Leukemia Assessment

Leukemia includes a group of malignant disorders that affect the blood and blood-forming tissues of the bone marrow, lymph system, and spleen. The loss of cell division regulation leads to the accumulation of dysfunctional immature white blood cells (WBC) that, if left untreated, causes fatalities. The four major types of leukemia are acute lymphocytic leukemia (ALL), acute myelogenous leukemia (AML), chronic myelogenous leukemia (CML), and chronic lymphocytic leukemia (CLL). Symptoms include recurrent infections, easy bruising, bleeding, fatigue, weight loss, anemia, and bone pain. Although patients diagnosed with leukemia may have a normal or high WBC count, they are at increased risk of infection.



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Etiologic Factor

Immature WBCs

Baby White Mac-men

Unregulated, differentiated growth of a large number of immature WBCs in the bone marrow contribute to marrow failure. Disease etiology from environmental and/or genetic factors including chemicals, viruses, radiation, immunologic deficiencies, and oncogenes may contribute to the development of leukemia in some patients. The type and location of the white blood cell affected determines the specific classification of leukemia.

Presenting Signs and Symptoms

Recurrent Infections

Recurrent-clock Bacteria

As leukemia progresses with worsening bone marrow failure, patients are at increased risk of recurrent infections. A lack of mature lymphocytes and increased prevalence of malignant leukocytes contributes to immunosuppression. The patient may experience chronic, recurrent or clinically worse infections than patients without such immunosuppression.

Easy Bruising

Easy-button Bruising

Bone marrow dysfunction and failure lead to decreased platelet (thrombocytopenia) formation. Since thrombocytes are partially responsible for clot formation, prolonged bruising and bleeding may be a symptom of low platelet counts. Even minor incidence of injury, such as bumping a coffee table, can produce prolonged and clinically significant bruising for long periods of time.

Bleeding

Bleeding

Bone marrow dysfunction and failure lead to decreased platelet (thrombocytopenia) formation. Since thrombocytes are partially responsible for clot formation, prolonged bleeding may be a symptom of low platelet counts. The patient may experience heavier than normal and/or prolonged bleeding during menses, in gingival tissues, or from even shallow abrasions or lacerations.

Fatigue

Sleepy-guy

Patients with leukemia may experience generalized fatigue with progressive weakness. The decreased production of red blood cells in the bone marrow decreases the body's ability to transport oxygen to other cells for energy production. The patient may experience constant sleepiness known as somnolence. Since fatigue becomes tiresome, teach the patient about medications, self-care measures, and when to seek medical attention.

Weight Loss

Skinny-guy with Baggy-pants

Increased metabolic demand, proliferation of malignant leukocytes, maintenance of body systems despite inefficient processes, and pathology (e.g. hepatomegaly, splenomegaly) contribute to the development of unintentional weight loss amongst patients with leukemia. Patients with leukemia should be referred for nutritional consultation in an attempt to prevent and mitigate unintentional weight loss (refer to the Picmonic on "Leukemia Interventions").

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Bone Pain

Bone Pain-bolt

Patients with leukemia may experience bone pain as the newly formed blast cells proliferate within the bone marrow, often infiltrating surrounding osseous and other structures. Myeloid tissues found in the bone marrow are common locations for the building pressure and infiltration causing bone pain.

Clinical Findings

Anemia

Anemone

Loss of mature RBCs secondary to bone marrow dysfunction and failure contributes to the development of anemia. Symptoms of anemia may include neuromuscular and/or psychogenic weakness, pallor, and dyspnea. Loss of perfusion secondary to loss of oxygen carrying capacity over a long period of time can contribute to the development of malignant cardiac compensation such as the development of cardiac hypertrophy.

May Have Normal or High WBC Count

Normal or High White Mac-men

A CBC with differentiation and peripheral smear may reveal leukocytosis (high WBC counts) or even normocytic, normochromic presentations based on the specific pathology of the leukemia. An elevated, undifferentiated WBC count may be the accumulation of immature lymphocytes and/or myeloid cells in the bloodstream. Chronic leukemias such as CML and CLL often present with leukocytosis. Acute leukemias, however, have less characteristic hematologic changes.

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