

Original Article

How much Blood Transfusion Protocols Are Followed among Health Care Providers in the Tertiary Care Hospitals of Rawalpindi and Islamabad

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ABSTRACT

Objective: The high-ceilinged importance given to safe blood transfusion, a study was conducted in the teaching hospitals of Islamabad and Rawalpindi to ascertain how much blood transfusion protocols are followed.

Study Design: Cross sectional study.

Place and Duration of Study: This study was carried out in the Teaching Hospitals of Islamabad and Rawalpindi, between Oct, 2007 to Dec, 2007

Materials and Methods: A total of seventy six health care professionals from surgical and allied specialties were put forward a questionnaire Performa relating to as to whether departmental guidelines for blood transfusion are followed or not.

Results: Out of total studied sample i.e. seventy six in total, forty health care personals i.e. 52.63% affirmed that they do follow departmental guidelines for blood transfusion, whereas thirty six personals i.e. 47.37% were lacking the follow-up of standard protocols in their settings.

Conclusion: In the study 47.37% i.e. thirty six in number of considered health care professionals were of the opinion that they do not pursue in spirit departmental guidelines regarding blood and blood product transfusion.

Key Words: blood transfusion; protocols of blood transfusion.

INTRODUCTION

The major indication for blood transfusion is prevention and treatment of tissue hypoxia by increasing oxygen carrying capacity of blood. Transfusion requirements of each patient should be based on clinical status or considering serial hemoglobin level or hematocrit concentrations.

According to a survey conducted by the Committee on Blood and Blood Products of the American Society of Anesthesiologists, anesthesiologists administer more than half of all blood given to the patients.¹ Few risks of blood transfusion include immunological i.e. hemolytic reaction—being most fatal among all, which result from misidentification of sample, transfusing unit or patient itself.² Febrile and urticarial reactions belong to non-hemolytic group of complications, which also include the notorious ones like, transfusion related acute lung injury and is the most commonest cause of morbidity and death after transfusion. It presents as an acute respiratory distress syndrome either during or within six hrs of transfusion³, transfusion related autoimmune neutropaenia in neonates⁴ and suppression of erythropoietin in premature infants.⁵ The study done by Ali SI and colleagues stated transfusion related acute lung injury as a devastating complication of blood or its components transfusions irrespective of the blood grouping and cross match and it is not an uncommon complication⁶.

Blood transfusions save the lives of incalculable numbers of people suffering from shock, hemorrhage, or blood diseases. It is employed routinely in cases of surgery, trauma, gastrointestinal bleeding, and in childbirths that involve great loss of blood world-wide every day. It is an integral aspect of modern medical care and best transfusion practice means transfusing a patient when there is an identified clinical need and not transfusing when there is no clear clinical indication. It is also a mean of maintenance of adequate intravascular volume while limiting the complications of severe blood loss. Therefore following the Protocols for blood transfusions may be an effective way to improve outcome, promote decision consistency and reduce the number of inappropriate blood transfusions, and thus help save lives or improving the patient's condition.

Consideration of adverse effects of blood transfusion, any transfusion reaction means that the transfusion is not performing the intended job and, importantly, has burdened a patient already burdened by the physiologic state requiring transfusion. Sensitization to blood cells can result in refractory results in subsequent transfusions. Transfusion of multiple units of whole blood sequentially in order to achieve a certain hematocrit may also produce pulmonary edema due to volume overload. Furthermore, transfusions dampen the physiologic response to deficiency of a blood constituent. For example, if a patient has a low red cell mass, tissue hypoxia results in increased erythropoietin

production and the marrow responds with reticulocytosis. Red cell transfusion, in this patient, will result in diminished and delayed reticulocyte response. Several questions should be considered prior to transfusion. 1) Is blood transfusion really necessary? 2) What is the patient's particular need? 3) Does the prospective benefit justify the risks of transfusion? 4) What blood component will effectively meet this special need at the lowest cost? And after transfusion: did the transfusion result in the anticipated benefit for the patient? Answers to these questions should be documented in the patient's record. The basic principle in transfusion therapy is the same as in all medical approaches, "primum non nocere" - first do no harm. The blood transfusion protocols guide in employment of evidenced-based transfusion guidelines answering the stated questions.

In study done by Kanwal S and colleagues⁷, at MCH Center PIMS, Islamabad, from Oct-Dec 2005, out of total admissions i.e. one thousand nine hundred and twenty, 206 patients (10.7%) were advised to arrange blood and 166 (8.6%) patients received blood transfusions. The obstetric patients were 132 (64%), 114 patients arranged blood and 106 received transfusions. Transfusion rate was 7%. Total units arranged were 272, and units transfused were 244, the number of transfusion per patient were 2.3 units. The two major indications for transfusion were chronic anemia and acute hemorrhage in 62(58.4%) and 44(41.5%) patients respectively. However 28(26.4%) patients had unnecessary transfusions. Three obstetric patients had immediate minor transfusion reaction. Mean pre-transfusion hemoglobin level of the patients was 8gm/dl (2.8-12.8gm/dl) and post transfusion was 8.4gm/dl (5-12.4gm/dl).

The goal of our study was to inquire about as to whether departmental guidelines for blood transfusion are followed or not, the stratum of personal who will make decision to transfuse blood and blood products and to inquire whether transfusion was based on which hemoglobin level or with expected blood loss more than one thousand ml or hematocrit level of $28\% \pm 2$ and to seek whether red cell concentrates were being transfused or not and lastly about formal lecture delivered related to blood transfusion in the department. As inferred from above stated risks and the soaring importance attributed to safe blood transfusion, we conducted a study in this regards keeping in sight goals whereby health care professionals from surgical and allied specialties of teaching hospitals of Islamabad and Rawalpindi, were put forward a questionnaire Performa.

MATERIALS AND METHODS

After approval of hospital ethical committee, we carried out a cross-sectional study in the teaching hospitals of Islamabad and Rawalpindi, between Oct, 2007 to Dec,

2007, whereby a total of seventy six health care professionals from surgical and allied specialties by convenient sampling were put forward a questionnaire Performa relating to as to whether departmental guidelines for blood transfusion are followed or not. Question was asked to three personals level i.e. consultants, trainees and medical officers having experience of at least three years in that specialty and a junior resident /house surgeons to negate the subjective bias in their answers. The answers for each department were kept strictly confidential. Data was compared and analyzed by SPSSv19.

RESULTS

A total number of seventy six doctors were surveyed, that included twenty one consultants, twenty nine medical officers/senior post-graduate students and twenty six junior doctors, out of which 52.63 % i.e. forty health care professionals affirmed that they follow the guidelines for blood transfusion and 47.37% i.e. thirty six professionals were lacking the proper follow-up of protocols for blood transfusion. So a high percentage of surveyed participants were not complying with protocols for blood transfusion. The study result breakup is shown in Table-1.

The major indication for blood transfusion in our study was a hemoglobin level of 9g/dl with expected blood loss of more than one thousand milliliters and hemoglobin value was taken into consideration as a guide for further blood transfusion. Furthermore in our study red cell concentrates were transfused in all cases. The hematocrit value stated was 28% for elective surgical cases.

In elective cases consultant/senior registrar decided about blood and blood products transfusion while in emergency on call senior registrar/post-graduate trainee were the personals involved.

The standing operating protocols as regards to safe transfusion of blood and blood products did exist in the respective Hematology Departments of the various teaching hospitals in the study.

Table No. 1: Results

Follow-up of protocols for Blood transfusion	Yes	No
Junior Postgraduate	11	15
Senior M.O/PG	18	11
Consultant	11	10
Total	40	36

DISCUSSION

Tissue oxygenation requires that oxygen supply be matched with oxygen needs, only when the capacity of compensatory mechanisms to anemia are exhausted, that, hypoxia and subsequent tissue injury occur. In our study improvement of oxygen carrying capacity of

blood was the main reason to transfuse packed cells and blood component therapy was mainly to treat disseminated intravascular coagulation state and to pre-operatively correct clotting profile derangements. In study of survey of blood transfusion done by Zafar N⁸ a questionnaire was distributed among the surgeons and anesthetists of various hospitals in Lahore. It was found that majority think if the pre-operative hemoglobin is above 10 g/dl blood should not be transfused, even if the anticipated blood loss is between 500-1000 ml. Post-operatively blood should not be transfused, if the hemoglobin is above 9g/dl without any active bleeding. Allergic reactions was the most common side effect of blood transfusion, followed by infection, while only few had mentioned the immuno-modulatory effects of blood transfusion. Fifty percent thought that the transfusion, if necessary, should be packed cells. In our study a hemoglobin level value of 9 gm/dl with expected blood loss about thousand ml was followed by the health care professionals and packed cells were transfused as replacement of blood loss rather than whole blood.

In the study done by Bhattacharya P and colleagues⁹ designed to analyze the incidence and spectrum of adverse effects of blood transfusion so as to initiate measures to minimize risks and improve overall transfusion safety in the institute. Analysis of transfusion-related adverse outcomes is essential for improving safety. Factors such as improvement of blood storage conditions outside the blood bank, improvement in cross-matching techniques, careful donor screening, and adherence to good manufacturing practices while component preparation, bedside monitoring of transfusion, and documentation of adverse events will help in reducing transfusion-related morbidity and mortality. The blood transfused in 52.63% of cases in our study did harmonize with the departmental operating protocols.

Anesthetists are more frequently involved in transfusion of blood and blood products to the patients¹, therefore in our study surgical and allied specialties were surveyed. A retrospective study done by Parveen S and colleagues¹⁰ on blood component therapy showed that pregnancy and its complications were the commonest indications for transfusion of blood. Whole blood was given to 898 cases (68.6%). Red cell concentrates were given to 241 cases (18.4%). Fresh frozen plasma/single donor plasma was given to 141 cases (10.7%). Platelets were given to 30 cases (2.3%). Leukocyte depleted blood was given to 4 cases (0.3%). Only three non-hemolytic febrile transfusion reactions were noted in patients who were transfused whole blood and thus with

modern facilities blood components can easily be prepared and their appropriate use can decrease morbidity and mortality. In our study packed cells were transfused in all cases. In study done by Nazli Hossain and colleagues¹¹, the percentage of blood and blood products transfusion in postpartum hemorrhage cases was noted to be 1.6% with mean blood loss being 1088ml (± 584 ml).

As per SHOT (Serious hazards of transfusion) initiative in UK,² analysis of first two annual reports indicate that, 366 cases were reported, of which 191 (52%) were 'Wrong blood to patient' episodes. There were 22 deaths from all causes including those from ABO incompatibility. There were 12 infections, four bacterial (one fatal), seven viral & one fatal case of malaria¹². Johnson JL and colleagues¹³ in their study regarding effect of blood products transfusion stated that regardless of the units of red cell concentrates transfused, fresh frozen plasma transfusion was independently associated with the development of post injury multiple organ failure while platelet transfusion was not associated. Eder AF and colleagues¹⁴ in their study done on complications of blood transfusion reported the overall rate of major complications was 7.4, 5.2, and 3.3 per 10,000 collections for whole blood, apheresis platelets, and automated red cells procedures, respectively.

Among the surveyed healthcare professionals 47.37% i.e. thirty-six persons who are involved in blood transfusion were not fully following protocols for transfusion of blood in our study. In study done by Luby S and colleagues¹⁵ on evaluation of blood bank practices in 2006 they observed that only 8% of facilities asked donors about injecting drug use, and none asked donors any questions about high-risk sexual behavior. While 95% of blood banks had appropriate equipment and reagents to screen for hepatitis B, only 55% could screen for HIV and 23% for hepatitis C. Thus appropriate protocols should be strictly followed for safe blood transfusion. In study done by Abu-Salem and colleagues¹⁶ regarding blood transfusion in obstetrics, stated that 41% of the participants were aware of the possible need for blood transfusion in pregnancy and 88% of all women would accept blood transfusion when necessary. The remaining 12% would refuse blood transfusion, even if it was life-saving, because of the fear of blood transfusion complications.

In data taken from record registers of blood banks of the hospitals namely, Pakistan Institute of Medical Sciences, Islamabad, showed that a total of 17323 units of blood and blood products were issued during the

year 2006 whereas these figures rose to 20840 for the year 2007, up till Nov 11, 2007, while the blood bank of Holy Family Hospital, Rawalpindi, issued 6419 units of blood during the year 2007, and 8763 units of blood were issued by Benazir Bhutto Hospital, Rawalpindi in the same year. The study done by Keating EM and colleagues¹⁷ suggested in their study that in order to avoid the risk of viral infection and immunosuppression and cost of blood transfusion the informed selection of alternatives based on preoperative assessment of hematologic status, estimated blood loss, and hence strategies like preoperative autologous blood collection, the use of haemostatic agents, perioperative blood salvage, and the use of recombinant human erythropoietin (epoetin alfa) to stimulate erythropoiesis can contribute to decreased use of allogenic blood services may enhance blood management practices in major elective surgeries.

An audit study done by Khan FA and colleagues¹⁸ for estimation of blood loss during cesarean, a total of 215 units were cross-matched for 126 patients undergoing Caesarean section delivery. 9.5% of cases were transfused intraoperatively and 5.5% post-operatively. The average blood loss estimated by anesthetists and obstetricians was about 498 + 176 ml and 592 + 222 ml respectively. The calculated blood loss based on patients blood volume and drop in hematocrit was 787 + 519 ml while the cross-match transfusion ratio was 9.7. Conclusion drawn was that only 13% of the patients needed blood transfusion. They also recommended that the practice of routine cross-match practice prior to Caesarean section should be re-looked by institutions dealing with obstetric anesthesia.

Chawla T and colleagues¹⁹ in their audit report as regard to blood cross-matching practices at Agha Khan University Hospital examined studied cross-matched to transfused ratio and Transfusion Index as a measure of the efficiency of blood ordering practice and it should ideally be between 2 and 2.5. Data was analyzed for 32 elective surgical procedures in 2131 patients. Majority (2079) (97.56%) of the patients had cross-matched to transfused ratios higher than 2.5. Only 12 in 450 (2.11%) patients, had a Transfusion Index higher than 0.5. There were 13 procedures in which both cross-matched to transfused ratio was greater than 2.5 and transfusion Index less than or equal to 0.5. They concluded that in vast majority of elective surgical procedures routine cross match was not required.

Lastly, infectious complications are also worth mentioning like viral, in the form of hepatitis B, C, HIV (Human Immunodeficiency virus), CMV (Cytomegalovirus) and HTLV type 1 (human T-cell

lymphotropic virus). Parasitic and bacterial complications, of real concern, include malaria, syphilis and *Yersinia enterocolitica* as described by Triple MA and colleagues²⁰. Multivariate analysis, in UK, showed that red cell concentrates are an independent risk factor for development of infections.¹

The study done by Grotte O and colleagues²¹ address key issues of transfusions of red blood cells and plasma products in the acute control of bleeding in traumatized patients stated that 30-40% of trauma mortality is attributable to hemorrhage. Timely transfusion of red blood cells and plasma products becomes essential to restore tissue oxygenation, support perfusion, and maintain the pool of active haemostatic factors.

CONCLUSION

Blood transfusion should be treated as an ORGAN TRANSPLANT, like any other organ transplant and it is crucial to increase awareness about it, not only among the health care professionals but also among the general public. Written guidelines for blood transfusion should be followed in each department to ensure patient safety. The use of red cell concentrates should be emphasized in place of whole blood, as many plasma factors are not available and secondly separation into components permits a single donation to meet the individual needs of more than several patients. Lectures on proper guidelines for blood transfusion should be held regularly. The study conducted by us had few reservations that it was not on large national scale, which demand full scale review to address the problem fully.

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