

Aplastic Anemia

What is the bone marrow?

The bone marrow is the factory that produces different cells that form blood. It is the soft inner part of some bones, such as the skull, shoulder blades, ribs, pelvis, and bones in the spine. Immature cells are produced in the bone marrow. These are called the blood stem cells. With time and under the effect of maturation factors, these cells become mature blood cells. Broadly there are of two types –myeloid stem cell or a lymphoid stem cell.

A myeloid stem cell goes on to form one of three types of mature blood cells:

- Red blood cells that carry oxygen and other substances around the body.
- Platelets that help stop bleeding.
- White blood cells (granulocyte) that fight infection and disease.

A lymphoid stem cell becomes a lymphoblast cell (immature cell) and then one of three types of lymphocytes (white blood cells):

- B lymphocytes that make antibodies to help fight infection.
- T lymphocytes that help B lymphocytes make the antibodies that help fight infection.
- Natural killer cells that attack cancer cells and viruses.

What is aplastic anemia?

Aplastic anemia is a condition characterized by peripheral blood pancytopenia (low counts of all blood cells) i.e. anemia, neutropenia and thrombocytopenia

associated with marked hypocellularity of bone marrow.

What causes aplastic anemia?

There are two types of aplastic anemia – inherited and acquired. About 75% of acquired cases have no known cause. Some of the known causes are:

Inherited causes

- Fanconi anemia
- Shwachman-Diamond syndrome
- Dyskeratosis congenita
- Diamond-Blackfan anemia

Acquired causes

- Toxins
 - Pesticides
 - Arsenic
 - Benzene
- Radiation therapy and chemotherapy for cancer treatment
- Autoimmune disorders
 - SLE
 - Rheumatoid arthritis
- Infectious diseases
 - Hepatitis
 - Epstein-Barr virus (EBV)
 - Cytomegalovirus (CMV)
 - Parvovirus B19
 - HIV
- Medicines
 - For autoimmune disorders
 - Some antibiotics e.g. chloramphenicol
- Pregnancy
- Cancer spread from other part of body to bone marrow



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What are the signs and symptoms of aplastic anemia?

The signs and symptoms are related to pancytopenia:

- Anemia (low red blood cell counts)
 - Progressive weakness and fatigue
 - Shortness of breath
 - Dizziness
 - Pale skin
 - Headaches
 - Feel less alert
 - Loss of appetite
 - Weight loss
 - Chest pain
 - Irregular heartbeat
- Neutropenia (low white blood cell counts)
 - Repeated infections
 - Prolonged infections
 - Fever
- Thrombocytopenia (low platelet counts)
 - Bruise or bleed easily
 - Prolonged bleeding from cuts
 - Heavy menstrual bleeding
 - Nose bleeds
 - Bleeding gums
 - Tiny, flat red spots under your skin (petechiae) caused by bleeding
 - Retinal bleeding (rare)

How is aplastic anemia diagnosed?

The following tests are done to diagnose aplastic anemia and rule out other conditions:

- Complete blood count
- Reticulocyte count
- Bone marrow aspiration and biopsy
- Iron level

- Vitamin B12 and folate levels
- Liver function tests
- Viral studies for hepatitis viruses, EBV, CMV
- Antinuclear antibody and anti-dsDNA
- Chest x-ray for infection
- Abdominal ultrasound for enlarged liver and/or spleen
- Bone Marrow Test

How is aplastic anemia treated?

Treatment depends upon the severity of aplastic anemia. Mild to moderate cases may be observed and no treatment given. Severe aplastic anemia (SAA) and very severe aplastic anemia (VSAA) cases are treated aggressively.

The only curative treatment is bone marrow transplant (BMT). For any reason, if BMT is not possible, then immunosuppression or marrow stimulating agents are used. Also antibiotics and antivirals are given to prevent and treat infections.

- Immunomodulators
 - Antilymphocyte globulin
 - Antithymocyte globulin
 - Cyclosporine
 - High dose corticosteroids
- Marrow stimulants
 - Erythropoietin
 - Colony-stimulating factors
 - Androgens

Supportive care, which include:

- Red blood cell transfusion
- Platelet transfusion
- Antibiotics

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