Editorial

Umbilical cord blood transplantation: an insight

Salman Naseem Adil, Natasha Ali

Allogeneic haemopoeitic stem cell transplant remains to be the only curative option for many patients with haemoglobinopathy, aplastic anaemia, leukaemia, myelodysplastic syndrome and metabolic storage disorders. The frequency of finding a matched sibling donor is 30%.[1] The sources of stem cells include peripheral blood and bone marrow. In the recent years there has been advancement in the use of umbilical cord blood derived stem cells for allogeneic transplant.

In the year 1989, the first umbilical cord blood transplant (UCBT) was performed to treat a child with Fanconi's anaemia.[2] Since then, UCBT has cured children with haematological malignancies, solid tumors and bone marrow failure syndromes.Its role in the paediatric population has been well established in several reports.[3,4] In adults, several retrospective studies have shown comparable survival to traditional stem cell sources. For improved engraftment and outcome, the use of expansion techniques and appropriate selection of umbilical cord blood units respectively, have yielded best possible results.[5]

The process of UBCT stems from the understanding that cord blood, which is normally wasted following child-birth, is enriched with pluripotent stem cells. These cells are similar to those found in the bone marrow and are responsible for the regenerative capacity of the bone marrow's haemopoeitic activities. In comparison to bone marrow transplant, UCBT has the following advantages:

1. Low risk of viral transmission (latent viruses e.g. Cytomegalovirus, Epstein-Barr virus, hepatitis viruses, human immunodeficiency virus)

2. Decreased incidence and severity of graft versus host disease which is a leading cause of morbidity and mortality in stem cell transplant procedures

3. Complete elimination of risk to the donor (by eliminating line insertion, administration of G-CSF and stem cell procurement procedures)

4. Less stringent HLA matching requirements with easy access to rare haplotypes

The main disadvantages however include:

1. Reduced cell dose which may result in delayed engraftment leading to decreased survival

2. Higher risk of graft rejection (match unrelated UBCT)

3. Some haematological and immunological disorders may not be apparent at birth and therefore careful donor screening is required

Since its inception, as of 2011, more than 25,000 cord blood transplants have been performed worldwide.[6] Umbilical cord blood (UCB) can be donated for public use and approximately 500,000 units have been donated in various public cord blood banks. UCB can also be stored for the participating mother and her family which is known as private cord blood banking. Private storage banks usually charge an upfront collection fee followed by yearly storage fees. Public storage banks are either supported locally or nationally. Wherever possible, these banks are also supported through philanthropy.

Recently, new indications for UCBT outside the field of Haematology/Oncology have also emerged which include neurology, diabetes and cardiology.[7,8] Therefore it is clearly evident that in the next decade or so, there will undoubtedly be additional uses that are not yet anticipated. In this perspective, making stem cell therapy accessible to our patients by employing well established procedures for stem cell collection, processing and storage should be our strategy in order to achieve a successful, nationally and culturally acceptable cord blood bank unit.

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Department of Pathology and Microbiology, Aga Khan University Hospital, Karachi.
Correspondence: Natasha Ali. Email: natasha.ali@aku.edu

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