

Original Research Article

Overview of Blood Transfusion in a Paediatric Medical Setting of a Tertiary Hospital in South-South Nigeria

Mabel Benson Ino-Ekanem¹, Eno-Obong Udomobong Bassey²

¹Department of Haematology, ²Department of Paediatrics,
University of Uyo Teaching Hospital, Uyo, Akwa Ibom State

Corresponding Author: Eno-Obong Udomobong Bassey

Received: 19/05/2016

Revised: 15/06/2016

Accepted: 29/06/2016

ABSTRACT

Background: Blood transfusion remains a critical component of care in the treatment of children with haematologic disorders, irrespective of the cause. It is a life saving intervention, but also recognized as a therapy that involves risks. Every healthcare institution should monitor the use of blood and blood products and also, sustain programmes or protocols to promote its rational use. There is a need for regular audits and research to evaluate the indications for transfusions, and blood transfusion practices of various centres. This helps to assess the safety of the transfusion process and practices, with the aim of reducing risks of transfusion-transmitted diseases, as well as adverse reactions.

Methods: A two year retrospective study of children admitted and transfused in the post neonatal wards of the Paediatric unit of the University of Uyo Teaching Hospital, Uyo, Akwa Ibom State. Data obtained were, age, gender, diagnosis made, packed cell volume before transfusion and blood product transfused.

Results: A total of one hundred and fifteen (115) children of the two thousand six hundred and eighty six children (2,686) admitted, were transfused with varied blood products. This constituted 4.3% of total admissions. The most frequently transfused blood products were the packed red cells, and the commonest indication for transfusion was severe malarial anaemia. The age groups with the most frequent need for transfusion were the children under five years.

Conclusion: The commonest indication for blood transfusion in the children in this study centre was severe malarial anaemia, and the age groups with the most transfusion were children under five years of age. This reaffirms the need for sustained efforts against malaria in children especially with the use of preventive malarial strategies in this endemic region.

Key words: Children, Blood, Transfusion, Outcome, Uyo, Nigeria.

INTRODUCTION

Blood is a living tissue and blood transfusion is a critical component of child emergency treatments in many health care facilities. It can be life saving if used appropriately and is the most donated tissue in medical practice.^[1,2] However, like all treatments, it may result in acute or delayed complications, cause serious illness or even death to the recipient if inappropriately used. Certain principles therefore, have to

be observed in order to ensure safe blood supply and administration.

Haematologic disorders especially severe anaemia is a common life-threatening condition of children, especially in the tropics. It is caused by various childhood illnesses, particularly malaria.^[3-5] Childhood anaemia is a significant contributor to child death and morbidity, and effective treatment of anaemia is imperative for child survival.

Blood therapy is a life-saving component of modern health care worldwide. Donated blood being a scarce national resource, must be used in the most effective and efficient manner. [5-7] A patient's haemoglobin level shouldn't always be the sole basis for starting a transfusion. The decision must be supported by the need to relieve clinical signs and symptoms and prevention of significant morbidity and mortality. [5-7] A delay in accurate intervention in terms of blood replacement may lead to an unfavourable outcome.

It is important to improve the quality and safety of hospital transfusion practices. This reduces the transfusion associated morbidity and mortality that can occur within the hospital transfusion processes. There is no research on the use of blood products in our local paediatric population. This study was conducted with the aim of determining the most common indication for blood transfusion and the most used blood product, in the paediatric unit of this tertiary hospital in southern Nigeria. This would enable evaluation of our transfusion practices, and help in necessary amendments of transfusion guidelines to ensure more appropriate and safe blood transfusion administration.

MATERIALS AND METHODS

The study was carried out in the Children Emergency Unit (CHEU) and Paediatric ward of the University of Uyo Teaching Hospital (UUTH) Uyo, in Akwa-Ibom State. A retrospective review of the hospital records of all paediatric in-patients who had received a blood transfusion during a two year period, from November 2012 to October 2014 was carried out.

A pro forma was used to extract information from the patient's records for age, gender, type and amount of blood product, reasons or stated indication for the transfusion of a blood product. When the reasons for the transfusion were not clear or there was no justification written for the transfusion, it was considered inappropriate.

The Teaching Hospital is one of the Tertiary Health Institutions in the state, and is located on the outskirts of Uyo, six kilometres from the centre of the city. It also serves as a referral hospital for children all over the state and its entire environs.

Laboratory and Diagnosis

A side-room laboratory is attached to the Children Emergency unit where preliminary emergency investigations, such as the haematocrit are conducted, while routine and specialized tests are carried out in the main Haematology Laboratory, including the Transfusion Medicine Laboratory and Microbiology laboratory. One unit of blood product was considered as one transfusion.

Malaria was diagnosed based on the presence of asexual form of plasmodium in the thin blood films stained with Giemsa stain. Parasite counts were not done. Haemoglobin electrophoresis was used to confirm sickle cell anaemia; G-6-P-D deficiency was clinically suspected, and confirmed by the G-6-P-D assay. Blood cultures were done for all patients with probable septicaemia.

Blood and Transfusion Logistics

Soon after diagnoses were made, blood samples were sent to the laboratory for grouping and cross matching. Parents/caregivers were required to pay for blood bags and screening was done for infections such as HIV, syphilis, Hepatitis B and C Virus.

Data analysis

Data generated were entered into the computer, and analysis carried out with the Microsoft excel. Descriptive statistics was used to present the data. Frequency tables and percentages were also used to present the results.

RESULTS

There were 2686 children admitted over the two year study period, and of these, 115 children received a blood transfusion, which represented 4.28% of the study population. Of the children transfused, 98 were male and 35 female, giving a ratio of

3:1. The various indications for transfusions were as listed in table 1 in order of decreasing frequency. Severe malarial anaemia was the most common indication, in 65.2% of patients and the age groups needing the most frequent transfusion were children below five years as outlined on table 2.

Table 3 shows the blood products used in the following frequency; Packed cells in 110 (95.6%) of patients, whole

blood in 4 (3.5%) and platelet transfusion in 1 child (0.9%). Fresh frozen plasma, clotting factor concentrates, cryoprecipitate was not used in any patient within the study period. Table 4 indicates the level of patients' packed cell volume before transfusion was initiated. Severe anaemia (Packed cell volume less than 15%) being the most frequent reason in 82.6% of patients.

Table 1: Various diagnoses made in children receiving transfusion of blood and blood products

Diagnosis	Frequency	Percentage (%)
Severe malarial anaemia	75	65.2
Sickle cell anaemia	12	10.0
Septicaemia	10	8.7
Acute blood loss due to trauma	7	6.1
Paediatric HIV/AIDS	5	4.3
Malignancies	3	2.6
Von Willebrand disease	1	0.9
Idiopathic thrombocytopenic purpura	1	0.9
Glucose-6-phosphate dehydrogenase deficiency	1	0.9
Total	115	100.0

Table 2: Age group of patients requiring transfusion

Age	Frequency	Percentage (%)
< 5years	98	85.2
5– 10 years	10	8.7
>10 years	7	6.1
Total	115	100.0

Table 3: Type of blood product transfused

Blood product	Frequency	Percentage (%)
Whole blood	4	3.5
Platelet concentrate	1	0.9
Packed cells	110	95.6
Total	115	100.0

Table 4: Packed cell volumes of patients before transfusion

Packed cell volume	Frequency	Percentage (%)
<15%	95	82.6
16- 20%	15	13.0
>20%	5	4.4
Total	115	100.0

DISCUSSION

Severe malarial anaemia ranked as the highest indication for transfusion in children in this study with a frequency of 65.2% of all transfusions. This relates with findings from Imo state, south-eastern Nigeria [8] and Ilorin, in western Nigeria, [9] where malaria also played a leading role in the causation of anaemia in an average of 86.2% and 80% of the studied children respectively. This finding however contradicts the reports from Enugu, south-eastern Nigeria, where malarial transfusions were as low as 10% of all transfusions.

[6] These localities in Nigeria share similar malaria transmission rates.

The reason for the observed differences from the studies may be because the report from Enugu [6] was represented from the paediatric wards only, whereas this study, and reports from Owerri, [8] included children nursed in the emergency room as well. Most transfusions in children with severe malarial anaemia are urgent and take place in the emergency room, for stabilization, and thereafter most children are transferred to the wards for convalescence. This may have accounted for the low transfusion rates recorded for malarial illness in Enugu.

The pathogenesis of anaemia in malaria is multifactorial. It results from a combination of hemolysis of parasitized red blood cells, accelerated removal of both parasitized and unparasitized red blood cells. There is depressed as well as ineffective erythropoiesis with dyserythropoietic changes. [10-12] Other factors include decreased red blood cell deformability, splenic phagocytosis and/or pooling, with an increased rate of clearance of the red cells from the circulation. With these haematological alterations, expectedly

anaemia occurs, as well as thrombocytopenia and splenomegaly, especially in children. [10-12]

The appropriate use of blood and blood products means the transfusion of safe blood products to treat a condition that causes significant morbidity and mortality, which cannot be prevented or managed effectively by other means. [1-3,7] These groups of children constituted the most transfused, with the packed cell product. This indicates that malaria is still an ongoing public health problem in endemic regions, therefore targeted measures towards primary prevention of malarial illnesses such as proper education, utilization of interventions such as insecticide treated nets, prompt administration of antimalarial drug regimen, will reduce the economic burden of the disease in resource-poor settings, as blood is a scarce national resource. [5-7]

Children with sickle cell anaemia also had a high transfusion frequency in this study. They were the second most frequent group requiring 10% of all blood transfusions. This was a similar observation in Enugu, [6] where it ranked as the third commonest indication with 12% of cases, but lower than the 25% reported from Ilorin. [9] Sickle cell anaemia (SCA), an inherited genetic condition of red cells results in chronic haemolysis and chronic anaemia. [13,14] It affects practically every system in the body and may sometimes present as crisis situations. They often need frequent transfusions due to recurrent crisis, therefore safe and appropriate blood is imperative for standard management. Paediatric HIV/AIDS and septicaemia had a low frequency of transfusion use in this study population.

Age groups needing the most frequent transfusion were the children below the age of five years. This is closely linked to their vulnerability to severe forms of malaria and other illnesses. Paediatric blood transfusions have a significant greater incidence of adverse outcomes in comparison with adults, so there must be adherence to safe transfusion practices to

avoid the risk of adverse reactions and transfusion transmissible infections (TTIs). [4,15]

Severe anaemia was the greatest indication for transfusion of blood; however some children with moderate anaemia were also transfused depending on the clinical state following proper assessment. Overall, most blood transfusions needed for children in this study was for the treatment of complications following malarial illnesses.

CONCLUSION

Blood replacement remains a crucial component of treatment of anaemia, irrespective of its cause. The transfusion of an appropriate blood component in adequate amounts is important for good management of many clinical conditions.

Red cell transfusion (packed cells) was the most frequently used blood product, and severe malarial anaemia, was the commonest indication for transfusion. Limitations identified in this study included loss of complete records of some children nursed in the institution, and as such were excluded from the study.

Recommendations include sustaining a standard hospital transfusion guideline, and the training of all staff, including ancillary staff involved in the transfusion process.

REFERENCES

1. Marti-Carjaval AJ, Munoz-Navarro SR, Mati-Pena AJ, Mattheus-Fernandez EC, Medina-Laurentin MC. Appropriate use of blood products in a Venezuelan University General Hospital: a cross-sectional study. *Salus online* 2005; 9(1): 20-30.
2. Cable R, Carlson B, Chambers L, Kollins J, Murphy S et al. 2002. Practice guidelines for blood transfusion. American Red Cross. 2nd edition. A compilation from recent peer-reviewed literature. Pp 3-56.
3. Comparative audit of blood transfusion policy 2011. Victoria, Tasmania, Northern Territory and the Canberra Hospital. Australian Red Cross Service. Pp 3-38.

4. Hughes AMJ, Jayatunge R. A re-audit of Paediatric blood transfusion within a secondary care trust. *Arch Dis Child*, 2012; 97: A84-A85.
5. Adedoyin OT, Afolabi JK, Oyeyemi B. Proposed formulae for determining blood transfusion requirements in children with severe anaemia. *Nig Jour Paed* 2004; 31(1):25-28.
6. Ughasoro MD, Ikefuna AN, Emodi IJ, Ibeziako SN, Nwose SO. Audit of blood transfusion practices in Paediatric Medical Ward of a Tertiary Hospital in south-east Nigeria. *East Afr Med J* 2013;90(1):
7. Foreword by Eyitayo Lambo. *The Nigerian National Blood Policy. National Blood Transfusion Service. Federal Ministry of Health, Abuja.* 2006; 1-14.
8. Austin N, Adikaibe E, Ethelbert OO, Chioma UE, Ekene NU. Prevalence and severity of malaria parasitaemia in children requiring emergency blood transfusion in a tertiary hospital in Imo state, Nigeria. *Ann Med Health Sci Res.* 2014; 4:619-23.
9. Ernest SK. Children requiring blood transfusion in a tertiary health centre. *Nig Jour paed* 2005; 32:00.
10. Layla AMB, Ahmed AB. Malaria; Haematological Aspects. *Annals of Saudi Medicine* 2002; 22(5-6): 372-77.
11. Facer CA. Haematological aspects of malaria in man. In; *Infection and Hematology.* Oxford; Butterworth Heinmann Ltd. 1994. 259-94.
12. Jandl JH. Hemolytic anaemias caused by infection of red cells. In *Blood.* 2nd edition. New York: Little Brown and Company; 1994: 473-501.
13. Animasahun BA, Bode-Thomas F, Temiye EO, Njokanma OF. Clinical profile of Nigerian children with sickle cell anaemia. *Curr Pediatr Res* 2013; 17(2): 95-99.
14. Utuk, EE, Akpan MU. The Pattern of morbidity in children with sickle-cell at the University of Uyo Teaching Hospital, Uyo. Akwa Ibom State, Nigeria. *Int J Health Sci Res.* 2015; 5 (5):91-97.
15. Muktar-yola M, Kuliya Gwarzo A. Pattern of blood transfusions in newborns at Aminu Kano Teaching Hospital, Kano, Northern Nigeria. *Africa Sanguine* 2007; 10 (1): 11-15.

How to cite this article: Ino-Ekanem MB, Bassey Eno-Obong U. Overview of blood transfusion in a paediatric medical setting of a tertiary hospital in south-South Nigeria. *Int J Health Sci Res.* 2016; 6(7):47-51.
