



EFFECT OF HEMATOCRIT AND STORAGE TIME OF RECONSTITUTED BLOOD ON SERUM BILIRUBIN, HEMOGLOBIN AND HEMATOCRIT OF NEONATES UNDERGOING EXCHANGE TRANSFUSION

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INTRODUCTION

Exchange transfusion is the use of whole blood or equivalent to replace the neonate's circulating blood and simultaneously removing bilirubin and maternal antibodies. It removes circulating bilirubin, antibodies in plasma and antibody-coated sensitized red blood cells (RBCs), replacing them with RBCs compatible with maternal serum or neonates' serum. Reconstituted blood for exchange is prepared by mixing RBCs (compatible with maternal serum or neonates' serum) and AB plasma.

AIMS & OBJECTIVES

1. To compare the difference in pre and post exchange transfusion levels of hemoglobin, hematocrit and total serum bilirubin of neonates undergoing exchange transfusion with reconstituted whole blood with the hematocrit of 45%-52% and 52.1%-60%.
2. To compare the difference in pre and post exchange transfusion levels of hemoglobin, hematocrit and total serum bilirubin of neonates undergoing exchange transfusion with reconstituted whole blood with the storage time of 1-5 days and 6-10 days.
3. To determine the complications due to exchange transfusion in neonates.

METHODOLOGY

On receiving the request for reconstituted whole blood for exchange transfusion, both mother's and baby's samples were tested and reconstituted blood was prepared by mixing O negative PRBC with AB plasma. Exchange transfusion was performed by "Manual push and pull technique". Volume of blood to exchange was calculated on the basis of the weight of the child. Double volume exchange transfusion was performed because it clears out 50% of bilirubin and 90% of neonatal red cells. Total no. of patients were divided into two groups on the basis of target hematocrit of reconstituted whole blood:-

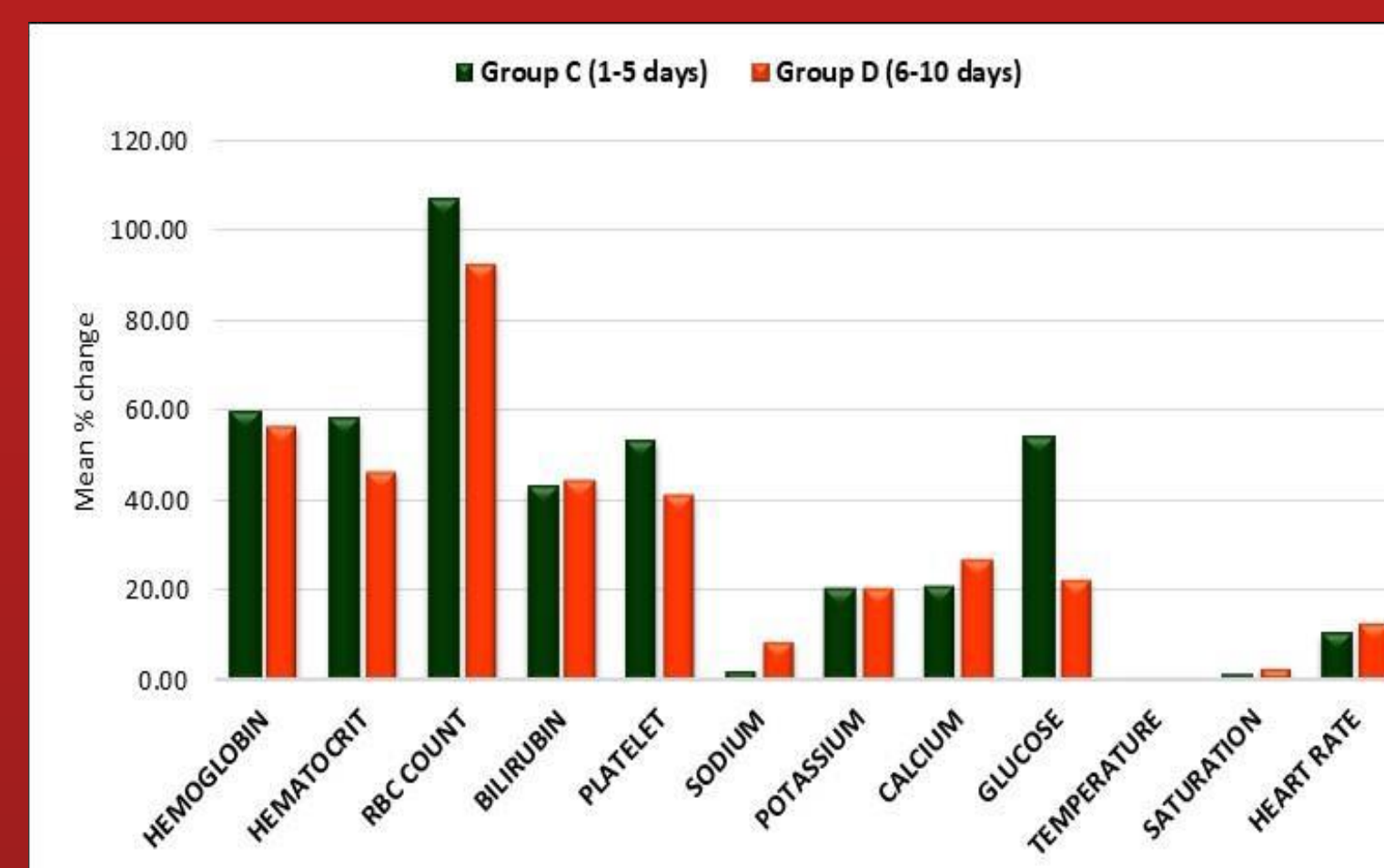
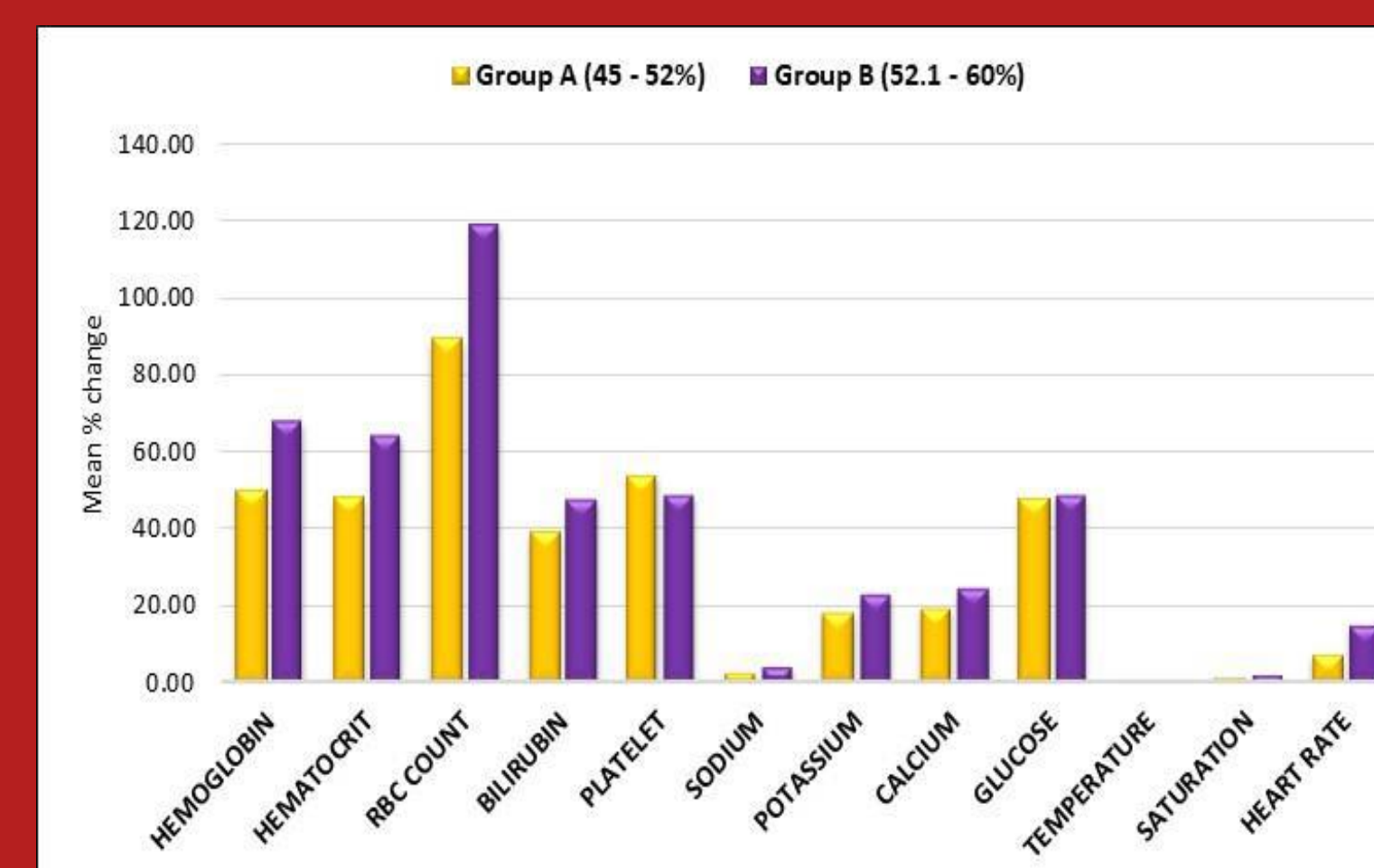
1. GROUP A (hematocrit 45%-52%)
2. GROUP B (hematocrit 52.1%-60%)

They were also divided into another two groups on the basis of storage time of RBCs.

1. GROUP C (PRBC 0-5 days old)
2. GROUP D (PRBC 6-10 days old)

Finally, both groups, Group A and Group B were compared based on the mean difference of the values of above parameters before and after the procedure. Thus, the results were evaluated and correlated with the respective hematocrit of the reconstituted whole blood. Similarly, both groups Group C and Group D were compared based on the mean difference of the values of above parameters before and after the procedure. Results were evaluated and correlated with the respective storage time of the reconstituted whole blood.

RESULTS



For bilirubin levels, a significant difference in mean percentage change was observed between Group A and Group B (t-value = -2.40, p = 0.027). For sodium levels, a significant difference in mean percentage change was observed between Group C and Group D (t-value = -4.83, p < 0.001). Additionally, for glucose levels, a significant difference in mean percentage change was observed between Group C and Group D (t-value = 3.11, p = 0.005).

CONCLUSION

These findings suggests that in case of hematocrit of the reconstituted whole blood units, higher hematocrit is better as it is associated with better reduction in serum bilirubin and better maintenance of oxygen saturation. In case of storage time of reconstituted whole blood units, O negative units less than 10 days old should be used, similar to the current standard practice. These findings also suggest that although exchange transfusion is a safe procedure yet it is associated with some complications like thrombocytopenia, hyperglycemia, hypocalcemia and hypokalemia. These complications are transient and should not discourage the use of exchange transfusion as a modality for correcting severe neonatal hyperbilirubinemia refractory to phototherapy and intravenous immunoglobulins, as the benefits outweigh the risks of exchange transfusion.

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