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Placental umbilical cord blood transfusion: A new method of treatment of patients with diabetes and microalbuminuria in the background of anemia

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iabetes mellitus is the commonest endocrine disease in all populations and all age groups. It is a syndrome of disturbed intermediary metabolism caused by inadequate insulin secretion or impaired insulin action, or both. Anemia is a common accompaniment of diabetes, particularly in those with albuminuria justifying tubulointerstitial injury or reduced renal function. There are other additional factors present in diabetes, which may contribute to the development of an increased risk of anemia. Cord blood, because of its rich mix of fetal and adult hemoglobin, high platelet and WBC counts, hypoantigenic nature, altered metabolic profile and high affinity for oxygen, may be an ideal choice for cases of diabetes with severe anemia necessitating blood transfusion. This article presents my team's experience with 78 units of placental umbilical cord whole blood (from 1 April 1999 to April 2005), collected after lower uterine cesarean section (LUCS) from consenting mothers (56 ml-138 ml mean 82ml+/-5.6ml SD, median 84ml, mean packed cell volume 49.7+/-4.2 SD, mean percent hemoglobin concentration 16.6g/dl+/-1.5g/dl SD) and transfused to diabetes patients with microalbuminuria and severe anemia necessitating transfusion. After collection, the blood was transfused, in most cases immediately after completion of the essential norms of transfusion. In rare cases, it was kept in the refrigerator and transfused within 72 hours of collection to a suitable recipient. For inclusion in this study, the patient's percent plasma hemoglobin had to be 8g/dl or less (the pretransfusion hemoglobin in this series varied from 5.2g/dl to 7.8g/dl) in the background of type two diabetes (fasting sugar 200mg or more), along with features of microalbuminuria (albumin excretion 30-299mg/g creatinine). This study included 39 informed consenting patients (22 males+17 females, aged 48-74 yrs, mean 59.6 yrs). The patients were randomized into two groups: Group A (control cases N=15, males=8 and females=7) and Group B (study group N=24, males=14 and females=10). In Group A the rise of hemoglobin (Hgb) after two units of adult blood transfusion was 1.5 to 1.8g/dl, as seen after a 72-hour blood sample assessment. The rise of Hgb as noted after 72 hours of two units of freshly collected cord blood transfusion was 0.6g/dl to 1.5g/dl. Each patient received two of four units of freshly collected cord blood transfusion (two units at a time), depending on availability and compatibility. Microalbuminuria was assessed in both groups after one month of treatment with transfusion and other identical support. The mean result was 152+/-18m SD of albumin per gram of creatinine excreted through 24-hour urine (pre-transfusion mean excretion was 189+/-16mg) in Group A and 103+/-16mg SD of albumin excretion per gram of creatinine in 24-hour excretion of urine in Group B (pretransfusion mean excretion was 193+/-21mg). Univariate analysis using Fisher's exact test was performed for the results of Groups A and B. The difference between Group A and B values and its comparison with the pre-transfusion microalbuminuria appeared to be statistically significant (p< less than .003). We have not encountered any clinical, immunological or non-immunological reaction so far in either group. Fetomaternal cell traffic has been implicated as the cause of scleroderma in mothers delivering male babies. In the present series, we did not see any such rare and unusual complication due to neonatal blood transfusion in the adult system in Group B patients in the six years from the initiation of the study.

Biography

Niranjan Bhattacharya, Head of the Department, Regenerative Medicine and Translational Science, Calcutta School of Tropical Medicine, Kolkata, India. He is credited as the first person to conduct more than 1,200 cord blood transfusions in patients with severe anemia (less than 8gm/100ml) without the report of single adverse event. Long-term follow-up studies confirm that nearly all patients achieved a sustainable rise in hemoglobin levels, imparting a positive impact on background conditions. The following method of cord blood transfusion under the titles "A study on Human Umbilical Cord Blood Transfusion in Case of Bone marrow suppression" and "Placental Umbilical Cord Whole Blood Transfusion" is also globally patented by the Department of Science and Technology, India. He is credited with setting up India's first public cord blood bank and is the one of the few clinical researchers in India to get a Doctor of Science Award in Obstetrics and Gynaecology for his award-winning work on "Intra-amniotic antigenic disruption of human fetal growth: search for a new safe and cheaper method of abortion in third world countries.

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