



Altruistic and directed umbilical cord blood banking for families at risk

To provide advice on altruistic and directed umbilical cord blood banking for families at risk.

Health professionals providing maternity care, and patients.

The evidence was reviewed by the

Umbilical cord blood is a rich source of stem cells that can be used in the treatment of a range of blood disorders and conditions of the immune system. A baby's cord blood can be collected at birth and stored for possible use in the future.

The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZC and 201 ns 14.0402 T.9766 re f* 5337.4 6333e!

Umbilical Cord blood represents a rich source of Haematopoietic Stem Cells (HSC). The major clinical use of cord blood stem cells has been in the treatment of haematological malignancy in children. Currently about 20 percent of stem cell transplants for young patients are cord blood transplants. Umbilical cord blood (UCB) as an alternative to bone marrow as a source of HSC for allogeneic transplantation has a number of potential advantages for both adults and children including availability, extension of the donor pool, lower incidence of graft versus host disease, can be transplanted even with a higher degree of HLA mismatch, and lower incidence of viral transmission.

Current uses of umbilical cord blood include:

1. Cord blood transplants (CBT) from related donors

Cord blood transplantation is particularly useful for treating children with haemoglobinopathies.

2. Cord blood transplants in children from unrelated donors

CBT is a good option for children with haematological malignancy who lack a related donor.

3. Cord blood transplants in adults from unrelated donors

Results of HSC transplants in adults with haematological malignancy are encouraging.

There is substantial speculation about the use of cord blood non-HSC in treatment of a variety of acute and chronic conditions and there is increasing interest in the use of fetal-derived stem cells in the treatment of neurological and other disorders. This interest in umbilical cord blood stem cells has arisen for two reasons. First, recent research has established that UCB stem cells can demonstrate plasticity (i.e. the ability under the correct conditions to differentiate into a variety of cells other than blood cells, such as neural cell, cardiac cells and osteoblasts), suggesting a role for them in the treatment of diseases such as diabetes, cerebral vascular disease and Parkinson's disease. Second, as the collection and use of UCB cells does not involve the destruction of an embryo, their use in research and therapy avoids many of the moral concerns raised by embryonic stem cell research.

In 2000, the Commonwealth Government assisted in the establishment of an Australian National Cord Blood Collection Network (NCBCN). The Australian Bone Marrow Donor Registry (ABMDR) was contracted to manage the (four year) "Development Phase" of the National Cord Blood Collection Network.

The network was officially launched under the name "AusCord" in September 2002. Australia now has three public UCB banks (including 11 collection centres), located in Sydney, Melbourne and Brisbane and nationally coordinated by AusCord.

The main objective of the network is to collect, process and store 22,000 searchable, TGA compliant Cord Blood Units, (including 2,000 indigenous units) for the purpose of transplantation and to establish a computerised national registry of Cord Blood Units for the purpose of searching, matching and distributing Cord Blood Units.

In New Zealand the government has been lobbied to establish a public UCB bank, but so far have declined to fund this initiative. Private UCB banking is available.

4. 2.1 Altruistic (non directed) donations

Thirty percent (30 percent) of Australian patients in need of an allogeneic bone marrow transplant have a suitable family donor, that is, 5 or 6 out of 6 Human Leucocyte Antigen (HLA) matched close relative. Of the remaining 70 percent of patients, only 20-25 percent are able to find an unrelated bone marrow donor on the existing registries. Therefore, over 50 percent of patients in need of an allogeneic transplant do not have a histocompatible related or unrelated donor. This same group may be eligible for a cord blood transplant as it is known that the degree of compatibility between the patient and the cord unit does not need to be as stringent as in bone marrow transplantation, with matching acceptable to a level of 4 out of 6 match. This is because graft-versus-host disease is lower in cord blood transplants at a given level of match, thereby increasing an individual's chances of finding a suitable cord blood donation at an acceptable level of match. The main indication for cord blood transplantation is relapsed acute lymphoblastic leukaemia in children.

Following the experience at the New York Cord Blood Bank and the National Marrow Donor Program in the United States in identifying suitably matched donors (5 out of 6 and 6 out of 6 HLA matches) for patients, the NCBCN expect that a collection of 20,000 cord blood units will enable 80-90 percent of Australian requests to be met.

4.2.2 Directed donations in at risk families

The collection of cord blood units for use by siblings born into a family where there is a known genetic disease amenable to HSC transplant remains a recommendation. If the cells are HLA-compatible they may be used for an affected child. If not, they may be useable for a future HLA-compatible sibling.

A limited number of hospitals are funded to arrange altruistic cord blood collections for AusCord. There are a number of challenges that remain. Collection and storing UCB is expensive and logistically complex. Also public UCB banks are still characterised by under-representation of many ethnic groups, particularly Aboriginal Australians and Pacific Islanders.

It is important to recognise that umbilical cord stem cell transplants for larger children or adults may require higher stem cell doses than single cord blood units provide, thus requiring a traditional bone marrow transplant in addition. Also, in many cases a patient's own cord blood is unusable for transplantation because precursors of the patient's disease (e.g., leukaemia) may be in the cord blood.

Some commercial groups claim that cord blood can prevent or cure a range of diseases, but there is currently insufficient evidence to prove this. In the future, the range of diseases treated using cord blood might be expanded as science and technology advances.

The College recommends that hospitals develop their own policies in relation to cord blood storage and use of UCB banks' services

Australian Bone Marrow Donor Registry (AusCord) <https://www.abmdr.org.au/public-cord-blood/>

Placental Blood Transplant and Autologous Banking – Caveat Emptor Johnson, F.L. Journal of Paediatric Haematology/ Oncology 1997; Volume 19 (3); 183-186.

Umbilical cord blood banking: public good or private benefit? Samuel GN, Kenridge IH, O'Brien TA. Med J Aust 2008 May 5; 188 (9): 533-5. Review.

Women's Health Committee Membership

- i. Steps in developing and updating this statement

This statement was originally developed in February 2003 and was most recently reviewed in

This information is intended to provide general advice to practitioners, and should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any patient.