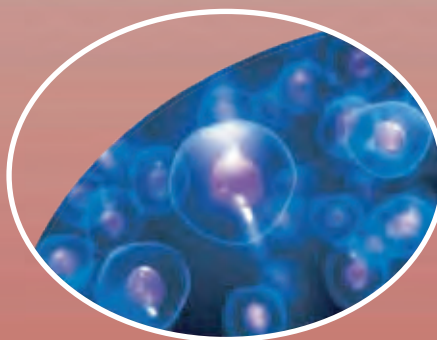
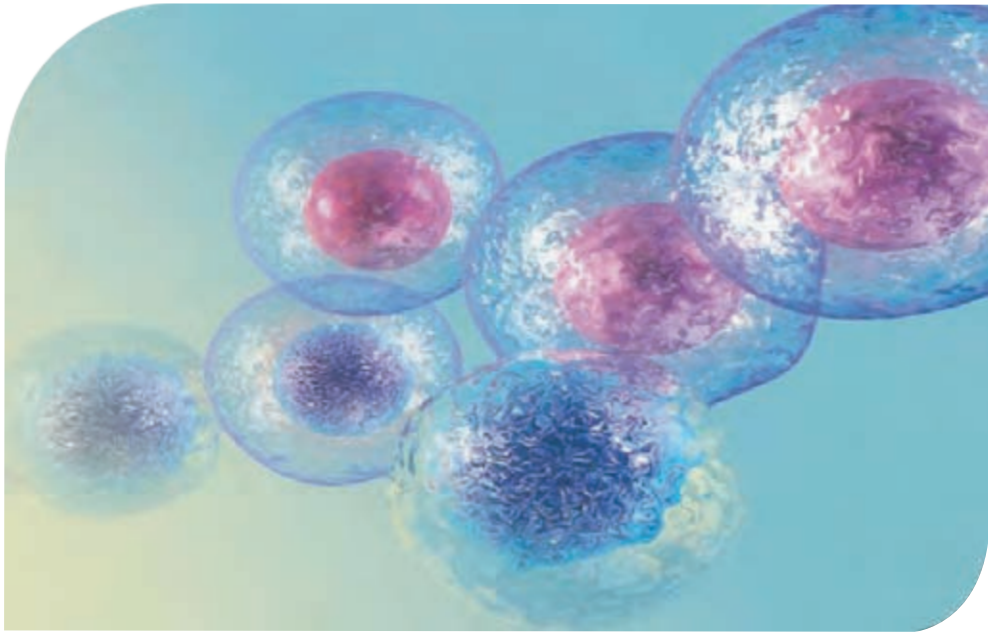




瑪麗醫院
Queen Mary Hospital



收集周邊血幹細胞
PERIPHERAL
BLOOD STEM CELL HARVEST



前言

血液幹細胞是一種獨特的細胞，主要存在於骨髓內，成熟後就會發展成紅血球、白血球和血小板等。

在正常情況下，幹細胞絕少在周邊血液中出现，存在亦是非常少量，但在白血球生長激素(Granulocyte Colony Stimulating Factor，簡稱G-CSF)或附加低劑量化療刺激下，可被驅使在周邊血液中出现。然後，透過血液細胞分離機收集。

造血幹細胞移植分為兩大類 - 自體或異基因。自體移植是使用病人本身的血液幹細胞，而異基因移植則是由親屬或非親屬志願者所捐贈。

周邊血幹細胞的優點

- ◆ 收集周邊血幹細胞時，不必進行多次骨髓穿刺，免除全身麻醉的風險及骨髓穿刺後引致的傷口痛楚。
- ◆ 健康的捐贈者於收集血幹細胞後，可即日出院回家休息。
- ◆ 使用周邊血幹細胞進行移植比使用骨髓幹細胞時，白血球和血小板恢復期比較短，可減少使用抗生素和接受輸血的情況，更可縮短住院時間。

收集前準備

- ◆ 在收集周邊血幹細胞前，必須接受詳細身體檢查，以確保安全。
- ◆ 必須簽署書面同意書。
- ◆ 捐贈者在捐贈前三天需要接受白血球生長激素(G-CSF)注射，每天一至兩次，在第四天開始進行收集，注射直至血幹細胞收集完成。
- ◆ 自體移植病人在血幹細胞收集前，須住院及接受低劑量化療和數天白血球生長激素(G-CSF)注射，將造血幹細胞驅動至血液中，然後監察血球指數以確定採集的最佳時機。
- ◆ 在收集前，保持飲食均衡和充足休息。過量進補可能會提升血液中的脂肪含量，影響收集的效果。
- ◆ 收集當日，不需禁食，但以清淡為佳。
- ◆ 收集血幹細胞次數取決於可收集得到的數量，需時一至三天。
- ◆ 為使收集過程順利，需要時會安放中央靜脈導管收集造血幹細胞。

收集過程



收採集周邊血幹細胞前，必須注射白血球生長激素和服食鈣片。



在每隻手臂插上針管，並保持挺直，以確保血液流動暢通。
血液經刺針導管抽取至血液分離機，分離後，提取所需的造血幹細胞，而其他不需要而被引流出體外的血液成份會經另一導管送回體內。



收集的造血幹細胞存放於血袋內，每日收集量一般不超過300毫升。



收集完畢後，捐贈的造血幹細胞一般會立即輸入受贈者體內。



為自體移植及非即日使用的異基因移植所收集的造血幹細胞會立刻被冷凍並貯藏。



護理及建議

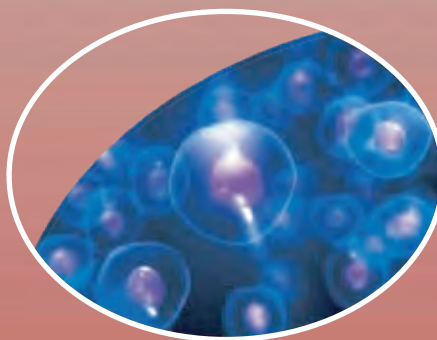
- ◆ 由於收集過程約四至六小時，請先如廁。收集進行中，亦可使用便盆或尿壺。
- ◆ 護士會監察整個過程。如有任何不適，請即知會，亦可隨時提出疑問。
- ◆ 收集完畢，稍作休息，然後從床上慢慢坐起活動；否則動作過急會引致暈眩。
- ◆ 在過程中，微量的紅血球及血小板會流失，但不會構成很大的影響。收集後，亦會檢查血球指數。

併發症

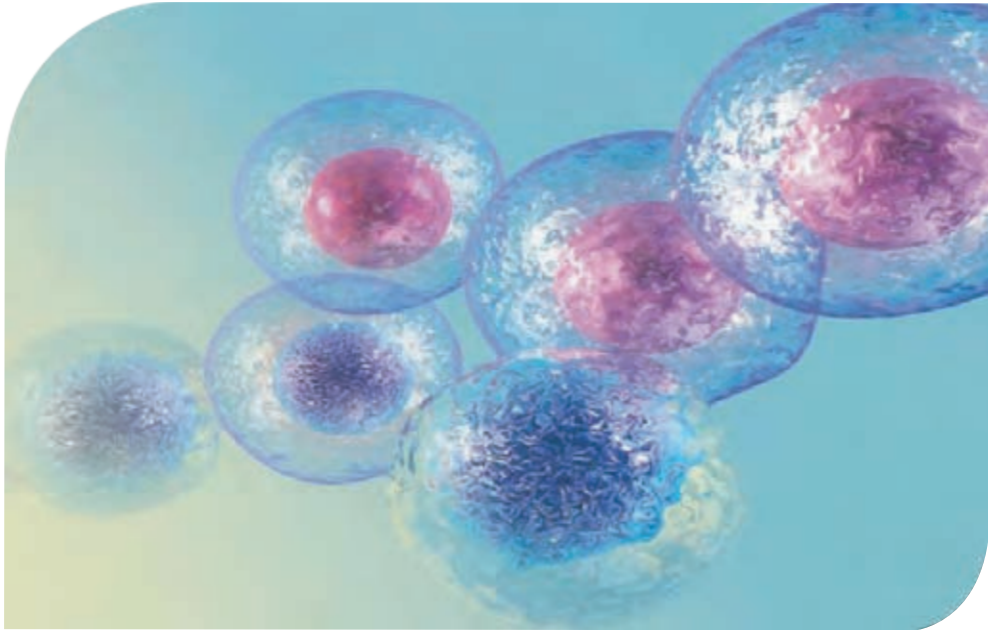
- ◆ 注射生長激素的副作用包括骨痛、輕微發熱或類似感冒等徵狀。注射停止後，徵狀便會消退。
- ◆ 收集過程中，須使用抗凝血劑防止血液在體外凝固。抗凝血劑會令血液內的鈣質短暫性

降低，可能出現唇邊、手指尖或腳趾尖有麻痺及針刺感覺，服用鈣片或透過靜脈輸入鈣劑便可改善。

- ◆ 收集期間，亦有可能血壓下降、頭暈、心跳或心律不齊。休息後，一般即可回復正常。



PERIPHERAL BLOOD STEM CELL HARVEST



Introduction

Haematopoietic stem cells are unique cells that are primarily located in the bone marrow and mature into red cells, white cells and platelets.

Under normal circumstances, peripheral blood stem cells (PBSCs) make up only a small portion of the blood cells in the body. However, they can be stimulated to move from the bone marrow into the blood stream by Granulocyte colony stimulating factor (G-CSF) after low dose of chemotherapy. PBSCs for haematopoietic stem cells transplantation (HSCT) are collected in a process called apheresis.

The PBSCs can be obtained from matched donors (either family members or unrelated volunteers) for “allogeneic” HSCT, or from patients themselves for “autologous” HSCT.

Advantages of PBSC

- ◆ Donation of PBSCs does not require surgery under general anesthesia, thus avoiding the risk of general anesthesia and wound pain.
- ◆ Healthy donor only needs day admission.
- ◆ Blood cells recovery is faster in using PBSCs than bone marrow cells in HSCT, thus resulting in lesser use of antibiotics and blood components support and shorter hospital stay.

Preparation

- ◆ Undergo body checkup prior to PBSC collection.
- ◆ A written consent is required.
- ◆ Healthy donor is given G-CSF injections, once or twice a day for four to five consecutive days and until PBSC collection is completed. The harvest will be performed on the fourth day of G-CSF administration.
- ◆ For autologous HSCT, a combination of low dose chemotherapy and G-CSF injections is used to move stem cells into the peripheral blood. Therefore, hospitalization is needed. Blood counts are monitored to determine when to harvest PBSCs.
- ◆ Prior to the procedure, keep a well-balanced diet and have sufficient rest. Excessive eating may increase fat content in the blood and affect the outcome of PBSC collection.
- ◆ Fasting is not needed on the harvest day; however, a light diet preferred.
- ◆ The number of procedure day depends on the number of stem cells collected. It may take one to three days.
- ◆ In some cases, a central venous catheter is inserted to ensure satisfactory venous access.

Procedure



G-CSF injection and oral calcium tablets are given before PBSC harvest.



An intravenous needle is put into each arm. The arm has to keep straight throughout the procedure to maintain a steady blood flow.

The blood cell separator (apheresis machine) then draws blood from a needle in one arm, separates the stem cells from the blood and returns the blood to the body through a needle in the other arm.



Stem cells collected are stored in a blood bag.

The volume is usually less than 300 ml per day.



For allogeneic HSCT, the stem cells are always infused immediately into the patient.



For autologous and future allogeneic HSCT, the stem cells are preserved, frozen and stored in liquid nitrogen.



Care & Advice

- ◆ Empty the bladder before the procedure as a harvest usually takes four to six hours. Once connected to the machine, urinal or bedpan is provided for use.
- ◆ An apheresis nurse monitors closely throughout the procedure. Do not hesitate to report any discomfort during the procedure and to clarify any queries.
- ◆ After the harvest, take some more rest. Then, ambulate slowly to prevent postural dizziness.
- ◆ Some red cells and platelets will be removed from blood along with the stem cells. This is unavoidable but should not cause any problems. Blood counts are checked afterwards to ensure safety.

Complications


- ◆ After the G-CSF injection, flu-like symptoms such as fever, chills, joint pain, headache and malaise may be experienced. These will subside after the drug is stopped.
- ◆ An anticoagulant is used to stop blood from clotting in the machine. The anticoagulant can induce temporary low calcium level in the blood. The possible side effects are numbness or tingling sensation around the lips, fingers and legs. This can be relieved by intravenous or oral calcium supplement.
- ◆ During the procedure, lowering of blood pressure, dizziness, palpitation and irregular heartbeat may occur and usually resolve after rest.

如有任何查詢，請聯絡你的主診醫生。
Should you have any queries, please contact your doctor in-charge.

以上資訊由瑪麗醫院內科部提供。
Information is provided by the Department of Medicine, Queen Mary Hospital



Prepared by Apheresis Unit, Queen Mary Hospital

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