The Royal Australian and New Zealand College of Obstetricians and Gynaecologists

Excellence in Women's Health

Altruistic and directed umbilical cord blood banking for families at risk

This statement has been developed and reviewed by the Women's Health Committee and approved by the RANZCOG Board and Council.

A list of Women's Health Committee Members can be found in Appendix A.

Disclosure statements have been received from all members of this committee.

Disclaimer This information is intended to provide general advice to practitioners. This information 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. This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The document has been prepared having regard to general circumstances.

First endorsed by RANZCOG: February 2003
Current: July 2020
Review due: July 2023

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

Target audience: Health professionals providing maternity care, and patients.

Values: The evidence was reviewed by the Women's Health Committee (RANZCOG) and applied to local factors relating to Australia and New Zealand.

Background: This statement was first developed by Women's Health Committee in February 2003 and reviewed in July 2020.

Funding: This statement was developed by RANZCOG and there are no relevant financial declarations.

1. Plain language summary

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.

2. Summary of recommendations

Recommendation 1	Grade
The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) supports the collection of altruistic and directed cord blood donations for at risk families.	Consensus-based recommendation

3. Introduction

Umbilical Cord blood represents a rich source of Haematopoetic 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.

4. Discussion and recommendations

4.1 Current uses of umbilical cord blood

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 UBC 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 Types of cord blood donation

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.

4.3 Practical implications of cord blood collection

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.

5. Conclusion

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

6. Other suggested reading

Australian Bone Marrow Donar 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, Kerridge IH, O'Brien TA. Med J Aust 2008 May 5; 188 (9): 533-5. Review.

7. Links to other College statements

Evidence-based Medicine, Obstetrics and Gynaecology (C-Gen 15)
https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical%20-%20General/Evidence-based-medicine,-Obstetrics-and-Gynaecology-(C-Gen-15)-Review-March-2016.pdf?ext=.pdf

8. Patient information

A range of RANZCOG Patient Information Pamphlets can be ordered via:
https://www.ranzcog.edu.au/Womens-Health/Patient-Information-Guides/Patient-Information-Pamphlets

Appendices

Appendix A Women's Health Committee Membership

Name	Position on Committee
Professor Yee Leung	Chair and Board Member
Dr Gillian Gibson	Deputy Chair, Gynaecology
Dr Scott White	Deputy Chair, Obstetrics
Associate Professor Ian Pettigrew	Member and EAC Representative
Dr Kristy Milward	Member and Councillor
Dr Will Milford	Member and Councillor
Dr Frank O'Keeffe	Member and Councillor
Professor Sue Walker	Member
Professor Steve Robson	Member
Dr Roy Watson	Member and Councillor
Dr Susan Fleming	Member and Councillor
Dr Sue Belgrave	Member and Councillor
Dr Marilyn Clarke	ATSI Representative
Professor Kirsten Black	Member
Dr Thangeswaran Rudra	Member
Dr Nisha Khot	Member and SIMG Representative
Dr Judith Gardiner	Diplomate Representative
Dr Angela Brown	Midwifery Representative, Australia
Ms Adrienne Priday	Midwifery Representative, New Zealand
Ms Ann Jorgensen	Community Representative
Dr Rebecca Mackenzie-Proctor	Trainee Representative
Dr Leigh Duncan	Maori Representative
Prof Caroline De Costa	Co-opted member (ANZJOG member)
Dr Christine Sammartino	Observer

Appendix B Overview of the development and review process for this statement

i. Steps in developing and updating this statement

This statement was originally developed in February 2003 and was most recently reviewed in July 2020. The Women's Health Committee carried out the following steps in reviewing this statement:

- Declarations of interest were sought from all members prior to reviewing this statement.
- At the March 2020 committee meeting, the existing consensus-based recommendations were reviewed and updated (where appropriate) based on the available body of evidence and clinical expertise. Recommendations were graded as set out below in Appendix B part iii)

ii. Declaration of interest process and management

Declaring interests is essential in order to prevent any potential conflict between the private interests of members, and their duties as part of the Women's Health Committee.

A declaration of interest form specific to guidelines and statements was developed by RANZCOG and approved by the RANZCOG Board in September 2012. The Women's Health Committee members were required to declare their relevant interests in writing on this form prior to participating in the review of this statement.

Members were required to update their information as soon as they become aware of any changes to their interests and there was also a standing agenda item at each meeting where declarations of interest were called for and recorded as part of the meeting minutes.

There were no significant real or perceived conflicts of interest that required management during the process of updating this statement.

iii. Grading of recommendations

Each recommendation in this College statement is given an overall grade as per the table below, based on the National Health and Medical Research Council (NHMRC) Levels of Evidence and Grades of Recommendations for Developers of Guidelines. Where no robust evidence was available but there was sufficient consensus within the Women's Health Committee, consensus-based recommendations were developed or existing ones updated and are identifiable as such. Consensus-based recommendations were agreed to by the entire committee. Good Practice Notes are highlighted throughout and provide practical guidance to facilitate implementation. These were also developed through consensus of the entire committee.

Recommendation category		Description
Evidence-based	A	Body of evidence can be trusted to guide practice
	B	Body of evidence can be trusted to guide practice in most situations
	C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
	D	The body of evidence is weak and the recommendation must be applied with caution
Consensus-based		Recommendation based on clinical opinion and expertise as insufficient evidence available
Good Practice Note		Practical advice and information based on clinical opinion and expertise

Appendix C Full Disclaimer

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.

This information has been prepared having regard to general circumstances. It is the responsibility of each practitioner to have regard to the particular circumstances of each case. Clinical management should be responsive to the needs of the individual patient and the particular circumstances of each case.

This information has been prepared having regard to the information available at the time of its preparation, and each practitioner should have regard to relevant information, research or material which may have been published or become available subsequently.

Whilst the College endeavours to ensure that information is accurate and current at the time of preparation, it takes no responsibility for matters arising from changed circumstances or information or material that may have become subsequently available.