

CORD BLOOD BANKING: RETRIEVE A NEW LIFE WITH SELF REPAIR KIT

Vijayaraddi Vandali and Kinjal Mistry

School of Nursing, P.P.Savani University, Gujarat, India

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ABSTRACT

Cord blood is the blood in your baby's umbilical cord. It contains stem cells that can grow into blood vessels, organs, and tissues. Once umbilical cord is considered a waste product was discarded with the placenta, it is now known to contain potentially life saving hematopoietic stem cells. Advantages of cord blood cell transplant over bone marrow transplant: Less risk of complications & viral infection when used in transplants, Ability to use one's own stem cells for conditions that currently lack medical treatment options, also known as "Autologous transplantation". Immediately available and can minimize disease progression in early treatment & High proliferation capacity.

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INTRODUCTION



Diagram 1

Once umbilical cord is considered a waste product was discarded with the placenta, it is now known to contain potentially lifesaving hematopoietic stem cells. It offers several distinct advantages over bone marrow or peripheral stem cells and it should not compromise obstetric or neonatal care.

Concerned definitions

Cord blood: It is the blood that remains in placenta & it's attach umbilical cord after child birth. Cord blood contains potentially lifesaving cells called stem cells. (The stem cells in cord blood are different from embryonic stem cells¹.)

Cord blood collection: The procurement of cord blood for banking and administration before and/or after the placenta is delivered.

Ex utero: The collection of cord blood cells from the placental and/or umbilical cord vessels after the placenta has been delivered.

In utero: The collection of cord blood cells from the placental and/or umbilical cord vessels after the infant donor has been delivered and separated from the umbilical cord, but before the placenta has been delivered.

Cord blood banking involves collecting blood left in your newborn's umbilical cord and placenta and storing it for future medical use².



Diagram 2

Benefits of cord blood banking

1. **Cord blood collection is easy and poses no medical risk to the mother or new-born baby:** It is collected from delivered placenta & it's not interfere with mother and baby's care.
2. **Cord blood is collected in advance, tested and stored frozen, ready to use:** All routine testing is completed

*Corresponding author: **Vijayaraddi Vandali**
School of Nursing, P.P.Savani University, Gujarat, India

and the unit is stored frozen, ready to use. If a match is found, it can be reserved immediately. Confirmatory HLA typing and any special testing required is usually completed within 5 days.

3. **Cord blood transplants do not require a perfect match:** Studies have shown that cord blood transplants can be performed in cases that the donor and the recipient are partially matched. In contrast, bone marrow grafts require 8/8 matching in most cases.
4. **Cord blood stem cells are currently used to treat over 80 life threatening diseases:** doctors have increasingly turned to cord blood as an alternative to bone marrow for use in stem cell transplants. Because cord blood does not need to be as closely matched to patient, it is usually easier to find an appropriate match.
5. **It protect child & his family from long term health problems:** cord blood & cord tissue are rich sources of stem cells. These cells have unique quality that it has an ability to renew & replace cells in blood, tissues, organs & immune system.
6. Cord blood stem cells are potential match for other family members too.
7. **Cord blood transplants are associated with lower incidence of GvHD:** Immune cells in cord blood are less likely attack patient's own tissue as seen in bone marrow transplant.
8. **Cord Blood Transplants are associated with lower risk of viral infections:** Cord blood is also less likely to transmit certain common viruses, like Epstein-Barr virus (EBV) and cytomegalovirus (CMV), potentially lethal infections for transplant recipients³.

Indication of cord blood banking

To treat many life-threatening diseases including leukaemia, certain other cancers and blood, immune and metabolic disorders in baby, his family and other patient.

Contraindication of cord blood banking

Absolute contraindications

- Mother having HIV infection, active syphilis, acute infections or active clinical forms of chronic infection with HBV and HCV (B and C hepatitis), infection contacted during pregnancy with Toxoplasma Gondi, rubella virus, cytomegalovirus
- Child is born with a genetic condition such as muscular dystrophy or spina bifida, and then the stem cells would have that condition⁴.

Relative Contraindications: the state of inactive chronic carrier of HBV or HCV.

Advantages of cord blood cell transplant over bone marrow transplant

Cord blood stem cells are biologically younger and are more flexible compared to adult stem cells from other sources like bone marrow. When saved, they have unique qualities and advantages as follows:

- Less risk of complications & viral infection when used in transplants
- Ability to use one's own stem cells for conditions that currently lack medical treatment options, also known as "Autologous transplantation"

- Immediately available and can minimize disease progression in early treatment
- Preserving them "stops the clock" and protects the cells from aging and being exposed to environmental factors and common viruses that can decrease their function⁵.
- High proliferation capacity

Cord blood collection procedure

Cord blood collection can begin with the third stage of labor, immediately after delivery of the baby. (Please note that the outside of the cord blood collection bag is not sterile, so it should not be placed on a sterile operative field in caesarean section. The cord blood will be collected into a 150 ml blood collection bag containing anticoagulant agent⁶.

1. Once the baby born, choose a site 4-6 inches from the cut end of cord for withdrawal of blood.
2. Wipe the site with gauze to remove blood. Use iodine swab to clean the chosen puncture site. After cleaning the site, do not allow secretions, non-sterile items, or maternal blood, to contaminate the puncture site.
3. Remove the needle cap from the cord blood collection bag with use of sterile technique.
4. Insert needle into umbilical vein at puncture site. As the blood begins to flow, hold the needle in place and lower the collection bag to allow blood to flow into the bag by gravity.
5. While filling, gently rotate the bag to mix blood with anticoagulant.
6. When blood flow stops, remove the needle and discard in a sharps container.
7. Write mother's name and social security number on label provided in kit. Affix provided label on collection bag.
8. Wrap cord blood bag in absorbent pad and place in large plastic bag⁷.

Cord blood storage

Since cord blood banking has only been in existence for 25 years, no scientific data is available to prove cord blood stem cells can be stored for longer than that. However, scientists have reported that cryogenically preserved cells have no expire date, and frozen cord blood possibly can be stored indefinitely. This is supported by key fact⁸:

Cord blood stem cells are stored at or below -190 degrees Celsius, where biological activity ceases.

CONCLUSION

Cord blood having the stem cells which is utilize for more than 80 life threatening diseases and have additional benefits over the bone marrow transplantation it's one of the best treatment modality in certain diseases which are life threatening. The cord blood collection has simple procedure which gives new life not only to baby but his family members & other patients who find at least partial match.

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