WORLD JOURNAL OF CURRENT MEDICAL AND PHARMACEUTICAL RESEARCH

Impact Factor-4.598

Review Article Open Access

UMBILICAL CORD BLOOD BANKING

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Abstract

Umbilical cord blood bank is a facility which stores umbilical cord blood for future use in both private and public cord banks. The banks which developed in response to the potential for cord blood in treatment for paediatric and adult patients presenting with haematological disorders, immunological defects and specific genetic diseases. The procedure which was used to collect the cord blood, storage and uses of the umbilical cord bank will be discussed in this article. Allergenic cord blood transplantation is of more than 25,000 performed worldwide since the first cord blood transplantation in 1988. More Than 7,80,000 cord blood units are stored in over 130 private cord blood banks, worldwide, and over 4,00,000 units in more than 100 quality controlled public cord banks. Umbilical cord banking is new way of curing the diseases researchers continue to evaluate the usefulness of cord blood cells in treating human diseases or disorders for purpose other than haematological disorders including heart disease, strokes, brain or spinal cord injuries and cancer. This review summarizes the status of potential use in the treatment of human disease.

Key Words: Umbilical cord blood, public and private cord blood banks, bone marrow, stem cells.

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Article History: *Received: 28.07.2019, Accepted: 12.08.2019, Available on Online: 15.08.2019.*

INTRODUCTION

Umbilical cord banking has been used successfully as an alternative for bone marrow or peripheral blood progenitor cells for transplantation purposes and developing into a new field of study in medicine for curing diseases. It is used to treat both paediatric and adult patients with haematological malignancies and disorders like thalassemia, leukaemia, and sickle cell diseases, etc., bone marrow failure, immunological defects and other genetic diseases[1]. Stem cell is an undifferentiated cell of a multi cellular organism which is capable of giving rise to indefinitely more cells of the same type, and from which certain other kinds of cells arise by differentiation. Two cord blood banking options are available private and public. Currently, 134 private cord blood banks worldwide are known to store more than 7, 80,000 units[3]. During the last 15 years cord blood banking has become more accessible for families due to better public awareness and a greater potential to treat diseases, but now the vast majority of families, were not showing interest due to cost or other reasons. Public cord blood banking represents the only option to obtain suitable cord blood in case of any need. It is important to educate prospective parents on the pros and cons of private versus public cord blood banking before the third trimester of pregnancy[4].

PROCEDURE TO COLLECT THE CORD BLOOD

It takes minutes to collect and save the stem cells in cord blood. Once cord was clamped, it is wiped with antiseptic and a needle is inserted into the vein of the umbilical cord to withdraw a few ounces of blood. There are few methods of collection in common use. First is to hang a blood bag lower than the Mother and let gravity draw the blood down the tube into the bag. This method is used in most countries of the world. It has the fewest steps, and therefore the fewest opportunities for mistakes or contamination. Second method is to actively draw the blood out, just like when a person has a blood for medical tests. The collecting of blood can be done with a standard syringe or with a bulb in the tubing of the blood bag that creates suction. Studies have shown that the actively drawing of the blood will collect a larger volume faster. Third method was some banks collect blood “ex utero” which means “outside the uterus”. They wait until the placenta is delivered, and then a trained technician take sit into another room and puts it in a high shelf so that all of the blood in the umbilical cord and some from placenta can be drained[5].

STORAGE OPTIONS OF CORD BLOOD

There are three cord banking options are available; private (or family), and public. Approved public cord blood banks are available for all donors and receivers umbilical cord blood following informed parental consents. The cord blood units will then belong to the public bank for later use. The inventory is first registered and later searched by the public and healthcare providers to access information for transplantation sources. To inclusion in the registry, samples are screened based on volume, cell number and tissue types, health history and infectious disease status. Private cord blood banks obtain blood samples and store the cord blood individual use by families and become the property of the child under the guardianship of the parents. The samples are most costly to collect and maintain in private banks. Cord blood samples stored in private banks.

Cord blood samples stored in private banks for either auto logous or allergenic transplants for the infant donor or related family members are not searchable or available to the public.

ADVANTAGES AND DISADVANTAGES OF CORD BANKING

These cells are able to treat over 45 diseases. These include cancers, leukaemia, metabolic disorders and blood disorders[6]. Cord blood collection is effortless and free from risks. The national cord program staffs at the New York blood centre performs cord blood collection from expelled placenta. The process does not in any way; intervene with the care of either the newborn baby or the mother. Therefore, there is no health risk to both of them. It is ready to use as it is stored frozen after collecting and testing it. In case a match a found, the unit can be reserved at once. It doesn't need a perfect match. Cord blood can be transplanted even if there is only a partial match between donor and recipient. The recipient is at fewer risks of complications by cord blood transplant. The immune cells present in cord blood are less likely to attack the tissue of patient as compared to bone marrow transplant. Also, cord blood is less likely to spread certain viruses such as cytomegalovirus, which is a deadly infection that strikes transplant recipients. Nearly half of the adult population of America is the carries of cytomegalovirus in the form of virus. Besides less than 1% of babies are born with cytomegalovirus.

The volume of cord blood collection is relatively small. Hence, the quality of stem cells for transplantation is less than that in peripheral blood or bone marrow. This problem is greater for adults and adolescence, as they need comparatively more quantity of stem cells for transplant. Cord blood transplantation exposes the patient to one of the rare genetic disorders of the immune system or blood. This disorder is not detectable while testing the cord blood sample, as it remains invisible in the child for many years. However, the chance of getting this disorder is less than 1 in 10,000. The donor cord blood stem cells come from newborn baby that is unavailable for extra cord blood donation. Therefore, if the first cord blood unit fails, the second unit will have to be obtained from a different donor. Just as every coin has two sides, so does umbilical stem cell cord blood. But, it promises to provide the solution to many critical medical conditions. Cord blood banking is gaining prominence day by day[7]. However, before we consider cord blood collection and cord blood transplant, we should be aware of the benefits of this process for the recipient. However, it may take a decade or two before there is definite cure to deadly diseases. The researchers are busy researching on stem cells in the hope to make it a powerful medical tool in the coming years.

DISCUSSION

Allergenic cord blood transplantation is of more than 25,000 performed worldwide since the first cord blood transplantation in 1988. There are few banking options for storing umbilical cord blood. Cord blood stored in private banks are used for either auto logous or allergenic transplants for the infant donor or related family members but private cord blood banks are not searchable or available to the public. More Than 7,80,000 cord blood units are stored in over 130 private cord blood banks, worldwide, and over 4,00,000 units in more than 100 quality controlled public cord banks.

CONCLUSION

Umbilical cord banking is new way of curing the diseases, researchers continue to evaluate the usefulness of cord blood cells in treating human diseases or disorders for purpose other than hematological disorders including heart disease, strokes, brain or spinal cord injuries and cancer. The banks which developed in response to the potential for cord blood in treatment for pediatric and adult patients presenting with hematological disorders, immunological defects and specific genetic diseases. This review summarizes the status of potential use in the treatment of human disease.

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Cite This Article:

G.V.K.S.Abhinav et al., World Journal of Current, Med. and Pharm. Research., Vol-1, Iss-4,126-127.

ISSN: 2582-0222