



To News Editor
For Immediate Release

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Double Unit Unrelated Cord Blood Transplantation Sheds New Hopes for Children with Leukaemia

Bone marrow transplantation (BMT) is a well-established treatment for children with various severe blood or hereditary diseases and cancers. However, BMT is limited by a lack of suitable donors. In communities with nuclear-sized families, it has become more difficult to find an identically matched sibling for transplantation. Unrelated donor BMT is associated with much higher complications rate, especially graft-versus-host disease (GVHD). Furthermore, the time required to search for compatible donors can be lengthy and it usually takes three months or longer.

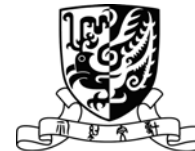
Umbilical cord blood, like bone marrow, also contains a rich source of blood producing stem cells. The use of cord blood transplantation (CBT) in children has witnessed important progress. With the first successful CBT from a compatible sibling in a child with Fanconi anaemia in 1989 and the establishment of the first public unrelated cord blood bank in the United States in 1991, the number of CBT from related and unrelated donors has increased dramatically to more than 10,000. While representing less than 5% in year 2000, 40% of children worldwide received cord blood as the stem cell source for unrelated stem cell transplantation in 2008. CBT has a number of advantages over BMT. Since cord blood units have already been stored in cord blood bank, they are readily available within 4 weeks. This time factor is especially important for patients who require urgent transplantation for serious diseases such as acute leukaemia. Furthermore, cord blood cells are naïve cells, and strict matching is not required as the risk of GVHD is not as severe as in BMT.

The Hong Kong Red Cross Blood Transfusion Service (HKRCBTS) established its public unrelated cord blood bank in 1998 and soon started to deliver cord blood units for transplant. However, before 2006, usage of unrelated cord blood had been modest. During an eight-year-period between 1998 and 2005, only 15 (29%) patients among a total of 52 paediatric unrelated transplants in Prince of Wales Hospital were transplanted with cord blood units from HKRCBTS. There are only a finite number of stem cells in each unit of cord blood collected, and depending on the weight of the patient, a unit of cord blood might not be adequate to secure an engraftment and to restore adequate marrow function for the patient. This had limited the usage of cord blood transplant in early years.

In 2006, Department of Paediatrics at The Chinese University of Hong Kong (CUHK) and HKRCBTS jointly launched a three-year programme on using double unit unrelated cord blood transplantation for patients who require BMT but without compatible related or unrelated bone marrow donors. Each of the compatible cord blood units alone contains inadequate cell doses to be used alone. The rationale of combining two units of cord blood was to increase the total number of cells infused which in turn to enhance the chance of engraftment.

During this period, 23 unrelated transplants were performed in this Centre, three (13%) were from unrelated bone marrow donor, three (13%) were from single unit unrelated cord blood, and the remaining 17 (74%) were from double-unit unrelated cord blood. Eleven of these 17 patients were transplanted for acute leukaemia, 10 patients (91%) had achieved successful engraftment. There is no increase in complications after transplantation. Up to now, 8 patients are alive with no evidence of leukaemia. These data support a very favourable outcome as compared to unrelated BMT or single unit CBT. Without utilization of double unit CBT, these high risk patients might not have a chance to go through stem cell transplantation and receive cure.

Public cord blood banks provide an alternative source of stem cell for transplantation that achieve an outcome similar to unrelated bone marrow in children. Usage of double unit cord blood for transplant saves the long search time for a suitable unrelated bone marrow donor and overcomes the obstacle of limited number of stem cells available in each cord blood unit. This has increased the chance of finding suitable cord blood units for early transplant and as a result, more patients can now benefit from umbilical cord blood transplantation.



致新聞編輯
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雙份非近親臍帶血移植為兒童白血病患者帶來新希望

骨髓移植是一種行之有效的治療方案，應用在兒童嚴重血液病、遺傳病及癌症的治療成效已經得到確認。但是，隨著家庭人口日趨細小，找尋到骨髓匹配的近親捐贈者將愈加困難。而使用非親屬捐贈的骨髓進行移植一般會有較高的併發症風險，尤其是嚴重的移植物抗宿主病。再者，找尋合適的非血緣骨髓往往需時三個月或更長時間。

臍帶血與骨髓一樣含有豐富的造血幹細胞。近年來，臍帶血應用在兒童幹細胞移植取得了重大進展。1989年，首例范可尼貧血患兒成功採用親屬臍帶血進行移植；1991年美國建立了首間公眾非親屬臍帶血貯存庫，至今採用臍帶血移植（包括親屬及非親屬）的病例已超過一萬宗。在2000年，非親屬的兒童幹細胞移植只有不足百分之五是源於臍帶血，到2008年已增長至百分之四十。臍帶血移植較骨髓移植的優勝之處，在於它是儲存於貯存庫，可以在短時間內（四星期）應用，時間因素對一些急需移植的病人，例如白血病患者尤其重要。臍帶血細胞是較單純的幹細胞，移植物抗宿主病一般較骨髓移植為低，因此，臍帶血的配型不需要如骨髓移植般嚴格匹配。

香港紅十字會輸血服務中心於1998年建立了香港唯一的公眾非親屬臍帶血庫，隨即開始為香港病人提供臍帶血作移植用途，大部份在香港中文大學（中大）威爾斯親王醫院兒童骨髓移植中心進行。但在2006年前，非親屬臍帶血使用量並不大。就威爾斯親王醫院而言，由1998至2005年八年間的52例非親屬移植病例中，只有15人（29%）使用由香港紅十字會輸血服務中心提供的臍帶血進行移植。使用率較低的主要因為每份臍帶血中的幹細胞數量有限，按患者體重計算，一份臍帶血可能不足以保證骨髓植入及成功恢復骨髓功能，因而限制了早期的臍帶血使用率。

2006年，中大兒科學系與香港紅十字會輸血服務中心，共同開展一項為期三年的研究，為需要進行骨髓移植但未能找到合適近親或非親屬捐贈者的病人，提供雙份臍帶血移植。由於單份臍帶血的細胞數量不足以單獨使用，將兩個單位的臍帶血聯合應用，可增加幹細胞的數量，提高臍帶血的成功植入率。

過去三年，威爾斯親王醫院進行了 23 例非親屬移植，其中 3 例（13%）為非親屬骨髓移植，3 例（13%）為非親屬單份臍帶血移植，另外的 17（74%）為雙份非親屬臍帶血。在這 17 例中，11 例為急性白血病患者，其中 10 名患者（91%）的臍帶血成功植入，移植後的併發症也未見增加。至今有 8 人仍然存活及沒有復發，相比於非親屬骨髓移植或單份臍帶血移植，這結果令人鼓舞。假如沒有採用這種移植方法，上述的一些高危病人可能沒有機會接受幹細胞移植而不能得到治癒機會。

公眾臍帶血庫為兒童幹細胞移植提供多一個選擇，非親屬臍帶血移植的成功率與非親屬骨髓移植相近，利用雙份臍帶血進行移植除了可縮短找尋合適非親屬幹細胞捐贈者之漫長時間外，同時克服了單份臍帶血幹細胞數量有限的關卡，大大增加找到合適臍帶血的機會及可更快進行移植，更多重病病童可得到治癒機會。

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