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ANTIBODY SCREEN AND IDENTIFICATION IN THALASSEMIA PATIENTS: THE WAY FOR EFFECTIVE MANAGEMENT!!

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KEYWORDS :

INTRODUCTION:

Thalassemia is an autosomal recessive hemoglobinopathy which is characterized by impaired hemoglobin (Hb) synthesis. Thalassemia major is usually suspected in a younger age with severe microcytic anemia, mild jaundice and hepatosplenomegaly.[1] Thalassemia intermedia presents at a later age with similar but milder clinical findings. Red blood cell (RBC) transfusions are a crucial healthcare practice such as in patients of thalassemia, myeloproliferative disorders and end-stage renal failure. Life-long red blood transfusion remains the main treatment modality for beta-thalassemia major patients. Such long-term blood transfusions can cause unwanted complications to the patient called transfusion reactions.[2] Alloantibodies development in response to RBC antigens is an important immune-mediated delayed hemolytic transfusion reaction which is a matter of great concern.[3]

CASE REPORT:

This report focuses on a case of major beta-thalassemia in a child, who was undergoing regular blood transfusions at multiple hospitals. The child was a clinically well-established case of beta-thalassemia outside after all proper investigations which included pedigree identification, High Performance Liquid Chromatography (HPLC) testing, complete blood count test, blood smear and parent HPLC typing. He was admitted in the emergency ward of our hospital when he presented with fatigue, weakness, shortness of breath and pale skin appearance. When laboratory investigations were done, he was suspected with ongoing hemolysis. Blood requisition form for two blood units was received at blood centre for cross-matching in view of low hemoglobin which mentioned hemoglobin as 3gm/dl. Blood sample for blood grouping and direct agglutination test (DAT) were also received at the blood centre. Testing was done using automation technique using gel cards. On blood grouping on gel card, blood group of the patient was identified as A Rh D Positive. On gel card, DAT was found positive (grade II) indicating hemolysis. For further testing, auto-control was performed, which turned out positive (grade II). Consecutively, cross-matching was performed. Two leuco-filtered blood (LFB) bags of group A Rh D Positive were cross-matched as per the request from the clinician. Here, leuco-filtered blood bags were cross-matched instead of packed red blood cells (PRBC) as per the departmental protocol set for blood transfusion in case of thalassemic patients. Both the LFB bags came out incompatible indicating some immunological modification in the child. Patient attendants were asked to visit the blood centre with documents of the patient to obtain complete history of the patient including blood transfusions if received any. It was found that the patient received multiple transfusions and that too at various government and private hospitals nearby with no documentation of type of blood component transfused i.e. PRBC or LFB. Since, thalassemic patients are more prone to multiple transfusions, the practice is to use LFB bags/washed PRBCs/bed-side blood filters whichever is available. Since, there is lack of knowledge on the blood transfusion practices in various institutes due to lack of trained staff and well-qualified transfusion specialists, unsatisfactory transfusion practices are prevalent. Indirect coombs test (ICT) came out positive (grade III). Antibody screen was put which was positive. Hence, antibody detection panel was done which indicated prevalence of anti-E antibody. Patient couldn't be phenotyped as gave the history of recent transfusion which was 3 weeks back. Two E antigen negative LFB units of blood group A Rh D Positive units were identified out of 10 A Rh D Positive LFB units on fully automated machine IMMUCOR. These two were cross-matched with patient's sample and found compatible and therefore, issued to the patient. The blood transfusion with both bags was uneventful. Progress was noted in the state of the patient and hemoglobin improved to 6 gm/dl. Subsequently, 10 more A Rh D Positive LFBs were phenotyped and 2 came out as E antigen negative. These were kept as reserve for this patient in case need arises. A day later, demand for one more LFB was raised. These both units were cross-matched with the new sample received and were compatible and ready to issue. This case highlights the need to incorporate the practice of using antibody screen and identification in routine whenever demand for blood is raised in case of multi-transfused patients. Early phenotyping of thalassemic patients before the start of blood transfusion also aids to prevent formation of allo-antibodies and decreases the chances of transfusion reactions. Also, the practice of using leucofiltered blood units in case of multi-transfused patients lessens the chances of human leukocyte antigen allo-immunization, febrile non-hemolytic transfusion reactions, transfusion related acute lung injury, transfusion related immune suppression etc.

DISCUSSION AND CONCLUSION:

The paper reports a case of major beta-thalassemia in a child, who was undergoing regular blood transfusions at multiple hospitals. The case leads the way for effective management. This case highlights the need to incorporate the practice of using antibody screen and identification in routine whenever demand for blood is raised in case of multi-transfused patients such as thalassemia, oncology patients. Early phenotype detection of thalassemic patient before the start of blood transfusion aids to prevent formation of allo-antibodies and decreases the chances of transfusion reactions. Also, the practice of using leucofiltered blood units in case of multi-transfused patients lessens the chances of human leukocyte antigen allo-immunization, febrile non-hemolytic transfusion reactions, transfusion related acute lung injury, transfusion related immune suppression etc. Antibody screening and identification in multi-transfused patients such as in thalassemia, cancer patients is very important.[4] Red blood cell allo-antibody detection on regular intervals along with corresponding antigen negative blood transfusion is strictly recommended in transfusion dependent thalassemia patients.[5] Rh and Kell blood group system antibodies account maximum of allo-anitibodies present.[6] A study also reported that Rh and Kell matching greatly reduce the formation of more new allo-antibodies and auto-antibodies.[7]

REFERENCES

1. Liu X, Jiang H, Ren L, Cao L. Post-transfusion severe headache in a patient with

thalassemia with superficial siderosis of the central nervous system: a case report and literature review. BMC Neurol. 2024 Jan 6;24(1):21.
2. Makroo RN. Blood transfusion reactions. In: editor, Norfolk D. Compendium of transfusion medicine. United Kingdom: Career Publications, 2009. p. 2–337.
3. Elshimy AM, Fouad TA, Hasan A. Screening and identification of red blood cell alloantibodies among hemodialysis patients in National Institute of Urology and Nephrology. J Med Sci Res. 2018; 1:261-5
4. Jain R, Choudhury N, Chudgar U, Harimoorthy V, Desai P, Perkins J, Johnson ST. Detection and identification of red cell alloantibodies multiply transfused thalassemia major patients: a prospective study. Indian J Hematol Blood Transfus 2014; 30:291–296.
5. Yadav BK, Chaudhary RK, Elhence P, Phadke SR, Mandal K, Saxena D, Moirangthem A. Red cell alloimmunization and associated risk factors in multiply transfused thalassemia patients: A prospective cohort study conducted at a tertiary care center in Northern India. Asian J Transfus Sci. 2023 Jul-Dec;17(2):145-150.
6. Dhawan HK, Kumawat V, Marwaha N, Sharma RR, Sachdev S, Bansal D, Marwaha RK, Arora S. Alloimmunization and autoimmunization in transfusion dependent thalassemia major patients: Study on 319 patients. Asian J Transfus Sci. 2014 Jul;8(2):84-8.
7. Seferi I, Xhetani M, Face M, Burazeri G, Nastas E, Vyshka G. Frequency and specificity of red cell antibodies in thalassemia patients in Albania. Int J Lab Hematol. 2015 Aug;37(4):569-74.