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For enquiries and appointments,
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Autologous Peripheral Blood Stem Cell Transplantation



Bone Marrow and Haematopoietic Stem Cells

Bone marrow is a soft, spongy tissue inside large bones that produces haematopoietic stem cells (HSCs). HSCs give rise to three types of blood cells, namely the red, blood cells, white blood cells and platelets. Most HSCs are found in the bone marrow, and some are in the bloodstream, i.e. peripheral blood stem cells (PBSCs).

Peripheral Blood Stem Cell Transplantation (PBSC Transplantation)

PBSC transplantation means transplanting healthy bone marrow to patients with abnormal or non-functioning bone marrow to restore their haematopoietic functions.

Types of PBSC Transplantation

Autologous Transplant

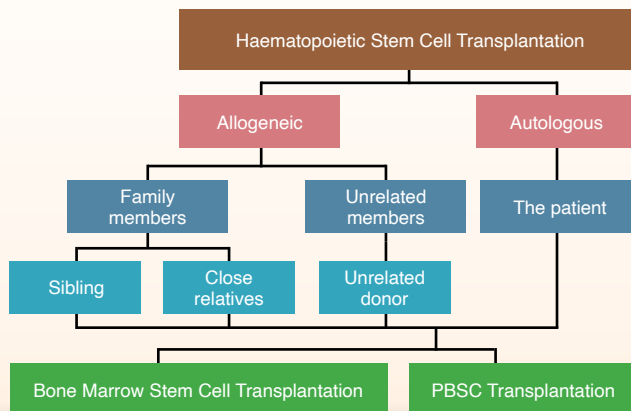
Patients receive their own blood stem cells

Syngeneic Transplant

Patients receive blood stem cells from their identical twins

Allogeneic Transplant

Patients receive blood stem cells from human leukocyte antigen (HLA)-compatible donors, who can be a sibling or a close relative or an unrelated donor.



Autologous PBSC Transplantation

Patients with the following conditions are suitable for autologous PBSC transplantation:

1. Multiple myeloma
2. Lymphoma
3. Others

Patients suitable for blood stem cell transplantation (haematopoietic stem cell transplantation) must have good cardiorespiratory function. Such factors as health condition, age, nature of illness and clinical diagnosis by doctors are considered for final screening.

Preparation and Examination before Autologous PBSC Transplantation

Preparation before Transplantation

Doctors and nurses will explain the transplantation procedures, complications, side effects and personal care to patients in detail. Patients have to sign the consent form for transplantation.

Examination before Transplantation

Blood examinations

General blood cell examination, biochemical test, virus antibody examination and other necessary blood tests

Imaging

Positron Emission Tomography (PET) examination, Magnetic Resonance Imaging (MRI) examination, chest X-ray, CT scan, lung function test, electrocardiogram, cardiac assessment, etc.

Various bacteria cultures

Bacterial cultures of blood, urine, stool, airway secretion, etc.

Bone marrow aspiration

Bone marrow condition is examined before the transplantation

Insertion of Catheter

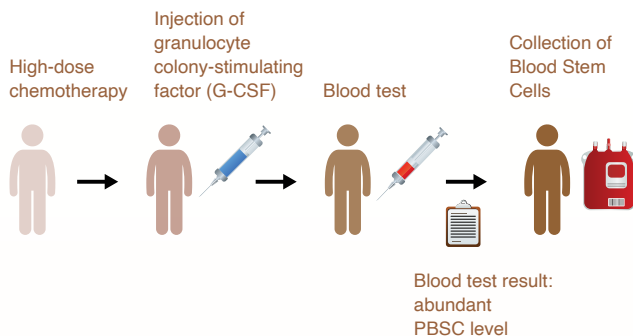
A double lumen catheter will be inserted into the jugular vein to maintain optimal blood flow for stem cell collection. The insertion procedure is performed one day before harvesting

Referral

Consult a dietitian for information. Also consult a dentist for dental and oral care when necessary

PBSC Harvesting Procedures

First hospitalisation



PBSC collection is performed using a blood cell separation machine called an apheresis machine. Patients will be admitted to the Hospital for PBSC harvesting. In a few days prior to harvesting, a patient will be given injections of chemotherapy medications and/or granulocyte colony-stimulating factor (G-CSF) to remove blood stem cells from the bone marrow into the circulating peripheral blood for collection by the apheresis machine. HSC collection begins when the blood test indicates an abundant PBSC level. The apheresis machine will draw a continuous flow of the patient's blood via a catheter. Blood stem cells are extracted from the blood in the process, while the red blood cells, white blood cells, platelets and plasma are returned to the patient via another catheter. The whole procedure will be repeated until the pre-determined amount of PBSC is collected.



On the collection day, a patient will be sent to our Comprehensive Oncology Centre to undergo harvesting procedure by nurse specialists. Connected to the apheresis machine through the central venous catheter, the patient will be closely monitored by equipment and nurses. In general, the whole PBSC harvesting process takes four to five hours and requires no general anaesthesia. In case the first collection does not yield the required quantity of blood stem cells, the patient may have another round of harvesting the following day. In total, about 250ml of "Peripheral Blood", which contains both blood stem cells and plasma, will be collected. The collected blood stem cells will then be sent for processing at the laboratory and stored in cryogenic liquid nitrogen containers at -196°C.

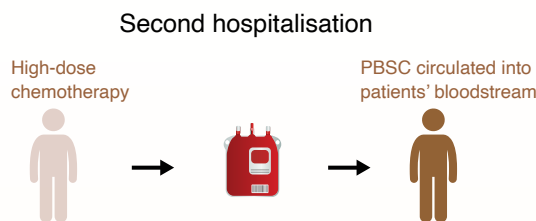
The patient can be discharged if in stable condition and the required quantity of blood stem cell is yielded.

Possible Risks and Side Effects of PBSC Harvesting

- Common side effects of G-CSF injection include bone pain, fever or other flu-like symptoms, which usually disappear after injection
- Though G-CSF has been approved for medical use in many developed countries as a routine treatment for cancer patients and healthy donors, its long term effects remain unknown. Patient should have regular follow-up

- Some patients may have pain, bruises or inflammation at the needle puncture site. They may feel dizzy and faint as blood pressure decreases during the harvesting process
- Anticoagulant will be added into blood during the harvesting procedure in order to prevent coagulation during circulation outside the body. The use of anticoagulant may lead to a decrease in blood calcium level, causing numbness and tingling sensation around the mouth, fingers and toes as well as mild muscle cramps. These symptoms can be relieved by taking calcium supplements
- It may lead to such side effects as increased risks of infection and bleeding if chemotherapy is given before the harvesting procedure

PBSC Infusion



Patients will be admitted to hospital again for high-dose chemotherapy when appropriate. Frozen PBSC will be sent to ward in a special cryogenic container and circulated into the patients' bloodstream via the central venous catheter while being defrosted by a nurse specialist.

Possible Risks before Blood Stem Cell Regeneration

- Nausea and vomiting
- Diarrhoea
- Mouth sores and ulcers
- Hair loss (from the head, face and body)
- Bleeding
- Infection

Possible Risks after Blood Stem Cell Regeneration

- Higher risk of infection and bleeding, such as pneumonia, gastrointestinal inflammation, bleeding tendency, etc. due to poor immunity
- Recurrence of myeloma or lymphoma
- Higher chance of infertility
- Other risks resulting from the side effects of high-dose chemotherapy, such as haemorrhagic cystitis
- Failure of blood stem cell transplant

Information for Admission to Isolation Ward

1. Air in Isolation Ward is filtered by "High Efficiency Particulate Air filter". High air pressure is maintained in the ward in order to prevent unfiltered air from entering the ward.
2. Inside the ward is a shower room that provides hot and cold water for bathing and cleansing. Patients are required to take bath and change clothes every day. Bed sheets and bedding bags are also replaced daily.
3. Limited number of visitors: prospective visitors must apply for visiting access in writing and learn how to protect the patients from infection before blood stem cell transplantation.
4. Visitors' belongings must be screened and sterilised before being brought into the room.

5. As instructed by doctors, medical professionals will conduct blood test for patients to check their number of blood cells, and will then decide the necessary blood products for blood infusion based on the test results. All blood products should first be irradiated and infused with haemofilter in order to reduce the chance of rejection.
6. Medical professionals will check the patients' body temperature every four hours and their skin condition, including the wound of central venous catheter every day. Catheter care and wound drainage are also performed.
7. Regular bacteria cultures of blood, urine, stool and airway secretion as well as chest X-ray will be conducted to detect any infection as early as possible.
8. Patients should wash their hands before eating, and rinse and brush teeth after meals. Oral swab and normal saline should be used to maintain good hygiene if platelet level is low.



Discharge Information after Autologous PBSC Transplantation

The length of hospital stay varies from patient to patient, i.e. three to four weeks on average. Those with good health and improved appetite can be discharged immediately. Extra care is required to prevent infection after discharge. Patients are required to record their body temperature both day and night and note any discomfort. Stay away from crowds and avoid sharing personal items with others. Wear disposable masks when going out to keep good personal hygiene. Stick to prescription and arrange regular follow-ups.

Advice on Basic Necessities

Clothing

1. Cotton underwear and clothes, which can be dried or ironed, are preferable. Quilt, bed sheet and quilt cover should be hung under the sun each week.
2. Wear fitting shoes. Patients having just recovered from foot mycosis should avoid wearing old shoes and socks to prevent infection.

Diet

Please refer to dietetic guidelines from your dietitian. (Neutropenic diet guideline, nutritional information for cancer treatment)

1. Maintain a balanced diet from five main food groups. Do not be picky with food.
2. Food must be fresh, clean and thoroughly cooked for consumption.
3. Avoid spicy and stimulating food.
4. Keep utensils and cutting board dry to prevent mould growth.

Accommodation

1. Keep home dry, clean, well-ventilated and well-lit. A separate room is preferable.
2. Avoid contact with people who have a cold or infectious disease. Wear a mask if family members feel unwell.

Outdoor Activities

1. Stay away from public places, such as cinemas, department stores, and public transport, for six months.
2. Wear long-sleeve tops, pants and a hat or bring an umbrella when having outdoor activities. Avoid direct sunlight. Prepare for sun protection.

Sexual Activities

1. Resume sexual activities when you feel fit. Use condom to prevent infection.
2. While male potency is usually not affected, colpoxerosis, i.e. dry vagina, is common among female patients. Water-based lubricants can be used to relieve discomfort during sex.
3. Since the ovarian function is suppressed by chemotherapy, you may consult doctors for referral to specialist in Obstetrics and Gynaecology as to the need for hormonal replacement therapy.

Fever

1. Measure and keep record of your body temperature both day and night.
2. Drink more water and take rest if your body temperature is below 38°C.
3. Please consult doctor if you have aversion to cold, tremour and fever (>38°C).

Bleeding

1. Check your skin for any haemorrhagic spot and haematoma as well as beware of haematuria or blood stool every day.
2. Hold iced water in mouth for 15 minutes or cover your face with ice wrapped in a towel if you have oral or gingival haemorrhage. Brush teeth with a soft toothbrush. Do not use toothpick.
3. Tip your head slightly forward and press your alar for 15 minutes, or apply ice between nose bridge and forehead for 15 minutes to stop nose bleeding.
4. Consult doctor if bleeding has continued for over half an hour or haematuria appears.

Diarrhoea

1. Take note of the frequency of diarrhoea as well as the type, shape and quantity of stool. Beware if you have abdominal pain.
2. Eat light, drink water, and avoid eating food served too cold or too hot. You should consult doctor if you have serious diarrhoea.

Others

1. Maintain good personal hygiene, wash hands before eating, and get used to rinsing with warm water or normal saline immediately after eating.
2. Do not keep any pet for your immune system to recover.
3. Do not grow plants or stir soil indoor to prevent microbial infection.