

Having a diagnosis of aplastic anaemia - a guide for patients and relatives.

What is aplastic anaemia?

Aplastic anaemia is a rare condition which affects approximately 150 – 200 people a year in the United Kingdom. The incidence of aplastic anaemia is slightly more common in men than women and can occur across the age range from the very young to the elderly.

Aplastic anaemia is recognised by a failure of the bone marrow to produce sufficient blood cells. In aplastic anaemia, the bone marrow can fail to such an extent that the person develops what is called pancytopenia. Pancytopenia is the term used to describe what happens when someone is low in all types of blood cells.

What is the bone marrow and what does it do?

Bone marrow is the part of the body responsible for producing all the blood cells required by a person. Bone marrow is found in all the long bones in the body, such as the thighbone and also in the hipbone and breastbone. The bone marrow produces three different types of blood cells. These blood cells are: -

- a) Red blood cells, which carry oxygen to the tissues in the body.
- b) White blood cells, which help the body to fight infection.
- c) Platelets, which help to stop bleeding and bruising.

All blood cells are produced by special cells in the bone marrow called stem cells. Stem cells are special because they have the ability to produce the different types of blood cells, depending on the body's needs. These cells are often referred to as Haemopoietic Stem Cells. In a healthy person the bone marrow is very active, replenishing blood cells as they are used up.



Part of the job of the bone marrow is to provide the right type of environment to allow the stem cells to work properly. In healthy bone marrow, the stem cells share the bone marrow with fat cells, with about 50% of the bone marrow being stem cells and 50% being fat cells.

How is the bone marrow different in aplastic anaemia?

In a person with aplastic anaemia, the bone marrow is different from normal bone marrow, because rather than containing 50% fat cells and 50% stem cells, it contains far more fat cells than stem cells. This reduction in the number of stem cells means that the bone marrow is not able to produce enough blood cells of all types.

What causes aplastic anaemia?

Aplastic anaemia is an acquired condition, which means that it cannot be passed on from parents to their children. It is thought to occur when an outside event causes the body's immune system to begin attacking the bone marrow. This type of attack is called an auto-immune response. In most cases, what causes the body to begin attacking the bone marrow is not fully understood. For approximately 75% of people diagnosed with aplastic anaemia, it is impossible to identify what the trigger was for the disease. This lack of an identifiable cause leads to this type of aplastic anaemia being referred to as Idiopathic (of unknown cause) aplastic anaemia. For the remaining 25% of patients with aplastic anaemia, the causes are quite difficult to prove, but it is known that certain things are linked with an increased risk of developing aplastic anaemia.



Factors known to increase the risk of developing aplastic anaemia.

- 1) Infection with a virus. It is believed that up to 1 in 10 patients have had a viral infection shortly before developing aplastic anaemia. There is some indication that the type of viral infection most commonly associated with aplastic anaemia is a form of unidentifiable, and not the usual, Hepatitis A, B or C. Hepatitis is the group of viruses which specifically target the liver.
- 2) The two other main causes are drugs and chemicals. These can be divided into two groups: -
 - i) Prescription Medication: Only a few prescription drugs are linked to the formation of aplastic anaemia, but there is a link with some of the following types of drugs: -
 - a) Drugs used in the treatment of rheumatoid arthritis. The particular type of drugs are: -
 - (i) Gold salts. Because of the known link between gold salts and aplastic anaemia, regular monitoring of the blood is carried out and the drug stopped if there are signs of damage to the bone marrow.
 - (ii) A certain class of painkillers called anti-inflammatory drugs.
 - b) Certain drugs used to treat an overactive thyroid gland.
 - c) Certain drugs used to treat mental illness.
 - d) Certain types of antibiotics.



ii) Some types of chemicals have been associated aplastic anaemia, including certain workplace chemicals. The link between exposure to chemicals in the workplace and the development of aplastic anaemia can be difficult to prove, but it is important to tell the doctors treating you about any exposure to chemicals. The types of chemicals potentially linked to aplastic anaemia are: -

a) Benzene, a type of petro-chemical

b) Wood preservatives.

These are just a couple of examples of the type of chemicals involved. Because the list of potential chemicals is very long, it is important to discuss this with your doctor.

How is aplastic anaemia diagnosed?

A problem with your blood is first identified with a simple blood test, but this is insufficient to confirm a diagnosis of aplastic anaemia. A diagnosis of aplastic anaemia is confirmed by removing some of the bone marrow with a Bone Marrow Biopsy. The tissue and fluid, called aspirate, is sucked out of the bone marrow. The trephine is a core of bone marrow tissue obtained from the same site. Both are then studied under the microscope, and a diagnosis of aplastic anaemia is made on the appearance of the bone marrow, looking at both the aspirate and the trephine. The terms used in interpreting bone marrow are: -

a) Hypocellular, which means a low number of cells in the bone marrow.

b) Hypoplastic, which means a low amount of blood forming tissue.



Aplastic anaemia is classified depending the bone marrow findings and the degree of reduction below the normal levels of the various different types of blood cells.

- A) Red Blood Cells. Red blood cells are the cells that transport oxygen to the tissues and carbon dioxide from the tissues. Contained within red blood cells is haemoglobin (Hb). Haemoglobin is the molecule that transports oxygen around the blood. A lowering of haemoglobin causes anaemia. The normal level of haemoglobin is 11.5-15.5 g/dL in women and 13.5-17.5 g/dL in men.
- B) White Blood Cells. White blood cells are the cells in the body that provide our defence against infection. The important type of white cell in aplastic anaemia is a type of white cell called a neutrophil, which kills invading bacteria. Neutrophils only have a short life span of about 10 hours, so the level of the neutrophils in the blood is a good indicator of how good the bone marrow is at producing white cells. The normal level of neutrophils in the body is $1.5-8.0 \times 10^9/L$.
- C) Platelets. Platelets are the cells in the blood that are responsible for helping the blood to clot and so prevent bleeding and bruising. The normal platelet count is $150-400 \times 10^9/L$

How is aplastic anaemia classified?

Aplastic anaemia has three levels of severity, which are: -

- a) Non Severe Aplastic Anaemia (NSAA).
- b) Severe Aplastic Anaemia (SAA).
- c) Very Severe Aplastic Anaemia (VSAA).

Non Severe Aplastic Anaemia. In NSAA the bone marrow has a hypocellular appearance and the blood counts may be low. Although the patient may require blood and platelet transfusions, the neutrophil count is not very low, so there is some protection against infection.



Severe Aplastic Anaemia. In SAA as well as having a hypocellular bone marrow, a full blood count test shows the following features: -

- a) A low platelet count (less than $20 \times 10^9/L$)
- b) A low Hb and young red blood cells called reticulocytes
- c) A low neutrophil count (less than $0.5 \times 10^9/L$), which is lower than in Non Severe Aplastic Anaemia.

These low blood counts mean that the person may feel tired due to the low Hb, is at increased risk of bleeding due to the lack of platelets and has an increased risk of infection due to a low neutrophil count.

Very Severe Aplastic Anaemia. VSAA is very similar to SAA, but in VSAA the neutrophil count is below $0.2 \times 10^9/L$, which is extremely low. This means that the risk of developing infections is very high.

The treatment options for aplastic anaemia are detailed in another leaflet.

Useful Contacts.

Bryony Dettmar
AA & MDS Support Group Coordinator
Aplastic Anaemia Trust
AA & MDS Support Group
16 Sidney Road
Borstal
Rochester
Kent.
ME1 3HF

Tel: 01634 844062

Email: aplasticanaemia@hotmail.com

