

What is Cord Blood Banking?

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Umbilical cord blood (UCB) is a rich source of haemopoietic stem cells that was usually discarded at birth. Since the first successful cord blood transplantation was performed in 1988, umbilical cord blood is becoming an important source for haemopoietic stem cell (HSC) transplantation other than bone marrow and peripheral blood. It has been used in therapies of cancer, blood disorders and genetic diseases. UCB has some advantages in comparison with other sources of haemopoietic stem cells. The collection of UCB is non-invasive and safer for the donor. UCB is collected and cryopreserved in advance so it is immediately available compared to bone marrow and peripheral blood. It reduced the risk of transmitting infections. UCB can be successfully transplanted with a higher degree of mismatch, with lower incidence and severity of graft-versus-host disease. The major challenge now is slower engraftment resulting in longer hospitalisation.

There are international registries providing services to search a match for cord blood transplantations. Bone Marrow Donors Worldwide (BMDW) is the biggest international bone marrow and cord blood registry. Up to July 2013, more than 583,000 cord blood units are listed on BMDW and ready for use. Other international registries include NetCord in Europe, and NMDP (National Marrow Donor Program) in the US.

Umbilical cord blood banks started from storing haemopoietic stem cells from cord blood only, and now different cells from various sources are stored in cord blood banks or stem cell banks. These cells range from the stem cells from cord blood, peripheral blood, menstrual blood, umbilical cord, placenta, amnion, adipose, teeth, and hair follicle, to plasma and DNA.

Cord blood banks are usually categorised into public bank (non-profit) and private bank (for profit), but hybrid models are getting popular in recent years. Public banks store cord blood samples from donors and provide cord blood units to unrelated patients for allogeneic transplantation. These banks are usually run by non-profit organisations funded by government, foundation, hospital or community. Public banks do not charge a fee of collection and storage, but they usually charge a fee when releasing units for transplantation. Private cord blood banks provide services of 'private banking' or 'family banking', which stores cord blood for autologous or related transplantations. Parents pay a fee for the storage of cord blood for 18-25 years. Private banks are usually operated by private companies. Much more cord blood units have been stored in private banks, but the utility rate is very low because it is usually limited to family use. Some medical bodies (Royal College of Obstetrics and Gynaecology, European Group on Ethics, and American Academy of Paediatrics) have issued statements against private cord blood banking without foreseeable risks.

Hybrid models move beyond the traditional division of public and private cord blood banking. Some cord blood banks are offering both options of donating cord blood and family banking, such as Stemcyte, and cord blood banks in China. In addition, the Virgin Health Bank in the UK provides the model that 80% of the cord blood is stored for public use, and 20% is stored for private use (Fisk and Atun 2008). In Spain, the private banks are regulated to disclose the HLA types of the cord blood to the public registries, and they are required to sell the family banked units for allogeneic transplantations in the medical emergencies (Katz-Benichou 2007; O'Connor et al., 2012). These hybrid models facilitate cell exchange or use resources more efficiently.

References

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