

# Ewing Sarcoma: High-Dose Chemotherapy and Stem Cell Transplant



## What is a stem cell transplant?

A stem cell transplant used very high doses of chemotherapy (chemo) to try to kill all the cancer cells in the body. This high-dose chemo also destroys the bone marrow. This is the soft, spongy tissue inside the bones where new blood cells are made.

Bone marrow (hematopoietic) stem cells are immature cells that are the starter cells for all types of blood cells. After the high-dose chemo, stem cells are "transplanted" or put into the body to replace the bone marrow that's been destroyed by the chemo.

The healthy stem cells that are put in the body will grow and become new, healthy bone marrow cells. This bone marrow can then make new blood cells. A stem cell transplant lets healthcare providers use much higher doses of chemo than a person would normally be able to get.

## When might a stem cell transplant be used for Ewing sarcoma?

High-dose chemo followed by a stem cell transplant might be used to treat Ewing sarcoma when:

- It has spread from where it first started to other parts of the body
- It's no longer responding to other treatments
- It comes back after treatment

Experts are working to find out how helpful stem cell transplants are for Ewing sarcoma. Stem cell transplants aren't a main treatment for Ewing sarcoma. And when a stem cell transplant is done, it's often as part of a clinical trial.

## Types of stem cell transplants

There are two kinds of stem cell transplants:

- **Autologous transplant.** This means the stem cells are collected from your body or your child's body and saved. This is done before the chemo is given.
- **Allogeneic transplant.** This means the stem cells come from another person (a donor). This may be a brother or sister. Or it may also be from someone not related to you or your child.

Autologous transplants are almost always used for Ewing sarcoma.

## How stem cells are collected

### From the blood

This is the most common source of stem cells for a transplant. You or your child may get an injection of a growth factor medicine for several days. This medicine helps force the bone marrow to make stem cells.

The process for collecting stem cells from the blood is called apheresis. It's a lot like giving blood, but it takes longer. A thin, flexible tube (called a catheter) is put in a vein and used to take out blood. The blood goes into a cell separation device where the stem cells are removed from it. Then the rest of the blood is returned to you or your child. The removed stem cells are then frozen until they're needed later. This process may need to be done more than once to collect enough cells.

## From the bone marrow

Stem cells may also be taken from the bone marrow. This process is done while medicines are used to make you or your child sleep and not feel pain (general anesthesia). A thick needle is put into the pelvic or hip bone and a syringe is used to pull out marrow. Afterwards, the hip bone may be sore for several days. The bone marrow is filtered and the stem cells are frozen until they're needed. Stem cells aren't often collected this way today.

## Having the transplant

- You or your child will likely be admitted to the hospital the day before the transplant. The healthcare provider will go over things you can do to help you or your child stay away from germs. This is needed because you or your child will be at a high risk for infections for a while.
- After chemo or radiation is done, you or your child will get the stored stem cells. They're put right into the blood through a vein. It's a lot like getting a blood transfusion.
- You then have to wait for your new stem cells or your child's new stem cells to start growing. You or your child may have to stay in isolation and away from people in order to keep from getting an infection. Once part of the white blood cell count (absolute neutrophil count or ANC) reaches a safe level, you or your child can come out of isolation and then, in time, go home. This may happen within a few weeks. But sometimes it takes longer.
- You or your child will need to have blood tests done to check blood cell counts for the next few months. This can be done as an outpatient. That means you or your child can go home the same day.

## Possible short-term side effects

Most of the short-term side effects of a stem cell transplant are from the high doses of chemo or radiation. Many of them can be treated, and some can be prevented. They should go away over time as you or your child recovers from the transplant. Common side effects can include:

- Infections
- Low blood cell counts
- Bleeding and easy bruising
- Low blood pressure
- Shortness of breath
- Chest pain or tightness
- Coughing
- Fever or chills
- Hair loss
- Nausea
- Vomiting
- Mouth and throat sores
- Loss of appetite
- Diarrhea
- Extreme tiredness (fatigue)

- Weakness

## Possible long-term side effects

Some side effects of a stem cell transplant may be long-lasting or not show up until years later. These can include:

- Bone pain. This is caused from bone damage because of too little blood (called aseptic necrosis).
- Growth of another cancer
- Lung problems
- Damage to other organs. These can include the heart, kidneys, or liver.
- Lack of menstrual periods. This may mean ovary damage.
- Infertility (not able to have children)
- Vision problems. This can be caused by damage to the lens of the eye.
- Weight gain. This may be a sign of thyroid gland damage.

## Talking with your or your child's healthcare provider

Before you or your child has a stem cell transplant, it's important to discuss the details of this procedure with your or your child's healthcare team to make sure you understand the possible risks and benefits. A stem cell transplant is a complex procedure that can cause life-threatening problems. It's only done by healthcare provider with special training. If you decide this is the best choice for you or your child, it's important to have it done at a hospital that specializes in stem cell transplants, such as a major cancer center. The procedure also costs a lot. Check with your insurance provider to see how much of it will be covered.

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