

## 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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### Cause

#### Immature WBCs

##### Baby White Mac-men

Leukemia is caused by a mutation of DNA in certain cells that result in immature WBCs in the bone marrow. A combination of environmental and genetic factors including chemicals, viruses, radiation, immunologic deficiencies, and oncogenes may lead to leukemia. Proliferation of immature WBCs leads to bone marrow failure as the blast cells replace normal bone marrow cells. The type of white blood cell affected determines the specific classification of leukemia.

### Assessment

#### Recurrent Infections

##### Recurrent-clock Bacteria

Since leukemia leads to bone marrow failure, patients are predisposed to recurrent infections, because there is an inadequate production of normal bone marrow elements including lymphocytes. A lack of lymphocytes leads to immunosuppression and increases the risk of fever. The patient may experience chronic infections or recurrent respiratory infections.

#### Easy Bruising

##### Easy-button Bruising

Patients are predisposed to bruising, since there is an inadequate production of normal bone marrow elements such as platelets. Platelets are responsible for clotting. Patients with leukemia may develop thrombocytopenia and experience ecchymosis, or bruising.

#### Bleeding

##### Bleeding

As dysfunctional cells crowd out normal bone marrow cells, the patient may experience bone marrow failure and decreased platelet formation. Since platelets are responsible for clotting, prolonged bleeding is a symptom of low platelet counts. The patient may experience heavy blood flow from the gums or nose.

## **Anemia**

### **Anemone**

Patients are predisposed to anemia, since there is an inadequate production of normal bone marrow elements including red blood cells. Symptoms of anemia include weakness, pallor, and dyspnea. Cardiovascular compensation may lead to cardiac hypertrophy and heart murmurs.

## **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**

The disease process may cause anorexia and nausea resulting in weight loss. Patients with leukemia should be referred for nutritional consult in attempt to prevent weight loss (refer to the Picmonic on "Leukemia Interventions").

## **Bone Pain**

### **Bone Pain-bolt**

Patients with leukemia may experience bone pain as the blast cells proliferate and infiltrate the patient's organs. Patients with ALL and CML experience bone pain.

## **Considerations**

### **May Have Normal or High WBC Count**

#### **Normal or High White Mac-men**

Depending on the type of leukemia, the patient's WBC count may be normal or high. Patients with leukemia may have a normal or elevated WBC count despite having low immunity against infections. Elevated WBC count is caused by the accumulation of immature and inefficient, white blood cells that interfere with normal organ function. As a general rule of thumb, chronic leukemias such as CML present with elevated WBC counts. Acute leukemias, however, have less characteristic hematologic changes.