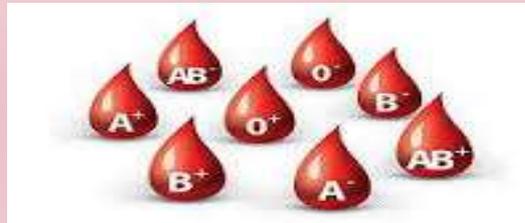


120 UNITS OF PLACENTAL UMBILICAL CORD BLOOD TRANSFUSIONS IN 77 PATIENTS WITH DIFFERENT CLINICAL CONDITIONS.

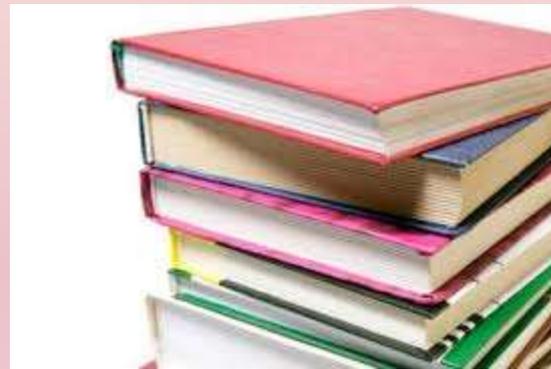
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**This is my thesis topic for M.S. Obst. & Gynae. G.R.
Medical college Gwalior, submitted at Madhya Pradesh
Medical Science University, Jabalpur 2016-17**



**It is my pleasure to present our institutional research
work in presence of eminent transfusion medicine
specialists from India and Abroad.**

What is cord blood ?

Cord blood is the blood remaining in umbilical cord and placenta after birth of baby.



What is Cord blood transfusion ?



Cord blood transfusion is the process by which cord blood is collected from the umbilical cord vein after Delivery and is administered intravenously for a therapeutic benefit after proper screening of the blood for transfusion transmitted diseases along with ABO, Rh group matching and with immuno-compatibility .

What is Essential ?



For Umbilical cord blood transfusion therapy, we adopted a standard practice i.e. donor and patient's informed consent. For this project we have also taken permission from the Institute's Ethical committee G.R Medical college, Gwalior and approval from appraisal committee, Govt. of Madhya Pradesh.

Introduction



- In the medical science the role of transfusion medicine and use of blood components as therapy is increasing day by day.
- Till date, there is no substitute of human blood. Even after all efforts for voluntary blood donation and blood component therapy, there is a substantial gap between demand and supply.
- So scientists are looking for an alternative source of human blood i.e. placental blood, which is a safe alternative to adult blood and can be easily obtained and utilized.

Introduction cont..

- **After birth, placenta is commonly discarded. It has 80 ml to 120 ml of precious whole human blood that can be saved, stored and used as a replacement of adult whole human blood.[1]**
- **As mother and fetus both have human blood; placenta also contains whole human blood as it connects mother and fetus. This study was conducted towards utilizing this natural human resource as a safe alternative to adult whole human blood and usefulness of its precious components in different clinical conditions.**

Introduction cont..



Placental cord blood has superiority over adult human blood as:

- It is a rich mixture of fetal and adult haemoglobin (Hb). HbF constitutes the major fraction (50-85%) and has a greater affinity to oxygen (O_2) than HbA. [2,3]
- It is pure i.e. free from bacteria and protozoal contamination; as the cord blood passes through the finest biological sieve – “the placenta”.
- The cord blood has a high concentration of cytokines and growth factors in its plasma, which eventually helps in gene switching mechanism.
- We & few authors used Cord blood as regenerative medicine
- Collection of umbilical cord blood is a painless procedure.

Introduction cont..

Superiority over whole blood

- Due to immature HLA status of umbilical cord stem cells, there is better tolerance for HLA mismatching in comparison with adult haematopoietic stem cells.[4] This unique feature of cord blood has low risk of Graft versus host disease (GvHD).
- Stem cells in placental blood are 0.01% of the total cellular content. Many laboratories collect it from umbilical cord whole blood for transplant and rest of the blood (99.9%) is discarded.
- These stem cells and Colony Forming Unit (CFU) are the building blocks of the blood. Stem cells in cord blood are immature and have not yet learned how to attack foreign substances and patients who receive these stem cells are less likely to reject the transfusion.

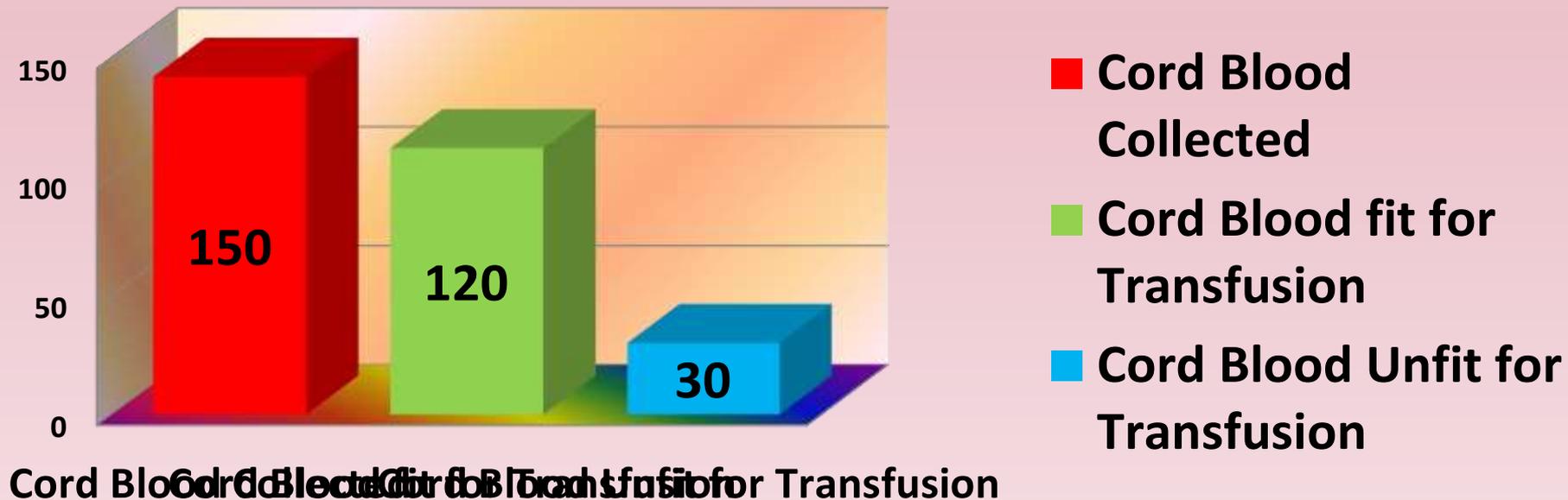
Material and Method

- **Umbilical cord whole blood was collected from healthy placenta after delivery in 100 ml of CPDA (Citrate Phosphate Dextrose Adenine Solution) bag.**
- **After collection, cord blood units were transferred to blood bank where it was tested for blood grouping, Rh typing, and irregular antibodies as well as screened for transfusion transmitted infections (TTIs).**
- **ABO and Rh compatible units after cross-matching were transfused to the pre-registered patients. The patients were subjected to follow up for up to 3 months after transfusion.**

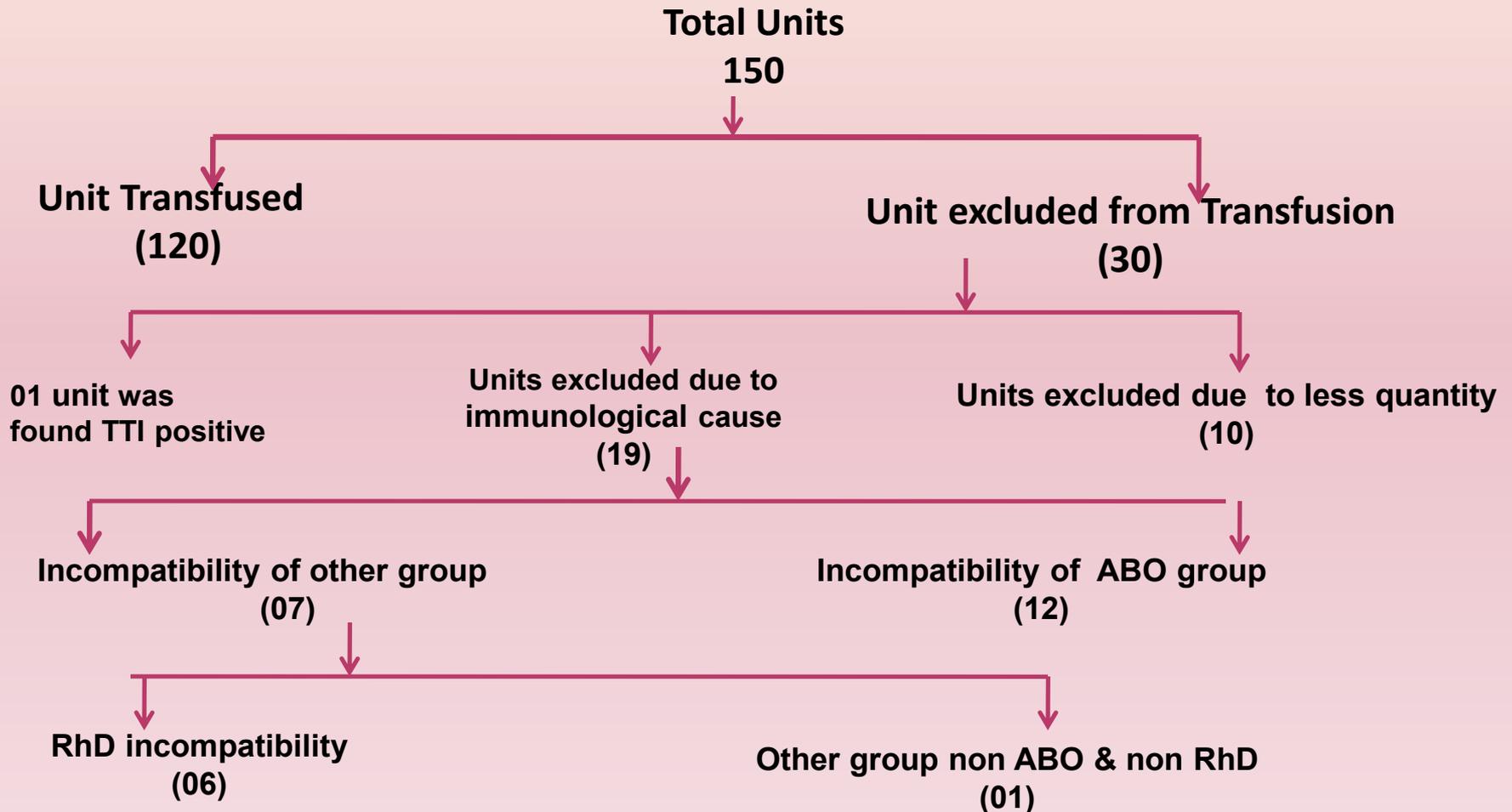
Results

A total number of 150 cord blood units were collected from the healthy placenta of normal deliveries. Out of 150 cord blood units, 120 cord blood units were found fit and 30 units were unfit for transfusion.

Cord Blood Collected Vs Fit/ Unfit



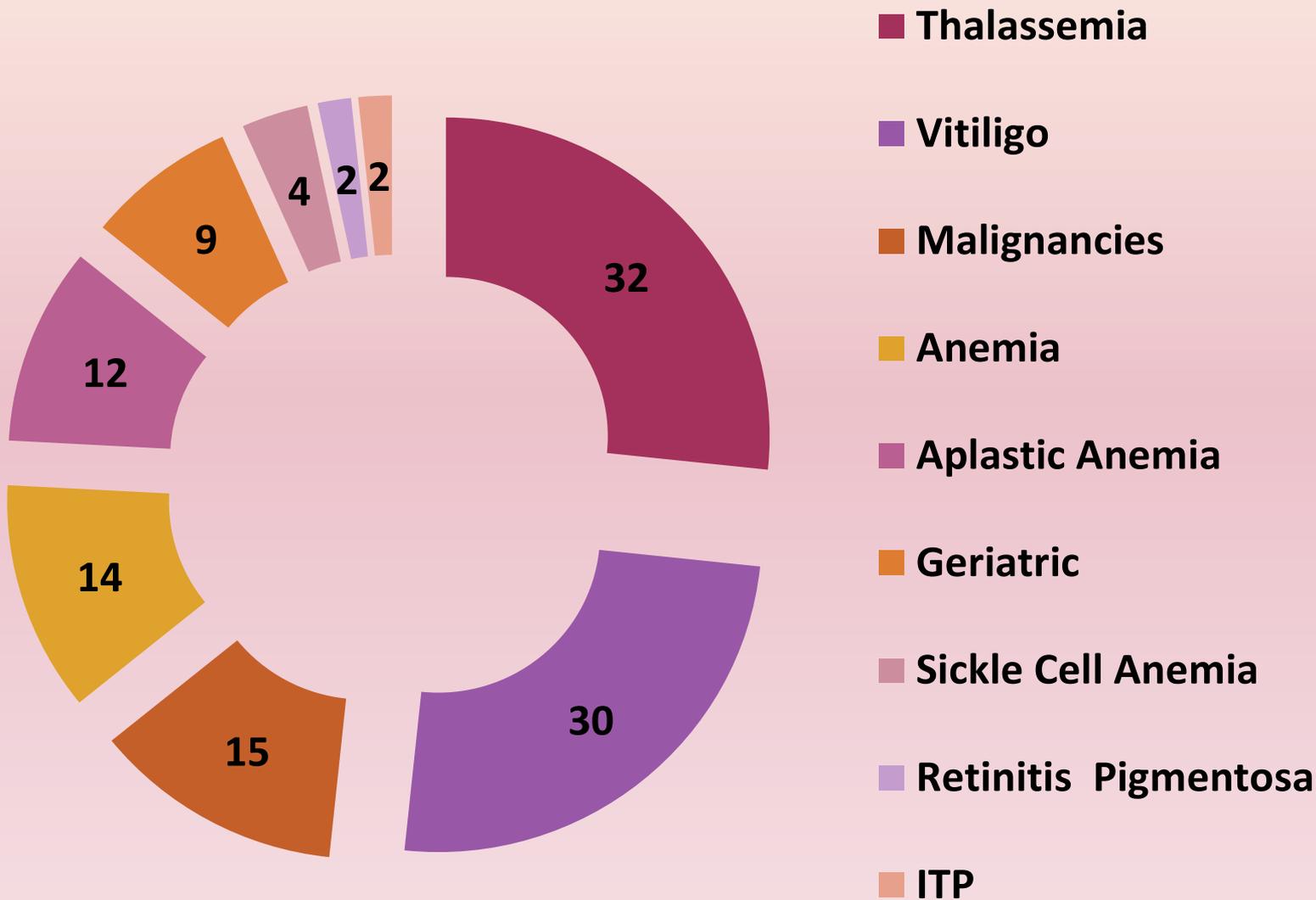
Out of 30, 10 units were discarded because of less quantity of blood collected (< 60 ml) and rest 19 units were discarded on immunological criteria and one unit is TTI positive



Results Cont..

- **Blood volume per unit varied from 60 to 120 ml with the mean of 80.75 ± 13.06 SD.**
- **Age of the patients was from <1 year to 75 year. The average age of the patient was 26.19 ± 20.5 SD.**
- **120 units of whole cord blood were transfused in 77 patients (average 1.5 unit/ Patient; minimum one and maximum 5 transfusions).**
- **Out of 77 Patients, Males were 46 (59%) and Females were 31 (41%).**
- **ABO group distribution of the patients was - A: 20, B: 34, O: 16 and AB: 7. Two Patients were Rh-D Negative and rest were Rh-D positive.**
- **Disease wise distribution of cord blood transfusion is summarized in figure below**

Cord Blood Transfusion in different clinical conditions

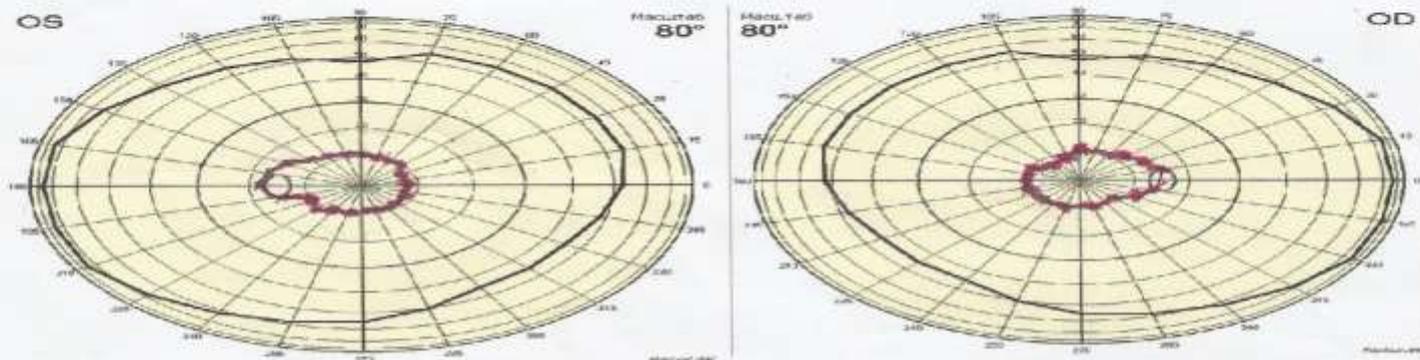


Results Cont..

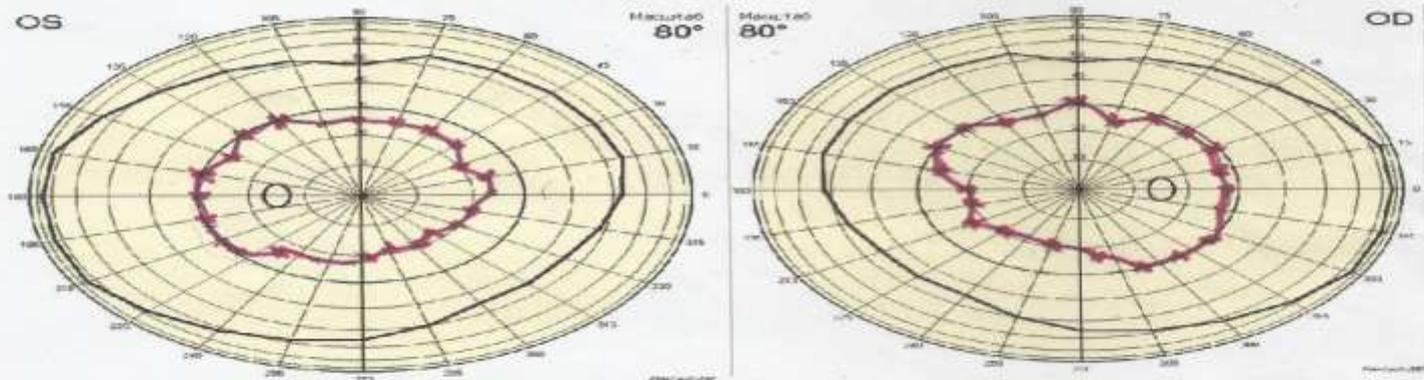
After transfusion of cord blood, follow up of the patient was done up to 3 months. During follow up following observations were drawn:

- In two cases after transfusions, adverse reactions were noted one was FNHTR and another one was allergic.
- Remarkable correction of anemia (0.5 to 1gm/dl) and prolongation of transfusion interval (7 ± 3 days) in transfusion dependent patients was observed.
- It also proved helpful in controlling diabetes, improvement in patients with Vitiligo, enhancement of vision field in retinitis Pigmentosa and general well being in geriatric patients.

Before Transfusion Field of vision



After Transfusion Field of vision



A 75 years old case of Retinitis pigmentosa: Vision field before and after cord blood transfusion.

A 24 year girl suffering from vitiligo over back of neck recovered after the treatment of cord blood transfusion and PRP treatment.



A 28 year old girl recovered from vitiligo after cord blood transfusion and PRP treatment (front of neck and chest)



Discussion

- In the present study we have given 120 cord blood transfusions in different clinical conditions.
- In thalassemia and sickle cell anemia, we have observed that due to higher O₂ carrying capacity of umbilical cord blood, less number of transfusions were needed in these patients. This might be helpful in reducing iron overload and preventing heart failure in these chronic transfusion dependent patients. Similar observations were noted by Bhattacharya N. et al [5].

Discussion Cont...

- In the study we have given 30 cord blood transfusions to vitiligo patients. Our patients were new patients with 6 months history to chronic patients with 12 years history of vitiligo. Our results were encouraging as shown in the previous figure in result .
- In our study, one case of retinitis pigmentosa to whom 2 cord blood transfusions were given, recovered his vision. He was visionless since last five years . It is not reported in previous study. More work in this field can be helpful to conclude any observation because in present study there was only one case.

Discussion Cont...

- In present study we have given 9 Transfusions in neonatal anemia. There may be therapeutic benefit of reducing transfusion transmitted infections and easy availability.
- In cases of malignancy no remarkable outcome was observed except general well being.
- In our study, 3 patients were having associated diabetes along with primary disease. In these cases after transfusion better control of blood sugar level was observed.
- Geriatric patients get improvement from their geriatric conditions.

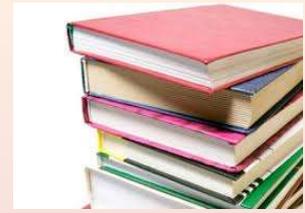
Discussion Cont...

- **Stem cells in cord blood are 0.01% of cellular population which is 10 times more than the adult blood (0.001%) while it was 0.1% in bone marrow. Stem cell therapy along with growth factors and cytokines can be provided to the patients simply by cord blood transfusion which is helpful in various clinical conditions. As mismatched stem cells are rejected immunologically by the host but cord blood stem cells which are hypo-immunogenic and immunologically innocent, can be accepted by natural matching.**
- **Here in the end we are not sure whatever we observed is due to stem cells/cytokines/Growth factors/combined effect of cord blood or may be due to some unknown factors. For this further studies are required.**

Conclusion

- From our observations we concluded that umbilical cord blood is a whole human blood (IP) and a genuine alternative of adult blood in routine and emergency transfusions.
- It is useful in neonates and helpful in correction of anemia in transfusion dependent patients.
- Apart from this it is a hope in the geriatric and degenerative diseases.
- we also have an opinion that for the sake of stem cells, other components of cord blood i.e. RBCs , cytokines , Growth factors hormones, unknown components should not be discarded and utilized.
- So with our study we concluded that this precious human resource can be preserved and utilized in the treatment of patients and more and extensive work is to be done to explore the possibility of future.

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THANK YOU