells primarily originate from hematopoietic (blood cell-producing) stem cells in the bone marrow—for example,

in the ribs and the ends of long bones. Stem cells, which exist in both embryonic and adult forms, are primitive cells not only capable of differentiating into other cells, but also of self-replicating to ensure their continuous supply. The hematopoietic stem cells found in the bone marrow are able to differentiate into either myeloid or lymphoid stem cells when specifically stimulated to do so. Lymphoid stem cells are able to produce either T or B lymphocytes, whereas myeloid stem cells can differentiate into RBCs, WBCs, and platelets.

The functions of RBCs include transporting oxygen (O_2) and carbon dioxide (CO_2), and helping maintain acid–base balance. The hemoglobin in RBCs contains heme, an iron compound, and globin, a protein. In the capillaries within the lung, oxygen binds with the iron on this hemoglobin; the oxygen-laden RBCs then flow to body tissues, where the body's cells receive this oxygen supply. Carbon dioxide attaches to the globin protein when CO_2 diffuses from tissue cells into the capillaries; from there, it is carried in the blood to the lungs to be expelled. Hemoglobin buffers excessive acids in venous blood by combining with hydrogen ions, which are produced by cellular metabolism.

Most of the heme found in RBCs is ultimately converted into *bilirubin*, a yellowish or orange-colored pigment in the bile, which is eventually excreted mostly through the feces. Pathologic bilirubin accumulation leads to *jaundice*, which may be evidenced by a yellowish tone of the patient's skin or sclera.

Erythropoiesis (production of RBCs) within the bone marrow is stimulated by erythropoietin, a hormone primarily produced and released by the kidney. This process requires many essential nutrients, including folic acid; vitamins B_{12}, B_2, and B_6; protein; and iron. Destruction of RBCs normally occurs in the bone marrow, liver, and spleen after approximately 120 days—the RBC's average life span.

Thrombocytes (platelets) function primarily to promote blood coagulation by initiating the formation of a platelet "plug" and the clotting process. This series of events can close an opening in the capillary wall to stop bleeding.

Leukocytes (WBCs) play an important role in the body's defensive and reparative mechanism. Granulocytes—that is, WBCs with granules in their cytoplasm—include neutrophils, eosinophils, basophils, and band cells (less mature granulocytes, the presence of which increases in infection). Eosinophils and basophils are said to be involved in hypersensitivity or allergic reactions. Agranulocytes—that is, WBCs without granules in their cytoplasm—include lymphocytes and monocytes.

The two subtypes of lymphocytes are B cells (derived from bone marrow) and T cells (mostly derived from the thymus). B cells provide humoral immunity, whereas T cells provide cell-mediated immunity. Both types of immunity are essential for maintaining human health, though their mechanisms can be complicated. In humoral (antibody-mediated) immunity, antibodies are produced by the B lymphocytes (differentiated B cells) found in plasma (the Greek word *humor* means "body fluid"). Humoral immunity is believed by researchers to need the "help" of T cells in recognizing some antigens and triggering antibody formation. In contrast, in cell-mediated immunity, T cells directly attack antigens—the foreign invaders, such as bacteria or viruses—instead of producing antibodies.

The immune system can be affected by a broad spectrum of factors, including a person's physical or emotional status, diet, or medications; thus, various types of immune system dysfunctions can occur anytime in the course of life. Normally, this system functions primarily to recognize the initial invasion of foreign (non-self) substances, such as microorganisms. It may subsequently develop antibodies and sensitize lymphocytes to mount a specific reaction (the immune response) to ward off repeated invasions of the foreign substance. Over-reaction of the immune system may result in hypersensitivity or allergy. When the ability to accept self-antigen or one's own tissues is impaired, autoimmune disorders may set in.

Immunity may be naturally developed or acquired. Natural immunity involves no prior contact with an antigen. For example, humans are immune to certain infectious agents

that cause illness in other species. Acquired immunity can be classified into two types: actively or passively acquired immunity. Actively acquired immunity may develop after a person has a disease or through immunization (i.e., vaccination with a less virulent antigen). Passively acquired immunity develops after a person receives antibodies to an antigen rather than synthesizing antibodies; for example, an infant may obtain antibodies through the mother's breastmilk or through an injection with hepatitis B immune globulin (serum antibodies). Passive immunity is usually short-lived, as it does not lead to the production of memory cells that might offer long-term protection to the individual against future encounters with the antigen.

A blood typing test is usually done before a person donates or receives blood, and for assessing the risk of Rh (Rhesus factor) incompatibility between an expectant mother and her fetus. The ABO blood typing system is based on whether specific blood group antigens (i.e., A and B) are present on RBCs' surface membranes. Group A blood has antigen A and anti-B antibodies, whereas group B blood has antigen B and anti-A antibodies. Group AB blood has both antigens (A and B) and no antibodies to react to the transfused blood; for this reason, individuals with type AB blood are known as universal recipients. Group O blood has neither antigen on its RBCs; individuals with group O blood are known as universal donors because their blood has neither antigen A nor antigen B, but does have both antibodies.

Blood clumping will occur when a patient with the A blood type receives a donor's blood containing B antigens (in either type B or type AB blood), and when a patient with the B blood type receives donated blood containing A antigens. Such a mismatch results in hemolysis of RBCs. Before administering a blood transfusion, it is imperative to confirm that the correct blood type is being given to the correct patient. If a patient who is receiving a blood transfusion starts to feel a vague sense of uneasiness, or have signs or complaints such as nausea, sweating, chills, shortness of breath, or low back pain, the first

nursing action is to immediately stop the transfusion and act per protocol; a potential blood type mismatch may be to blame.

The spleen, which is the largest lymphoid organ, is located in the left upper quadrant of the abdomen. It filters the blood and performs many functions, including producing RBCs in the fetus and when bone marrow is damaged in adults, removing old and defective RBCs, recycling iron, filtering circulating bacteria, and storing RBCs and platelets. In addition, the spleen has some immunologic functions, such as forming lymphocytes and monocytes. Nevertheless, this organ is not considered essential to survival.

The spleen is highly vascular. A penetrating injury to it may necessitate a splenectomy to prevent hemorrhage, septicemia, or peritonitis. After a splenectomy, the patient may have immunologic deficiencies; measures should be taken to prevent infection.

DISORDERS AND CONDITIONS

ANEMIA

In anemia, a lower-than-normal hemoglobin concentration is present, reflecting fewer erythrocytes in the blood, which in turn reduces the amount of oxygen delivered to the body tissues. This condition manifests as generalized tissue hypoxia and may be attributable to a host of etiologies. Various terms are used to describe types of anemia based on different etiologies or criteria. Some of the more common types are discussed in this section.

Main Symptoms

Symptoms are influenced by many factors, including the rapidity of development, durations, patients' conditions, and underlying disorders. The tissue hypoxia associated with anemia (due to different causes) commonly accounts for the following manifestations:

- Pallor
- Dyspnea on exertion

- Palpitation
- Dizziness
- Chronic fatigue

Nutritional anemia may result from a deficiency of iron, vitamin B_{12} (cobalamin), or folic acid.

Iron-deficiency anemia may be induced by factors such as inadequate iron intake, malabsorption, excessive loss of iron due to blood loss, or red blood cell trauma. In addition to changes in lab values, such as low hemoglobin levels (because iron is needed for the formation of hemoglobin), other common clinical findings may include the following:

- Fatigue, inability to concentrate, and exertional dyspnea
- Cracks at the corners of the mouth, and inflammation of the tongue (glossitis) or lips (cheilitis)
- Pica (eating non-food) behavior in some cases
- Headache or numbness/tingling in the extremities

In pernicious anemia, a type of megaloblastic anemia (characterized by abnormally large erythrocytes), there is a deficiency of vitamin B_{12} due to various causes—for example, inability to absorb cobalamin or loss of intrinsic factor, which is needed for vitamin B_{12} absorption. Loss of intrinsic factor can result from a partial or total removal of the stomach, as intrinsic factor is produced by mucosal cells in this organ. Patients with pernicious anemia may have a sore tongue, weakness, and paresthesia (numb and tingling sensations in the extremities).

Aplastic anemia may be caused by a depression of the bone marrow or injury to stem cells, resulting in pancytopenia (decreased production of all blood cells—RBCs, WBCs, and platelets). The symptoms vary with the severity of the condition. This type of anemia may be idiopathic (without recognizable cause) or triggered by a specific factor, including chemical agents, toxins, severe disease, or radiation.

In sickle-cell anemia, a genetic disorder, the RBCs tend to assume a sickle shape in response to a low oxygen level. Sickle-cell anemia can be precipitated by hypoxia resulting from

stressful conditions such as infection, high altitude, or blood loss. The sickle-shaped cells cannot easily pass through blood capillaries, which leads to blood vessel obstruction, impaired circulation, and anemia. Such cell sickling can result in cell destruction (hemolysis); if it is not reversed with sufficient oxygenation in time, serious complications can develop. One of the main symptoms of sickle-cell disease is severe pain due to lack of oxygen in tissues. Chronic sickle-cell anemia may manifest as pallor of the mucous membranes, activity intolerance, swollen joints, and fatigue. Severe oxygen depletion of the tissues and hypovolemia can result in life-threatening shock.

Anemia may also stem from renal disease. When renal function is impaired, the kidneys' production of erythropoietin, which stimulates red blood cell production, will be affected. Notably, patients undergoing dialysis may lose blood into the dialyzer, contributing to iron deficiency and anemia.

Selected Nursing Tips

1. Manage different types of anemia according to their specific nursing guidelines for each. Eliminate identifiable causes and provide vigorous supportive care. Implement energy-saving practices, such as sitting to perform daily tasks. Monitor lab results and report to the practitioner to get any problems addressed.
2. Encourage patients to consume a nutritionally appropriate diet or obtain recommended vitamin replacement to correct nutritional deficiencies and improve their resistance to infection.
3. Watch lab values, including hemoglobin and hematocrit; be alert to signs of infection. Schedule undisturbed rest periods while patients are hospitalized.
4. When caring for patients with iron deficiency:
   - Advise patients to take liquid iron through a straw to avoid staining the teeth. Vitamin C or orange juice can enhance the absorption of iron.
   - Alleviate and manage the side effects of iron supplementation, which include constipation; increase fluid and

dietary fiber intake as appropriate. Inform patients that iron supplements may turn stools dark-colored, which may mask bleeding.
- Offer non-irritating mouthwashes or foods for patients who have a sore mouth or tongue.
- Tell patients to report the side effects of iron supplements, such as nausea, vomiting, or constipation, for possible dose adjustment. In case of an allergic reaction, stop the iron infusion and be prepared to provide supportive treatment at once.
- Z-track administration of iron intramuscular (IM) injections may prevent side effects such as brownish skin discoloration and irritation at the injection sites.
- Advocate for iron-deficiency prevention in susceptible populations. Foods rich in iron include meats (especially organ meats), eggs, beans, green leafy vegetables, and raisins.
- Stress the importance of compliance with iron supplementation therapy, as iron replacement takes time; prevent overdose or overuse of iron supplements.

5. When caring for patients diagnosed with sickle-cell anemia, one of the priorities is to assess their pain level and control pain with prescribed analgesics. Encourage patients in remission to take measures to prevent exacerbation:
   - Avoid wearing tight-fitting, restrictive clothing or participating in strenuous exercise.
   - Ensure adequate hydration and practice infection prevention.
   - Avoid conditions that may induce hypoxia, including cold temperatures, high altitude, and use of medications that produce vasoconstriction. Promote general health and good hygiene practice.

Points to Consider

1. Counsel patients who have had extensive gastric resections or who are on strict vegetarian diets about the importance

of having prescribed vitamin B_{12} supplementation, possibly for life.
2. Folic acid anemia may be related to chronic alcohol use or inadequate dietary intake.
3. In case of aplastic anemia, in which the patient has a decreased bone marrow production of erythrocytes, leukocytes, and platelets, reverse isolation is usually necessary. Patients should prevent infection by avoiding crowds, practice good hygiene, and eliminate raw foods from their diets.

Precaution

In case blood transfusions are indicated, carefully follow nursing guidelines regarding the proper techniques and policies. Closely monitor the patient for signs of a transfusion reaction, including the highly dangerous acute hemolytic reaction, such as elevated temperature, chills, rash, hives, itching, back pain, or restlessness, which often occur in the initial period of therapy. If allergic reaction is suspected, stop the transfusion immediately.

DISSEMINATED INTRAVASCULAR COAGULATION

Disseminated intravascular coagulation (DIC) may be precipitated by sepsis, cancer, shock, toxins, allergic reaction, or other serious disorders. It is a sign of a serious, potentially life-threatening health problem. The profuse bleeding may be attributed to a variety of factors, including depletion of platelets and clotting factors when excessive amounts of clots are formed in the microcirculation (i.e., platelets and clotting factors get used up in clotting process).

Main Symptoms

Abnormal bleeding into the skin (e.g., petechiae or ecchymosis) may be noted in susceptible patients without a hemorrhagic disorder. Bleeding from an invasive procedure sites, mucous membranes, and the gastrointestinal (GI) or urinary tract may also occur. Patients may have abnormal lab results, including

progressively decreasing platelets, low fibrinogen level, and altered coagulation time, possibly with accompanying signs of serious complications, such as severe muscle pain, cyanosis, dyspnea, or shock.

Selected Nursing Tips

1. To resolve DIC, the underlying conditions must be treated concurrently.
2. Monitor vital signs and blood studies, including hematocrit, hemoglobin, and coagulation test results.
3. Avoid injuries, straining, and rubbing of bleeding areas; use pressure, cold compresses, or prescribed hemostatic agents to stop bleeding.
4. Watch for signs of GI bleeding and shock. Measuring waist girth may be a way to detect the abdominal distension resulting from internal bleeding.
5. Manage fluid and electrolyte balance. When blood transfusion is ordered, carefully adhere to administration guidelines and specifications and closely watch for signs of transfusion reaction or fluid overload.

Point to Consider

New interpretations or theories regarding the pathology of DIC are likely to lead to new treatment approaches.

Precaution

Prompt recognition and treatment of underlying causal condition are of great significance; caution should be taken to avoid injuries and any precipitating cause of bleeding.

HEMOPHILIA

Hemophilia, a genetically transmitted blood disorder, is characterized by the lack of normal clotting factor VIII (in hemophilia A) or clotting factor IX (in hemophilia B or Christmas disease). This deficiency results in prolonged coagulation time and abnormal bleeding.

Main Symptoms

The severity of this bleeding disorder depends on the degree of clotting factor deficiency and the site of bleeding, with the most dangerous site being in the head:

- In minor cases, patients may present with prolonged bleeding only after major trauma.
- In severe hemophilia, spontaneous or excessive bleeding after minor trauma may cause hematoma. Bleeding into various body parts, especially the joints, may produce pain and disabling effects. Internal bleeding from the urinary or GI tract may also occur.

Selected Nursing Tips

1. Provide therapy as prescribed; treatment may prevent crippling consequences and prolong the patient's life expectancy.
2. Medications with an anticoagulant effect, such as aspirin, should be avoided.
3. Take measures to prevent bleeding, including adopting healthful practices to avoid preventable surgery or procedures, such as ensuring good dental hygiene to avoid tooth extraction.
4. Ensure the safety of the patient's living environment; remove clutter to prevent falls or injuries.
5. Refer the patient and family to genetic counseling when reproductive concerns are an issue.

Point to Consider

Most patients with hemophilia are males. Carriers are females, who may need genetic counseling regarding reproductive concerns.

Precaution

Advise patients to prevent injuries and report signs of internal bleeding, such as blood in the urine and blackish stools.

HUMAN IMMUNODEFICIENCY VIRUS INFECTION

In human immunodeficiency virus (HIV) infection/acquired immunodeficiency syndrome (AIDS), the patient's immune system is severely compromised. HIV is transmitted by direct contact with infected blood or body fluids. It is not spread through casual social contact, such as hugging or dry kissing.

Medical terms that are frequently used in caring for patients with HIV or AIDS include *viral load*, meaning the number of the viral particles in the plasma (measured via a test), and *CD4$^+$ T-cell count*, whose decline may be indicative of an impaired immune system.

HIV infects human cells that have CD4 receptors on their surfaces, especially T cells. T cells, which are also known as T-helper cells or CD4$^+$ T-lymphocyte cells, are believed to have more CD4 receptors on their surface than other cells also bearing CD4 receptors.

CD4$^+$ T cells play a key role in recognizing and fighting pathogens. When they are infected and destroyed, and if the body is unable to produce enough new CD4$^+$ T cells to replace the destroyed cells, immune function will be compromised. When HIV-positive patients have a low CD4$^+$ T-cell count, they may develop severe health problems. HIV infection may progress to AIDS—a condition in which patients develop opportunistic diseases, such as oral candidiasis or Kaposi's sarcoma.

Main Symptoms

The disease process and manifestations of HIV/AIDS are largely individualized and not usually predictable. When initially infected with HIV, patients may experience a flu-like illness characterized by symptoms including fever, sore throat, malaise, diarrhea, and rash. Patients may then be able to maintain a level of CD4$^+$ T-cell count for many years with only vague and nonspecific symptoms. When the CD4$^+$ level drops further, patients may develop worsening symptoms, such as persistent fever, drenching night sweats, and chronic diarrhea.

Candidiasis or thrush, herpes, bacterial infections, shingles, and Kaposi's sarcoma can also occur.

Patients with AIDS who develop *Pneumocystis jiroveci* (formerly known as *Pneumocystis carinii*) pneumonia (PCP) are often acutely ill. The increased metabolism associated with PCP can cause sweating, diarrhea, vomiting, fever, tachypnea, tachycardia, and other manifestations.

Selected Nursing Tips

1. Evaluating the pattern of CD4 cell counts over time is more important than any single test result to assess the effectiveness of antiviral therapy, along with viral load testing (which measures the quantity of HIV particles in the blood).
2. Provide education and counseling regarding the risk factors and preventive methods, including abstaining from sharing body fluids or drug needles in any way.
3. When caring for patients during the terminal phase of AIDS, provide palliative care to keep them comfortable, maintain a restful environment, encourage expression of concerns, and enhance coping mechanisms.

Points to Consider

1. Screening for HIV antibodies has minimized the risk of AIDS transmission associated with blood transfusions. While there is still a "window period" following exposure to the virus during which HIV antibodies may not be detectable, the risk that blood donations from infected individuals will be mistakenly accepted has been minimized or eliminated through many screening and preventive measures.
2. *Pneumocystis jiroveci* pneumonia is an opportunistic lung infection, often seen in immunocompromised individuals, including patients who have HIV infection, leukemia, or lymphoma, and those who have undergone organ transplantation. Treatment outcomes for this infection have considerably improved in recent years, thanks to continuing research.

3. HIV treatment protocols are frequently updated; the new therapies and drugs available for patients have improved their life quality and expectancy.

Precautions

1. Patients' strict adherence to drug regimens is especially important with HIV/AIDS because missing even a few doses of prescribed drugs can lead to viral mutations, resulting in HIV becoming resistant to the drugs.
2. Practicing universal and standard precautions is key to HIV infection prevention.

(LEUKEMIA) RELATED TO

In leukemia, a hematologic malignancy, the rapid turnover of blood cells affects the bone marrow, leading to decreased production of normal blood cells. This deficiency eventually affects the patient's major organs, such as the liver and spleen. Leukemia can strike people of all age groups.

Various terms are used to describe leukemia based on the type of white blood cell involved and specific criteria or characteristics, including acute, (or chronic) lymphocytic leukemia, and acute (or chronic) myeloid leukemia.

Main Symptoms

Symptoms vary depending on the types or stages of disease. Generally, patients with leukemia may experience the following signs and symptoms:

- Fever and infection (because of a lack of sufficient mature white blood cells to defend against infection)
- Fatigue, weakness, and pallor
- Palpitation, tachycardia, and dyspnea
- Signs of hematologic disorders, such as anemia or abnormal bleeding (e.g., nosebleed, easy bruising)

Selected Nursing Tips

1. Provide prescribed treatment therapy to achieve the longest possible periods of remission (e.g., medication, platelet or red blood cell transfusion, or even bone marrow or stem cell transplant in some cases), relieve symptoms, and prevent infection.
2. Promote good nutrition, adequate fluid intake, and general comfort. Minimize constipation and the adverse effects of treatment, such as chemotherapy, and prevent complications.
3. Practice reverse isolation: Protect the patient from being exposed to infections or communicable diseases.
4. Ensure safety and prevent injuries. For example, patients should avoid using bladed or other sharp tools to prevent injuries and bleeding. Applying pressure or a cold pack to a bleeding area or elevating an injured limb, as appropriate, may help stop bleeding.

Points to Consider

1. Dietary counseling may be needed, as some medications can alter the nutritional status of patients with leukemia.
2. It is generally advisable for patients with leukemia to avoid raw fruits or vegetables and undercooked food.

Precaution

Monitor the patient for early signs of infection (e.g., elevated temperature, cough, sore throat) or abnormal bleeding (e.g., bruising, ecchymosis), and initiate treatment promptly as indicated.

LYMPHOMA

Lymphoma, a malignancy of the cells of lymphoid origin, may be generally termed as Hodgkin and non-Hodgkin. The exact cause of this malignancy is unknown.

HODGKIN LYMPHOMA

In Hodgkin (or Hodgkin's) lymphoma, the malignant cells known as Reed-Sternberg cells are characteristically present. The cause

of their development remains unknown. Proper, timely treatment of Hodgkin lymphoma can increase survival rate; this disease is now potentially curable owing to advances made in therapy.

Main Symptoms

The first sign of Hodgkin lymphoma may be painless enlargement of one or more lymph nodes. Manifestations of the disease may involve multiple systems depending on the disease stage, including generalized itching, B symptoms (e.g., fever, night sweats, and weight loss), dyspnea, and malaise. Systemic involvement eventually affects the major organs, such as the spleen, liver, and bones. In the late stage, other features of Hodgkin lymphoma may include edema, anemia, and susceptibility to infection.

Selected Nursing Tips

1. Provide treatments aiming for a cure and manage problems related to the disease or the side effects of therapy (e.g., chemotherapy and/or radiation therapy).
2. Provide small, frequent meals with sufficient nutrition and adequate fluids to improve general health, so as to stave off infection.
3. The skin in the radiation field requires special nursing attention to prevent complications; keep skin in radiated areas dry and free from irritation.
4. Promote the patient's self-care and disease management abilities, stressing the importance of preventing second malignancies by reducing risks, including use of tobacco or alcohol, exposure to excessive sunlight, and exposure to other environmental carcinogens.

Points to Consider

1. The large, unique Reed-Sternberg cell is the hallmark of Hodgkin lymphoma; its presence may be revealed via one or more biopsies.
2. With advanced therapy, Hodgkin lymphoma is potentially curable—a fact that may be shared with patients, if appropriate, to encourage a positive outlook and compliance with treatment.

3. Refer the patient and family to local services for supportive assistance wherever available.

Precaution

Minimize the pain and bleeding associated with stomatitis (inflammation of the mouth) resulting from therapy by using a soft toothbrush and proper cleansing agents (e.g., alcohol-free mouthwash).

NON-HODGKIN LYMPHOMA

A considerable number of subtypes of lymphoma originating in the lymphoid tissues are not defined or diagnosed as Hodgkin lymphoma; instead, they are known as non-Hodgkin lymphoma (NHL). In NHL, the lymphoid tissues are often infiltrated by cancer cells and the disease is frequently not localized.

Main Symptoms

The symptoms of NHL vary widely, and the patterns of spread are unpredictable or erratic, reflecting the disease's variable nature. It sometimes presents with a painless lymph node enlargement, accompanied with other manifestations depending on the locations to which the NHL has spread.

NHL can involve different systems. By the time it is diagnosed, the patient may display symptoms specific to the areas involved. Patients may also complain of fatigue and have B syndromes (fever, night sweat, malaise, and unintended weight loss).

Selected Nursing Tips

1. Based on the stage of disease and affected body systems, manage symptoms stemming from NHL, such as pain related to tumor, pancytopenia, and adverse effects of the treatment.
2. Counsel patients about strategies to alleviate or cope with systemic side effects of chemotherapy, including nausea, hair loss, infection susceptibility, and side effects arising from the areas being radiated (e.g., skin irritation).
3. Implement energy-saving practices to lessen fatigue, which is generally experienced by patients receiving either chemotherapy or radiation therapy.

4. Listen to the concerns of patients and their families and provide emotional support as appropriate.

Point to Consider

The treatment of NHL is often not as effective as the treatment of Hodgkin lymphoma because chemotherapy is more effective in treating faster-growing cells.

Precaution

Patients need to be reminded to minimize their risks of infection and report early signs due to the nature of the condition and its therapy.

MULTIPLE MYELOMA

In multiple myeloma, a malignancy affects the marrow plasma cells that secrete immunoglobulins (proteins necessary for the production of the antibodies that combat infections). The result is an increase in the volume of nonfunctional immunoglobulins, which often infiltrate or otherwise affect the bones and other organ tissue. When the production of normal red blood cells, white blood cells, and platelets is disrupted, patients may experience problems stemming from anemia, episodes of infection, bone destruction, and soft-tissue or organ damage. Factors potentially influencing a person's risk of developing this type of plasma cell cancer include exposure to radiation, chemicals, or viral infection.

Main Symptoms

- Bone pain, often in the back and ribs
- Arthritic symptoms, such as joint swelling and achiness, and possible pathologic fractures or vertebral compression
- Anemia and increased susceptibility to infection due to impaired production of the blood cells and antibodies
- Hypercalcemia (high blood calcium level), as calcium is released from bone destruction, with patients subsequently

displaying signs such as confusion, polyuria, GI problems, or seizure
- Fever, peripheral paresthesia, or malaise

The M (monoclonal) protein produced by the myeloma cells may be detected in urine and blood tests.

Selected Nursing Tips

1. Relieve bone pain and minimize the side effects of medications (e.g., nonsteroidal anti-inflammatory drugs [NSAIDs]), such as GI distress.
2. Ensure the patient's adequate hydration, and monitor fluid intake and output.
3. Assist the patient to walk and be mobile, as immobilization increases bone demineralization and leaves the patient more vulnerable to complications. If the patient is bedridden, maintain good alignment, do passive range-of-motion exercise, and log-roll the patient when turning him or her.
4. Encourage the patient to engage in safe exercise as tolerated to promote lung expansion. Some activity restriction may be necessary to prevent fractures.
5. Alleviate adverse effects of chemotherapy or radiation therapy. Observe for signs of infection or fracture, such as fever, malaise, or pain. Note that steroidal medications may mask the signs of infection.

Points to Consider

1. Weight-bearing activities such as walking promote bone reabsorption of calcium.
2. Adequate fluid intake may dilute the blood and prevent renal complications, resulting from renal tubular obstruction due to the presence of large amounts of abnormal protein, hypercalcemia, and hyperuricemia.
3. Analgesics should be taken as ordered or before pain becomes too severe.

Precaution

Provide a walker and support the patient as necessary to prevent falls, as individuals with multiple myeloma are prone to fractures.

SYSTEMIC LUPUS ERYTHEMATOSUS

Systemic lupus erythematosus (SLE) is characterized by an abnormal immune regulation that results in excessive production of autoantibodies. Multiple body systems can be affected in lupus, a complex inflammatory disease of the connective tissues. The exact cause of SLE is unclear, but there is evidence suggesting interaction of many factors, including genetic, hormonal, and immunologic involvement. Environmental hazards (e.g., sunlight or thermal burns) and certain medications have also been implicated in inducing this condition. The course of SLE is unpredictable, often marked by remissions and exacerbations. Its severity and manifestations vary widely.

An infection or stressful event can exacerbate SLE. Sun exposure may significantly aggravate the condition.

Main Symptoms

- Erythematous (red) rashes across the nose and cheeks; skin lesions exacerbated by sunlight or artificial ultraviolet (UV) light
- Cardiopulmonary or renal abnormalities, including hypertension
- A wide range of neurologic dysfunction, from subtle personality changes to deterioration in cognitive ability

Selected Nursing Tips

1. Relieve symptoms and manage acute and chronic problems involving affected systems and the side effects of the treatment. Adequate rest, optimal nutrition, and regular exercise may boost patients' immune function and help prevent serious complications.

2. Instruct patients on how to avoid provoking factors. For example, provide skin management tips, such as the use of sunscreen, an umbrella, protective long-sleeved clothing, or a large-brimmed hat to avoid UV/sunlight exposure.
3. Encourage patients to engage in activities that promote general health status. Patients may also benefit from participating in support groups.
4. Counsel patients regarding medication regimens. For instance, explain that topical or oral steroidal medications need to be tapered off before their complete discontinuation with physician's approval. Advise patients on steroid therapy to avoid exposure to acute infection, such as chickenpox or measles.
5. Consult with a dietician and make dietary recommendations pertaining to patients' specific conditions, such as hypertension.
6. Remind patients of the importance of routine follow-ups to assess the effectiveness of treatment and of reporting signs of developing cardiovascular, renal, or neurologic complications.

Points to Consider

1. The ANA (antinuclear antibody) test may be positive in patients with active cases of SLE.
2. NSAIDs may be used in an effort to minimize the corticosteroid medications prescribed for exacerbations.
3. In some cases, only the skin is affected, but the disease may evolve to impact other systems.

Precaution

Take measures to avoid exposure to sunlight and other aggravating factors, such as stress or infection. Prevent calcium and vitamin D deficiencies, which may result from lack of sunlight exposure or dietary inadequacy.