Acute Myeloid Leukemia (AML): Stem Cell Transplant

What is a stem cell transplant?

Stem cells are immature cells that live in your bone marrow. They're the starter cells for all types of blood cells. A stem cell transplant uses stem cells to replace bone marrow that contains cancer. First, the bone marrow with cancer is destroyed with high-dose chemotherapy. Sometimes this is done along with radiation to the whole body. Healthy stem cells are then put in your body. Over time, these transplanted stem cells grow and become new, healthy bone marrow.

When might a stem cell transplant be used for AML?

A doctor may advise a stem cell transplant in cases like these:

- AML is in remission after induction therapy. (Transplant may be done instead of consolidation chemo.)
- AML doesn’t go away completely with induction chemotherapy (the initial or first treatment).
- AML returns after a period of remission.
- You are young or healthy enough for your body to handle it.

Types of stem cell transplants

There are two kinds of stem cell transplants:

- **Allogeneic transplant.** This means the stem cells come from another person whose cell type is almost exactly like yours. This may be a brother, sister, other family member, or a matched unrelated donor. Another option for allogeneic transplant is using stem cells that were saved from the umbilical cord after a baby was born. This is a cord blood stem cell transplant.
- **Autologous transplant.** This means the stem cells are collected from your own body and saved. This is done before you get the high-dose chemotherapy.

An allogeneic transplant is preferred if a stem cell donor can be found. An autologous transplant might be needed if it's hard to find a matching donor. Autologous transplant may cause fewer side effects, but there's concern that the stem cells from your own body could have some leukemia cells, even after they're treated in a lab.

How stem cells are collected

You might use your own stem cells for transplant. Or you might get stem cells from a donor or cord blood. These are three very different ways to collect stem cells.

From blood

This is the most common source of stem cells for a transplant. The stem cells are taken out of donor's blood or your blood.

You or your donor are given shots of a growth factor medicine for several days. This forces your bone marrow to make a lot of stem cells. Blood tests are done to check the number of stem cells in the blood before collection starts.

The process for collecting the stem cells from the blood is called apheresis. A thin, flexible tube (catheter) is used to take blood out of a vein. A thin tube carries the blood into an apheresis machine. It separates and

saves the stem cells. The rest of the blood goes back into you or the donor. The stem cells that were removed are then frozen until they're needed.

This process may need to be done more than once to collect enough cells. It takes about 2 to 4 hours each time.

From bone marrow

Stem cells may also be taken right out of the bone marrow. This is done in an operating room. You or your donor get medicines to make you sleep and not feel pain (called general anesthesia). A thick, hollow needle is put through the skin, through the bone and into the bone marrow. This is done in the back of the pelvic or hip bone, so you are face down on the table. Suction is used to pull out about 2 pints of thick, spongy bone marrow. It takes an hour or two. (This process is like getting a bone marrow biopsy, but takes longer and more marrow is removed.)

Hip soreness, aching, and bruising is common and may last for a few days. The donor's bone marrow recovers to normal levels in 4 to 6 weeks.

The removed bone marrow is filtered, and the stem cells are taken out of it. They may be frozen until they are needed. Or the donation might be timed so that they go right to the person who needs them.

From cord blood

This type of transplant has been done for more than 25 years, but it's still new. Parents make the decision to donate cord blood instead of throwing it away. Then, after the baby is born, the blood is collected from the umbilical cord and placenta. This has no effect on the baby or birthing parent.

The umbilical cord and placenta blood naturally contains a lot of stem cells. They're collected and frozen. They're then saved at public cord blood banks until someone needs them.

Having the transplant

This is a brief review of what transplant is like. Your transplant team will go over the process in detail. It's a long procedure that can have serious side effects. You need to know what to expect.

- You may be admitted to the hospital the day before the transplant process begins.
- After the chemotherapy (and maybe radiation therapy), you might get a day or two to rest. Then the stem cells will be put into your blood through a catheter (IV). This is a lot like getting a blood transfusion. You may have a strange taste in your mouth during the process. This is from the preservative used to freeze the stem cells.
- You then have to wait for your new stem cells to go into your bones and start growing. You stay in the hospital and may have to be in isolation (not around people). This is because your blood counts are really low, and you can easily get an infection. Once part of your white blood cell count (called the absolute neutrophil count or ANC) reaches a safe level, isolation ends. This may happen within several weeks, or it may take longer.
- Your blood will be drawn every day to check your blood cell count. This will be done for many weeks even after you go home. It can be done on an outpatient basis. This means you go home the same day.
- You will have to follow certain precautions while in the hospital and after you're home. Follow all instructions from your healthcare team.

What is a mini-transplant?

A mini-transplant is an allogeneic transplant sometimes used for a person with AML who can’t handle a standard transplant. It’s also called nonmyeloablative transplant or reduced-intensity allogeneic transplant. It's done with lower doses of chemotherapy and maybe lower doses of radiation. This doesn't fully destroy the bone marrow. But it’s enough to suppress the immune system. Then you get the donor stem cells. Over time, these stem cells develop an immune reaction to the AML cells left in your body and kill them.

Because this treatment uses lower doses of chemo and radiation, it often has less severe side effects. Older adults or people with other health problems may do better with this treatment.

Possible short-term side effects

Most of the short-term side effects of a stem cell transplant are from the high doses of chemotherapy and radiation. These should go away as you recover. Most can be controlled or even prevented. Common side effects can include:

- Infections
- Low blood cell counts
- Easy bleeding and bruising
- Low blood pressure
- Shortness of breath
- Chest pain or tightness
- Coughing
- Fever or chills
- Hair loss
- Nausea
- Vomiting
- Mouth sores
- Loss of appetite
- Diarrhea
- Extreme tiredness
- Weakness
- Skin and nail changes

Possible long-term side effects

Some side effects of stem cell transplant may be long-lasting or not even happen until many years later, such as:

- Infertility (not able to have children)
- Growth of another kind of cancer
- Damage to the liver, kidneys, lungs, heart, or other organs
- Lack of menstrual periods, which may mean early menopause
- Vision problems caused by damage to the lens of the eye (cataracts)

Another possible long-term side effect is graft-versus-host disease. This can occur with an allogeneic transplant. The immune system cells in the donor's stem cells attack your body. The cells can attack your skin, liver, gastrointestinal (GI) tract, mouth, or other organs. This can cause symptoms, such as:

- Skin rashes with itching
- Yellowing of the skin (jaundice)
- Damage to the liver, kidneys, or other organs
- Severe diarrhea
- Severe tiredness (fatigue)
- Muscle aches

Making a decision

It's important to discuss the details of stem cell transplant with your doctor to make sure you understand the possible risks and benefits. Stem cell transplant is very hard on your body and your mind.

Check with your health insurance plan, too. Transplant is very expensive, and you may be in the hospital a lot.