

Autologous Stem Cell Transplant In Lymphoma



OVERVIEW

Autologous stem cell transplants are a type of treatment that some patients can receive for their subtype of lymphoma. These autologous transplants utilise stem cells collected from the blood stream to repopulate a patient's bone marrow after a high dose of chemotherapy treatment. The chemotherapy aims to kill the lymphoma and to remove any remaining traces of lymphoma in the body.

A stem cell is an immature blood cell that is born in the bone marrow. They grow into mature red blood cells, white blood cells and platelets that are spilled out into the blood stream everyday throughout the human body.

INDICATIONS FOR AUTOLOGOUS STEM CELL TRANSPLANT

Autologous stem cell transplants are used for many different subtypes of lymphoma. Your specialist will consider many other factors including your age, general health, medical history, stage of lymphoma and response to previous treatments. The latter is a very important factor as an autologous transplant is not an effective treatment for a patient whose lymphoma has shown to be progressive and resistant to chemotherapy. In general, an autologous stem cell transplant is used for the following indications:

- To be used as part of a patient's upfront initial treatment for their lymphoma whilst they are in remission. The aim is to decrease the risk of the lymphoma ever coming back or to keep the lymphoma away as long as possible
- To be used when a patient's lymphoma comes back after a response to salvage treatment. The aim is to decrease the risk of the lymphoma ever coming back a second time or to keep the lymphoma away for as long as possible
- To be used upfront when a patient may not respond to initial treatment as well as expected so they go on to receive a salvage treatment followed by a transplant to aim to decrease the risk of the lymphoma ever coming back or to keep the lymphoma away as long as possible

AUTOLOGOUS STEM CELL TRANSPLANT

An autologous stem cell transplant uses a patient's own stem

cells. The stem cells can be collected at different time points throughout the patient's treatment journey. Patients will have their stem cells collected after one of their initial cycles of treatment for their lymphoma. This can be done once the doctors know there is no sign of lymphoma in the bone marrow and the lymphoma is responding well to the initial treatment.

Some patients will have their stem cells collected while they are in remission or after they have received what can be known as salvage treatment. This is given when their lymphoma has returned and has shown a response to the salvage treatment.

There are some patients who choose to have their stem cells collected when they are in remission just in case their lymphoma ever returns. This is referred to as a just in case collection of stem cells. The stem cells are stored in case they are ever required in the future as opposed to being collected for a planned transplant.

The stem cells are mobilised from the person's bone marrow to the blood stream after giving chemotherapy and injections of a growth factor hormone (stem cells collected after the treatment) or by giving the injections of growth factor hormone alone (stem cells collected while the lymphoma is in remission and does not require any anti lymphoma treatment).

AUTOLOGOUS STEM CELL TRANSPLANTATION PROCESS

There are four major steps in the process of an autologous transplant:

1. **Collection of stem cells:** the stem cells are collected from the patient's blood stream using an apheresis machine. As stem cells normally live in the bone marrow, the patient has to receive either a dose of chemotherapy and injections of growth factor hormone (patient having stem cells collected during or immediately post completion of treatment) or injections of growth factor hormone alone (patient in remission) to mobilise the stem cells into the blood stream for collection.

The apheresis machine is able to draw whole blood into the machine, spin it through a centrifuge to separate the components of the blood and collect the layer that contains the stem cells all while reinfusing the rest of the blood back

to the patient on the machine. This apheresis process can be carried out by inserting special apheresis needles into the patient's veins on the day of the procedure or by using a central venous access device and the patient may be collected anywhere from one to five times to collect the amount of stem cells required for the transplant.

- 2. Processing and storage of stem cells:** stem cells collected from the blood stream on the apheresis machine are processed and stored in a special freezer until required for transplant. These stem cells are divided up into smaller bags to be stored in a freezer containing liquid nitrogen to keep the stem cells frozen until they are required. The patient may end up with anywhere from one to twenty bags of stem cells of all different amounts. The patient's specialist will decide the amount of stem cells to reinfuse to the patient at the time of the transplant.
- 3. Administration of the transplant conditioning regime:** the patient is admitted to hospital (note that some hospitals may do this step by visiting the day centre each day instead) to receive the conditioning regime which involves administration of high dose chemotherapy that aims to destroy any residual lymphoma cells and clear the patient's bone marrow of stem cells ready for transplant of the new stem cells. Depending on what type of transplant you receive you may be in hospital for two to four weeks, depending on your progress and recovery.
- 4. Reinfusing stem cells:** once the high dose chemotherapy has cleared the patient's bone marrow the new stem cells are reinfused into the blood stream. Your nurse or specialist laboratory scientist will bring the frozen bags of stem cells to your bedside in the hospital and thaw them in a warm water bath, so they are ready to reinfuse back to you immediately after they have thawed. The stem cells do have a small amount of preserving agent in them called DMSO so you will receive a pre medication to decrease any risks of a reaction to this preserving agent but the majority of patients tolerate this procedure very well with minimal side effects including a strange taste in their mouth relieved by sucking on a lolly at the time of reinfusion. The body recognises that these stem cells are not mature cells and sends them back into the bone marrow for maturing into red cells, white cells and platelets. Once these stem cells have matured, they are spilled into the blood stream and the patients' blood counts start to normalise.

POST RE-INFUSION OF STEM CELLS

After having the stem cells reinfused, the patient remains in hospital for their counts to begin to normalise and to manage any infections and side effects as a result of the transplant. The risk of

developing a severe or potentially life-threatening complication of the transplant is highest whilst the patient's blood counts are extremely low. This risk becomes less as the new stem cells mature and replenish the blood stream and increase the ability for the patient's own immune system to fight off any infections.

During the first month following a transplant, the transplanted stem cells will start to grow and produce in the patient's bone marrow and produce a steady stream of healthy new red cells, white cells and platelets that can then repopulate and circulate in the patient's blood stream. This process is referred to as engraftment. Frequent blood tests will be performed to monitor this process and complete recovery from an immune function point of view may take several months or up to a year. It is very important for patients to take precautions to avoid exposure to infections including diligent hand washing, avoiding close prolonged contact with anyone who is unwell, avoiding crowds, fresh flowers and gardening and not sleeping with pets just to name a few. Your specialist will go through recommendations for you after your transplant.

POSSIBLE SIDE EFFECTS

After high dose chemotherapy the blood cell counts are extremely low. This substantially increases the risk of getting a fever, infections and having a bleeding complication. Also as the dose of chemotherapy is higher than usual the risk of side effects such as nausea, vomiting, diarrhoea, fatigue, mouth sores and loss of appetite may be more intense and is another reason why the patient remains in hospital during this time to be closely monitored and manage these potential side effects. Potential long-term side effects will also be monitored for in the clinic including potential infertility, early menopause, damage to thyroid gland function, cataracts, lung, heart and bone tissue.

FOLLOW-UP

Once an autologous stem cell transplant is completed, people with lymphoma need to be followed up closely by their specialist with regular appointments to monitor:

- Evaluate the effectiveness of the transplant
- Ongoing transplant side effects
- Recovery from transplant
- Signs of lymphoma relapsing
- Potential late effects caused by the transplant that can occur months or years later, that can be based on the duration and frequency of transplant and prior treatments, age, gender and overall health of each person

Depending on the type of transplant you have received and your tolerance to this transplant you may need to relocate closer to the hospital for a certain period of time shortly after discharge

FACT SHEET

from the hospital as your home may be far from specialist care if required. There are many supports in place for patients and their carers that require to relocate for a certain period of time so just ask your specialist to refer you to speak to your hospital's Social Worker or Nurse Specialist to help work through these supports and refer you to the organisations that can assist during this time.

RESOURCES AND SUPPORT

Organisation	How can they help?
Lymphoma Australia	<ul style="list-style-type: none">• Lymphoma Australia offers a wide variety of resources and support for people with lymphoma or CLL and their carergivers. Please visit lymphoma.org.au for further information:• Lymphoma Australia Fact sheets & booklets including:<ul style="list-style-type: none">• Lymphoma: what you need to know• Transplants in lymphoma• Lymphoma subtypes• Emotional impact of a lymphoma diagnosis & treatment• lymphoma.org.au/page/1218/fact-sheets• Lymphoma Australia YouTube Channel: Presentations and interviews on a variety of topics about lymphoma subtypes, management and supportive care. Including: Transplants in lymphoma, presented by Dr Nada Hamad, St Vincent's Hospital, Sydney• youtube.com/user/LymphomaAustralia• Lymphoma Nurse Support Line: 1800 953 081 or email: nurse@lymphoma.org.au• Online private Facebook group: Lymphoma Down Under http://bit.ly/2mrPA1k

- How will we know how successful the autologous stem cell transplant has been?

SOME QUESTIONS TO ASK YOUR DOCTOR

- Are autologous stem cell transplants used for my subtype of lymphoma?
- Am I a candidate for an autologous stem cell transplant?
- Should we test my siblings to see if they are a potential donor for a future allogeneic (donor) stem cell transplant if required?
- Once an autologous stem cell transplant is planned how long would I be in hospital for?
- What is the follow up required after the autologous stem cell transplant?