Myelofibrosis

Although the majority of cases of myelofibrosis are associated with changes in the genes of blood stem cells, it is thought that this happens after birth.

What is myelofibrosis?

Myelofibrosis belongs to a group of diseases called myeloproliferative disorders. Myelofibrosis is a serious bone marrow disorder that disrupts your body's normal production of blood cells. This leads to reduced levels of:

- Red blood cells (erythrocytes). This causes anaemia.
- White blood cells (leukocytes). This makes your body less able to fight infections.
- Platelets. This causes your blood vessels to bleed much more easily.

Other body organs, especially the liver and spleen, try to compensate by producing blood cells. This causes the liver and spleen to become enlarged. Sometimes the spleen becomes very big and can cause pain and other problems.

Myelofibrosis causes

- Myelofibrosis which occurs without any underlying illness is called primary myelofibrosis.
- Myelofibrosis which develops as a complication of other diseases is called secondary myelofibrosis.

Myelofibrosis is caused by an abnormality of the developing cells (stem cells) in the bone marrow. These developing stem cells usually divide into the different specialised cells that make up your blood. In myelofibrosis the cells become abnormal because of a change in the cell's genes (called a genetic mutation). It's not known what causes the genetic mutation in blood stem cells. The gene mutation that occurs in most people affected by myelofibrosis is a mutation in Janus Kinase 2 (JAK2). Other gene mutations may also be associated with myelofibrosis.

As the mutated blood stem cells divide and increase in number, they begin to have serious effects on normal blood production. This causes a lack of red blood cells (causing anaemia) and also abnormal production of white blood cells with varying numbers of platelets. The bone marrow is normally spongy but myelofibrosis causes the bone marrow to become scarred.

Secondary myelofibrosis can be caused by other conditions such as essential thrombocythaemia or polycythaemia rubra vera. It has also been linked to exposure to some industrial chemicals and exposure to high levels of radiation.

Is myelofibrosis hereditary?
Although the majority of cases of myelofibrosis are associated with changes in the genes of blood stem cells, it is thought that this happens after birth. There is no evidence that it is hereditary.

How common is myelofibrosis?

Myelofibrosis is uncommon and affects about 1 in 20,000 people. Myelofibrosis usually affects middle-aged and elderly people but can occur at any age.

What symptoms does myelofibrosis cause?

Myelofibrosis usually develops slowly. In its very early stages, many people don't have any symptoms and don't know that they have myelofibrosis. Increasing disruption of normal blood cell production causes symptoms as a result of:

- Anaemia (feeling tired, weak, short of breath, pale skin and lips).
- Enlarged spleen (pain or fullness below your ribs on the left side).

- Low or abnormal platelets (easy bruising and easy bleeding).
- Abnormal white cells (frequent infections, high temperature (fever) and excessive sweating during sleep).
- Hardening of your bone marrow (bone pain).

How is myelofibrosis diagnosed?

Your doctor will initially arrange some blood tests to check for anaemia and also to check your white cell and platelet counts. If your doctor has any concerns that you might have myelofibrosis then you will be referred to a specialist in blood diseases (called a haematologist) for further investigations. These further investigations will usually include X-rays, magnetic resonance imaging (MRI) and also a bone marrow biopsy and aspiration (which can confirm the diagnosis of myelofibrosis).

Myelofibrosis treatment

Immediate treatment may not be necessary if you do not have any symptoms and do not have anaemia or any other complications such as an enlarged spleen. Instead, your doctor is likely to monitor your health closely through regular check-ups. This will make sure you receive treatment if and when you need it. Some people remain without symptoms for many years.

If or when you do need treatment, this will include medicines to control the abnormal bone marrow cells. Medicines, such as hydroxycarbamide, can be used to control the abnormal bone marrow cells. Treatment will also be needed for the effects of reduced production of blood cells such as anaemia.

Thalidomide and other similar medicines (lenalidomide and pomalidomide) may also help to improve blood cell production and reduce the size of an enlarged spleen. These medicines may be used together with steroid medicines.

Dr Sarah Jarvis, December 2021
NICE guidance on drug treatments for myelofibrosis
Fedratinib for treating disease-related splenomegaly or symptoms in myelofibrosis
The National Institute for Health and Care Excellence (NICE) has issued new guidance on a medicine called fedratinib to treat spleen enlargement or symptoms in myelofibrosis.
They point out that most people with higher-risk myelofibrosis are treated with another drug from the same family, called ruxolitinib.
Studies suggest that for people who have stopped ruxolitinib (either because it did not help or stopped working) fedratinib may improve myelofibrosis symptoms and reduce spleen size.
However, because the research is uncertain, at the moment fedratinib is recommended only for people who have previously had ruxolitinib.
You can find out more about why NICE made these recommendations from the link in the further reading list at the bottom of this leaflet..

Treatments for anaemia

If myelofibrosis is causing severe anaemia then you may need regular blood transfusions. Taking a a medicine similar to the male hormone (androgen) may help your body to make red blood cells and so improve anaemia.

Treatments for an enlarged spleen

If an enlarged spleen is causing any complications, you may need surgical removal of your spleen (splenectomy). Splenectomy does have some risks, including infections, excessive bleeding and blood clot formation leading to stroke or pulmonary embolism. Chemotherapy or radiotherapy can also be used to reduce the size of the spleen, when surgical removal isn't an option.

Stem cell transplant

Stem cell transplant from a suitable donor (allogeneic stem cell transplantation) is the only treatment that has the potential to cure myelofibrosis. Stem cell transplant is also called a bone marrow transplant. But it also has a high risk of life-threatening side-effects. Most people with myelofibrosis, because of age, stability of the disease or other health problems, don't qualify for this treatment.

What are the possible complications of myelofibrosis?

Increased pressure on blood flowing into your liver. Normally, blood flow from the spleen enters your liver through a large blood vessel called the portal vein. Increased blood flow from an enlarged spleen can lead to high blood pressure in the portal vein (portal hypertension). This in turn can force excess blood into smaller veins in your stomach and gullet (oesophagus). These veins then enlarge and may rupture to cause bleeding into your gut (bowel).

To compensate for reduced production of blood cells in your bone marrow, your body tries to make blood cells outside the bone marrow (this is called extramedullary haematopoiesis). This may create clumps of developing blood cells in your liver and spleen and in other areas of your body. This may cause problems such as bleeding in your bowel, coughing or spitting up of blood (haemoptysis), compression of your spinal cord, or fits (seizures).

Myelofibrosis increases your body's production of uric acid. Too much uric acid in your body can lead to gout. Some people with myelofibrosis eventually develop a type of acute leukaemia called acute myelogenous leukaemia.

Myelofibrosis prognosis

Many people with myelofibrosis become progressively worse and some may eventually develop a more serious form of leukaemia. However, some people with myelofibrosis do not have any symptoms for a number of years.

Myelofibrosis life expectancy

This rare disease - which normally affects elderly people - has a life expectancy of 4 to 5.5 years.

Further reading

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