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AUDIT OF THE RED CELL UNITS SUPPLY OF A BUSY HOSPITAL BLOOD BANK IN NIGERIA

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ABSTRACT

Background/Objective: Blood bank audit embraces all procedures from blood procurement to the long -term consequences of transfusion which helps to identify opportunities for improvement .We have therefore looked at red cell transfusion in our hospital to identify areas that will require improvement.

Method: Data was collected retrospectively from the hard copy record of the blood bank for a period of one month.

Results: Request was made for 1210 red cell units; crossmatch was made for 64% of the request. All units crossmatched were issued, of these 4.15% were returned unutilized. 5.1% were issued as uncrossmatched. The obstetrics/Gynaecology unit recorded the highest blood usage and the medical unit the least. The use of blood by the emergency and paediatric were the same. The crossmatch:transfusion ratio for the hospital was 0.9: 1. This study has shown that the crossmatch and transfusion rates are almost equal and only a small percentage was returned unused.

Conclusion: This showed that there is inadequate supply of blood. There is a need to assess the reason for transfusion and establishing a blood transfusion advisory committee by the hospital. This will ensure interaction and collaboration between blood suppliers and users to improve the quality of transfusion practice. The new policy establishing a national transfusion service will also improve the transfusion service but emphasis has to be put on donor recruitment and donor care.

Key Words: Red cell transfusion, crossmatch:transfusion ratio, blood wastage. *(Accepted 13 March 2008)*

INTRODUCTION

Red cell transfusion is an important aspect of the management of patients in whom oxygen supply to tissue will be improved by a rapid increase in red cell mass. The process of provision of blood to patients involves blood ordering and crossmatch before eventual release of blood to patients for transfusion. Cross matching is employed to ensure compatibility between patient's serum and donor's red cells. A wide variety of techniques are used for crossmatching. It ranges from indirect antiglobulin test (IAT) to immediate spin test and recently computer crossmatch .The computer crossmatch is well known to reduce crossmatch:transfusion ratio and blood wastage[1].The computer crossmatch is used in most developed countries. These countries have equally reported decrease in workload and cost implications of crossmatching specimen.[2] . These benefits are not available with manual serological crossmatch (indirect antiglobulin test). Serological cross match is performed for all patients' sample in many developing countries. Therefore, in situation where excess crossmatch: transfusion ratio occurs as reported in some developed countries[3,] the impact will not only be on cost of reagents but also staff workload .It will also affect blood availability to patients thereby reducing the effectiveness of the blood bank. In most developing countries, there is perennial shortage of blood[4,5]. Knowledge of the degree of shortage is therefore important in forward planning of the nation's blood supply. The demand for blood placed on transfusion services may not always reflect the true need of patients. When blood crossmatched for a patient is not transfused to same patient, it could be attributed to inappropriate request for blood. The blood unit is therefore tied to a patient who is not likely to need it while provision of such unit of blood to another patient is likely to save life.

One of the basic ways of improving transfusion services is to demonstrate that blood stock is managed optimally without unnecessary wastage. This study was therefore carried out to assess the red cell unit supply and demand of the hospital blood bank of the University College Hospital, Ibadan and to determine how effectively the crossmatched units of blood were transfused as well as to identify areas needing improvement of the transfusion services.

MATERIALS AND METHOD

Data was collected retrospectively from the blood

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bank of an Eight hundred bedded tertiary hospital. All clinical specialties were represented in the hospital. The hospital blood bank recruits blood donors, collects and process the blood. The blood is fractionated into red cell concentrates, fresh frozen plasma, cryoprecipitate and platelet concentrates according to the need of the hospital and is issued out on request. Information was obtained from the hard copy record of the blood bank for a period of one month. The Blood bank record was reviewed to establish the total number of blood units that was requested for, the number of unit crossmatched and the number issued out that month. The number of blood units that were issued out as uncrossmatched blood was also noted. Those that were issued out and were not transfused were identified as returned units.

RESULT

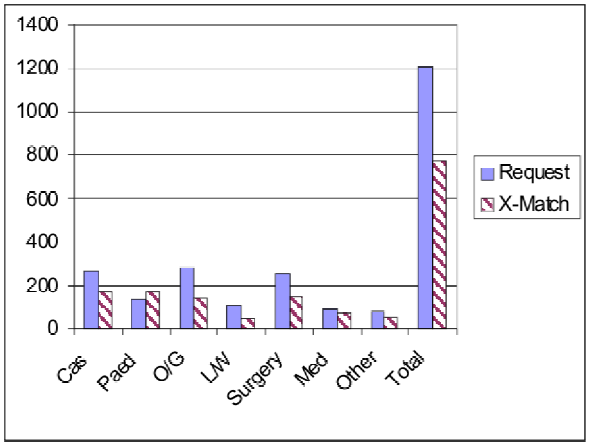
A total of 1210 units of red cells were requested for, of which 711 (64%) were crossmatched for patients. All the units of red blood cells crossmatched were issued out but 32 units (4.15%) were returned back to the blood bank as untransfused to be the crossmatched for other patients. Therefore, 739(95.8%) of the crossmatched unit were transfused to patients. In addition to the crossmatched unit of blood, 40 units (5.1%) were issued out as uncrossmatched blood. This sums up the number of transfused units to 779 units. Figure Bar chart shows (proportion of crossmatched blood to number of requests) that the number of request outstrips the number of blood units available for crossmatch. Table shows the crossmatch: transfusion ratio and blood supply pattern for various wards. The total crossmatch: transfusion ratio for the hospital is 0.99. Even though Obstetrics and Gynaecology (O/G) ordered for the highest number of blood units with consequent highest number of crossmatched units followed by casualty and surgery but the highest transfusion took placed in Paediatrics and Accident and Emergency(A/E).On the O/G ward ,patients in labour ward were transfused with more blood units than was crossmatched. No blood was returned to the blood bank as unused from the labour ward. The category, "Other wards" are radiotherapy ward, staff clinic, Dental clinic and burn unit. Paediatrics and Accident and Emergency (A/E) had the highest blood units that are uncrossmatched while Medical wards have one of the lowest number of crossmatched and transfused unit of blood but have the highest percentages of returned unit of blood. "Other wards" which include: burn unit, dental clinic, radiotherapy ward and staff clinic, though having few crossmatched and transfused unit of blood, they have comparable number of unit of blood returned to the blood bank with surgery and O/G.

Table1: **Crossmatch: Transfusion Ratio and Blood Supply Pattern for Various Wards.**

WARD	CROSSMATCHED N=771	UNCROSSMATCHED N=40	RETURNED N=32	TRANSFUSED UNITSN=779	CTR
Casulty	165(21.4%)	19(47.5%)	4(12.5%)	180(23.1%)	0.92:1
Paediatrics	166(21.5)	14(35%)	4(12.5%)	176(22.6%)	0.94:1
OG	178(23.1%)	2(5%)	5(15.6%)	175(22.5%)	1.02:1
Surgery	142(18.5%)	1(2.5%)	5(15.6%)	138(17.7%)	1.03:1
Medicine	71(9.2%)	2(5%)	9(28.1%)	64(8.2%)	1.12:1
Others	49(6.4%)	2(5%)	5(15.6%)	46(5.9%)	1.07:1

O/G=obstetrics angyneacology; CTR=crossmatch:transfusion ratio.

Legend to Figure**: Proportion of Crossmatched Blood Units to Number of Blood Requests.**



DISCUSSION

The availability of blood and blood products, particularly red cells have improved the management of patient with anaemia due to various aetiologies and facilitated aggressive treatment of malignancies as well as permit extensive surgical procedures on patients. Though, the use of alternative to blood transfusion has become more popular with the advent of the HIV pandemic, the need for blood transfusion is unavoidable in some clinical conditions. The increasingly stringent screening measures before blood donation transfusion medicine has resulted in insufficient blood supply. The provision of 64% of the required blood units to patient is a reflection of the degree of challenges faced in developing countries to supply adequate units of blood to patient. An earlier study carried out 20 years ago showed that the demand was three times greater than the supply of blood [6]. This shows that the pattern of blood supply and demand has changed over the years. It underscores the need to put more effort on improving the transfusion service so as to meet up with the present challenges in the development of medicine and surgery. The blood bank should aim at being self sufficient, notwithstanding, the strict criteria being put in place for donation and people being less altruistic with blood donation [7]. Most blood banks in developed countries have sufficient supply with

Just sporadic periods of blood shortage. These periods of blood shortage are well taken care of by "plan of management" of blood shortages 8. This includes importation of blood components from other countries. The sufficiency of blood supply in the developed countries can be attributed to a well coordinated National blood service which is lacking in most developing countries. This emphasizes the legal and financial role of the government in ensuring adequate blood supply .There must be willingness on the part of the government to support the blood banks to ensure adequate blood supply. There is an urgent need for strategies to be put in place to reduce the gap in the inadequacy of blood supply. In addition to regular prioritizing of blood use by the blood bank, it will be worthwhile persuading relative donors to become regular voluntary donors. This requires emphasis on donor education and extra funding. The funding of donor recruitment and care will have to be a priority, to ensure adequate blood supply.

Autologous blood donation should be encouraged for patients who are fit. Exchange of blood supply between independent blood banks is likely to improve blood sufficiency especially in attending to natural disaster and emergencies. It is generally accepted that the crossmatch to transfusion of less than 2 to 1 is satisfactory, [9] the limited blood supply has not given room for excess crossmatch: transfusion ratio found in blood banks of developed countries[3,10] including some other African countries [1]. Rather than having excess crossmatch, the blood issue is prioritized. Revenue loss from prioritization is difficult to quantify as a single unit of blood maybe crossmatched more than once for different patients based on the degree of urgency of need. The worst hit by the insufficient blood supply are patients in Accident and Emergency and Paediatrics wards. The blood requirement of patients in O/G and Paediatrics are comparable but differ in blood ordering habit of clinicians managing the patients. The utilization of blood beyond the amount crossmatched is a function of the under supply of blood. This necessitated the sourcing of blood from nearby state government owned blood bank. The use of blood for Paediatrics patients in this study is consistent with utilization previously reported [6]. .A similar study carried out at Harare showed that the largest consumer was the Obstetrics and Gynaecology [12], though most studies in developed countries showed that highest transfusion rate is related to surgery [13] due to extensive more complex operative procedures meeting with the challenges of development in surgery. The high transfusion rate in Paediatrics is a reflection of the prevalence of childhood anaemia especially due to malaria, malnutrition and haemoglobinopathy. Unnecessary crossmatch is unlikely in this group of patients evident by the use of uncrossmatched blood and crossmatch: transfusion ratio <1. The considerable use of uncrossmatched blood in Paediatrics and casualty wards as an immediately life saving treatment is an indication that strategies to decrease blood order (demand side) might have to extend beyond educating the clinicians by addressing the preventive aspect of the causes of anaemia within the community. Late presentation to the hospital, in most cases necessitates use of uncrossmatched blood as a life saving measure for anaemias that could have responded to haematinics. The use of blood products on children with long life expectancy and possibility of transfusion transmitted infection (TTI) is a strong reason to tackle all preventable anaemia in children so as to reduce their exposure. Trauma victims constitute 70% of the casualty patients (Personal Communication, O.O. Ogunlade) therefore the use of colloid and plasma expander on patients in a community with low blood donor base will reduce the demand for blood. The use of surgical haemostasis and pharmacological haemostasis should also be encouraged in these patients. The blood ordering practice for patients in obstetrics and Gynaecology and surgery as reflected by the crossmatch: transfusion ratio of 1.02 and 1.03 respectively suggest appropriateness of the clinical judgment made on the patients. This may not be absolute considering the number of units returned to the blood bank unused. Even though a larger study is required to determine the degree of wastage contributed by the retuned units of blood, this is still a most appropriate time to draft a maximal surgical blood ordering schedule (MSBOS) for patients going for planned surgery including elective caesarean section in our practice. The MSBOS is of value in improving blood availability to patients and assist the blood bank to conserve blood in the absence of electronic crossmatch 1[4]. In a blood bank, where blood issue is prioritized, the returned units could be handled as "type and screen" or "group and save". The group and save will also apply to medical patients with the highest number of returned units of blood. This method will not only conserve cost on manual conventional serological crossmatch carried out on the returned unit. It will also reduce the blood bank staff work load hence, type and screen has been recommended for O/G and surgical patients [15, 16]. The returned units are unsafe for subsequent transfusion because they are likely to have been left carelessly out of blood refrigerators ultimately resulting in wastage. Without prejudice to the CTR which is <2, appropriate restraint in the prescription of blood should be promoted among physicians. A review of the criteria for transfusion with clear indications for medical patients should take account of the impact of the anaemia on patients. The role of the hospital transfusion committee is important in

this regard. Notwithstanding there are Haematology patients on the medical wards who are transfusion dependent and the decision to transfuse can be complex. Transfusion criteria will serve as a guide to reduced wastage .The crossmatch transfusion ratio in the "other wards" burnt unit, dental unit, radiotherapy is comparable to the practice in surgical wards. The management of these patients by doctors who are also fellows of the college of surgeons will reflect a similar orientation of the clinician to transfusion practice. As blood is becoming more expensive and difficult to source, alternative strategies involving the use of erythropoietin and haematinics in patients with chronic anaemias as well as intra-operative blood salvage in surgical operation is to be further encouraged .There should also be in each hospital a blood bank committee which is made up of clinicians from various disciplines .Clinicians are educated on the appropriate use of blood the problems of the blood bank through such committee .The need for a national transfusion service cannot be overemphasized in a developing country.

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