BLOOD COMPONENT SUPPORT IN THE MANAGEMENT OF SERIOUS HEMATOLOGICAL DISORDERS

Muhammad Ashraf, Rehan Ahmad Lodhi*

CMH Abbottabad, *AFIP Rawalpindi

ABSTRACT

Objectives: To study the current blood transfusion trends in patients undergoing treatment for serious haemotological disorders and stem cell transplantation.

Study Design: Descriptive study

Place and duration of study: Armed Forces Institute of Transfusion (AFIT) from January 2008 to December 2008.

Material and Methods: Data of 719 patients receiving blood components support in Army Forces Bone Marrow Transplant Centre (AFBMTC) was analyzed. Patient's characteristics and type / frequency of blood component requirement were noted. Any reaction associated with blood transfusion was recorded on separate proforma.

Results: A total of 16767 units of different blood products were issued from AFIT to AFBMTC during a period of 12 months. Post transplant patients constituted the bulk of transfusion requirement in AFBMTC. The main bulk transfusion were made up of platelets (10949 units), followed by RCC's (2720 units) and FPP's (3477 units). Acute febrile reaction was seen in 03patients following RCC transfusion and in one patient following platelet transfusion.

Conclusion: The requirement of blood components in patients undergoing bone marrow transplantation and suffering from serious haemtological disorders is enormous. Prompt and safe supply of blood components is the life line for batter result management in these patients.

Keywords: Blood component, Haemopoietic stem cell transplantation (HSCT), Transfusion reaction.

INTRODUCTION

Treatment of haematological malignancies has seen tremendous advancements over the past three decades[1,2]. Various chemotherapeutic protocols have also been revised with several new chemotherapeutic agents and newer regimens[3]. Hematological malignancies such as acute lymphoblastic leukemia and acute myeloid leukemia, which were once considered fatal, are now more amenable to chemotherapy[4]. Recent additions of more aggressive anti neoplastic agents in the arsenal of treating haematologists have not only made the protocols more efficient but also more myelosuppressive.

Similarly, advent of human stem cell therapy has given medical sciences a revolutionary stance; numerous conditions which were always considered to be untreatable became curable with stem cell transplant as a treatment option[5-8]. These conditions included thalassaemias, aplastic anemia, myelodysplastic syndromes, leukemias and myeloproliferative disorders especially myelofibrosis[9,10].

Technically advanced transfusion support becomes exponentially important in these cases, as haematologists can now safely eradicate the disease just because of the confidence that blood component support is readily available as and when required.

During treatment with hematopoietic stem cell transplant (HSCT), various conditioning regimens had to be devised which increased the efficiency and safety of HSCT[11,12]. But during these conditioning regimens bone marrow had to be suppressed, whether the conditioning was myeloablative, or non myeloablative[14]. During this phases of treatment, role of effective blood component support came into focus, or it became evident that HSCT could not be performed without a meticulous, judicious and state of the art blood banking facility[8] with a very steady and regular blood transfusion support.

Correspondence: Brig Muhammad Ashraf, SI (M) CMH Abbottabad

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This study was conducted to see the current situation in blood transfusion practices in patients undergoing hematopoietic stem cell transplant (HSCT) at the Armed Forces Bone Marrow Transplant Center (AFBMTC) Rawalpindi and receiving blood transfusion support from Armed Forces Institute of Transfusion (AFIT) Rawalpindi.

PATIENTS AND METHODS

All the patients undergoing blood transfusion at AFBMTC from January 2008 to December 2008 were included in the study. Data was collected from the records available at both AFIT and AFBMTC. The data included the name of patient, age, gender, blood group and number of transfusion received. Any instance of transfusion reaction was also noted. The nature of transfusion was classified as red cell concentrate, (RCC) fresh frozen plasma (FFP), platelets or cryoprecipitate. The blood transfused was screened for HIV, HBsAg, and anti HCV antibodies at AFIT using a closed system utilizing chemiluminescence ELISA techniques. Blood was also screened for malaria and syphilis by examination of peripheral smear and ICT method respectively.

Mostly blood was issued after irradiation to reduce the risk of transfusion associated graft versus host disease. General principles of transfusion were observed in all transfusions and group specific blood was used in most of the cases. All RCCs were transfused after complete cross match, whereas only group specific FFPs and Platelets were transfused. Only adverse transfusion reactions that led to termination of blood transfusion were defined as transfusion reaction and were included in the study. Any transfusion reaction was thoroughly investigated to establish the cause.

Data was collected and entered into computer using SPSS version 13.0. Descriptive statistics were applied through standard formulae and results noted.

RESULTS

During the study period a total of 16767 blood products were provided to a total number of 719 patients admitted or being treated in outdoor at AFBMTC. In our study 381(52.9%) patients were male patients while 338(47.1 %) were female. The mean age of the patient receiving transfusions was 16 yrs. 401 patients were categorized as pediatric patients while remaining were adult patients. The main bulk of the transfusions were made up of platelets, which constituted around 10732 units. While 2720 received RCCs and 3315 received FFPs. Break up of the different blood products and groups is given in table. Of all the components transfused no fatal transfusion reaction was reported.

Acute febrile reaction was seen in three patients following RCC transfusion and in 01 patient following platelet transfusion. About 70 % patients were transfused more than one blood product, but requirement for platelets was much more pronounced. Maximum

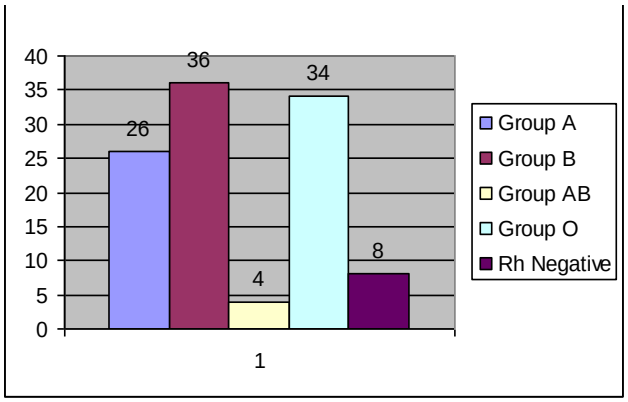

Figure: Percentage of group wise issue of blod products.

Table: Blood products and group distribution

	Group 'A'	Group 'B'	Group 'AB'	Group 'O'	
RCC	707	981	108	924	2720
Platelets	3014	3378	1269	3288	10949
FFPs	600	1417	133	1327	3477
Total Transfusions	4321	5776	1510	5539	16767

number of transfusion given per day was calculated to be 14 platelets 4 RCC and 6 FFP to one patient in a day. Frequency of different blood groups of the transfused blood was group 'B' 36%, 'O' 34 %, 'A' 26 % and AB 4% Rh negative accounted for almost 8% (Figure). The blood group frequency among males and females also did not reveal any significant difference. The requirement of blood transfusion was highest for post transplant patients, other conditions requiring transfusion were aplastic anemia, pretransplant conditioning, post chemotherapy bone marrow suppression and TTP/HUS.

DISCUSSION

Advances in the field of transfusion medicine have revolutionized modern medicine. Safe, timely and adequate transfusion is a lifesaving procedure[13]. Safe transfusion practices have strong impact on surgical, gynaecological and chronic patient care[14], but more importantly, the field in which treatment strategies have shifted from a conservative to liberal approach just on the basis of availability of safe, accurate blood transfusion services is haematology in general and hematopoietic stem cell transplantation in particular[15]. Today the role of transfusion services in assisting haematologists in conquering the blood diseases have grown tremendously[16].

We studied our experience of blood transfusion practices for patients of AFBMTC and had very interesting results. Although, severely hampered by the daunting nature of the job concerned, we conducted a fairly large number of transfusions. The slight male preponderance may be due to the nature of patients coming to AFBMTC, because majority of the patient group coming to consult in this hospital are enlisted personal. A very high percentage of platelet transfusion can be attributed to several factors. Platelets are the most sensitive myeloid cell lineage that is affected during any hematological conditioning regimen, aggressive chemotherapy, or stem cell transplant. Moreover very short life span in vivo and in vitro renders platelet transfusions a major component of all the transfusions. Similarly dosing of platelets can not be achieved with one or two platelets units, that's why platelets are the major blood product transfused.

Another interesting and encouraging finding in case of RCC was that there was not a single serious untoward reaction. This may be attributed to a very strict adherence to standard operating procedures, effective cross matching techniques and careful handling of the paperwork necessary with the blood transfusions. The spectrum of the blood groups was almost in concert with the prevalent blood group frequencies in our population[19].

CONCLUSIONS

Blood bank providing the transfusion support to stem cell transplant patient must cater for an uninterrupted and non exhaustive supply of platelets and RCC transfusions as this form the bulk of transfusions in bone marrow transplant setup. Since requirement of platelets is more than any other component, blood banks should rely more on platelet apharesis. Platelets collected from single donors are safer, yield better results and are less likely to cause refractoriness.

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