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AN AUDIT OF IMMEDIATE ADVERSE EFFECTS OF BLOOD TRANSFUSION REPORTED IN A TERTIARY CARE HOSPITAL

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Abstract :
Data from specific registers of the Medical College Hospital Blood Bank from 2008 to 2010 was collected to audit the occurrence of immediate transfusion reactions (ITR) and their distribution across the various blood products that were issued. The average occurrence of ITR during the study period was 2.3 per 1000 issues. Of the 100 ITR that occurred during the study period 63 were mild allergic reactions followed by febrile non-haemolytic transfusion reactions (FNHTR). Packed RBCs were responsible for 91 percent of the FNHTR while allergic reaction was noted with all the blood products. All the three anaphylactoid reactions were observed with the use of fresh frozen plasma. The use of lab side leukocyte filters would play a significant role in bringing down the incidence of FNHTR associated with the use of Packed RBCs.

Keyword : Blood transfusion, Reaction, Immediate, Acute, Audit

INTRODUCTION:

Transfusion of blood and blood products is generally a safe procedure owing to advancements in infection screen techniques and the use of newer sensitive technologies for routine cross matching such as the gel based systems. Yet adverse effects do occur in routine transfusion practice. Adverse effects of transfusion are classified as immediate (acute) or delayed and these could be either immunologic or non-immunologic in nature. All of the infectious complications are delayed effects of transfusion. Both immediate (acute) hemolytic transfusion reactions and immediate (acute) non-hemolytic transfusion reactions are reported to the blood bank through a transfusion reaction form that was initially issued along with the blood product, to the receiver. The occurrence of immediate (acute) hemolytic transfusion reactions is rare and has ranged from 1 in 10000 to 1 in 50000 issues of blood and blood products[1,2]. At least 3 percentage of all transfusions result in either a febrile non-hemolytic transfusion reaction or an allergic reaction[3]. As on date there has been no audit of the

transfusion reactions (immediate or delayed) that were reported by the users of blood products of the Medical College Hospital.

AIMS:

1 To identify the occurrence of immediate adverse effects of transfusion reported to the Medical College Hospital blood bank.

2 To identify product-wise association with the occurrence of the various types of immediate adverse effects of transfusion.

MATERIALS AND METHODS

The study is a retrospective analysis of data recorded in specific registers of the Medical College blood bank. The study period was from 01-01-2008 to 31-12-2010. We accessed the following records and registers maintained in the blood bank of after the necessary permissions were obtained.

1 Master record of blood and its components- this had information regarding components prepared and their utilization.

2 Issue register- it had details regarding date and time of issue, ABO and Rh group, total quantity issued, group of recipient, details of cross matching report etc.,

3 Transfusion adverse reaction record- this register had information on all the adverse events reported during transfusion, results of complete transfusion reaction workup, diagnosis and suggestions for prevention of such reactions in future transfusions to the same recipient.

RESULTS:

The average occurrence of immediate transfusion reactions (ITR) during the study period was 0.23percentage. The highest occurrence was observed in the year 2009. Table 1 details the year wise occurrence of transfusion reactions.

The product-wise distribution of reactions that occurred during each calendar year is depicted in Tables 2, 3 and 4. Only 1 reaction was reported with the use of cryoprecipitate, which occurred in the year 2010.

The consolidated product-wise distribution of acute events that was reported during the study period is shown in Figure 1. Packed RBCs had the highest occurrence of immediate (acute) adverse events. Although the total number of events that was reported with the use of FFP and Platelets is the same, the latter has a higher percentage of occurrences of events (Table 5), as the number of issues of platelets is lesser than that of FFP.

During the study period there was no incidence of an Acute Hemolytic Transfusion Reaction (AHTR). Three types of Acute Non Hemolytic Transfusion Reaction (ANHTR) observed during the study period are Febrile Non Hemolytic Transfusion Reaction (FNHTR), mild allergic reactions and anaphylactoid reactions. Table 6 depicts the number of ANHTR that occurred during the study period. The most common type ANHTR that was observed during the study period was mild, uncomplicated allergic reactions (63 percentage).

Packed RBCs were responsible for 91percentage of febrile non-hemolytic transfusion reactions while all the 3 reported events of anaphylactoid reaction (100percentage) occurred with the use of FFP. All the 3 major components viz packed RBCs, FFP and platelets were associated almost equally with the occurrence of mild allergic reactions as shown in Figures 2 and 3.

Table 1- Year wise occurrence of immediate (acute) adverse events

2008	14013	28	0.2
2009	13504	39	0.3
2010	14692	33	0.2

Table 2- Distribution of ITR that occurred in the year 2008, component wise

Whole blood	1936	7	0.36
Packed RBCs	4039	13	0.32
FFP	3933	4	0.10
Platelets	3864	4	0.10
Cryoprecipitate	241	0	0.00
Total issues	14013	28	0.19

Table 3- Distribution of ITR that occurred in the year 2009, component wise

Whole blood	2124	2	0.09
Packed RBCs	3925	16	0.40
FFP	4085	9	0.22
Platelets	3124	12	0.38
Cryoprecipitate	246	0	0.00
Total issues	13504	39	0.30

Table 4- Distribution of ITR that occurred in the year 2010, component wise

Whole blood	2486	0	0.00
Packed RBCs	4325	17	0.39
FFP	4040	9	0.22
Platelets	3449	6	0.17
Cryoprecipitate	392	1	0.25
Total issues	14692	33	0.20

Table 5 - Occurrence of acute transfusion reactions, product wise and year wise

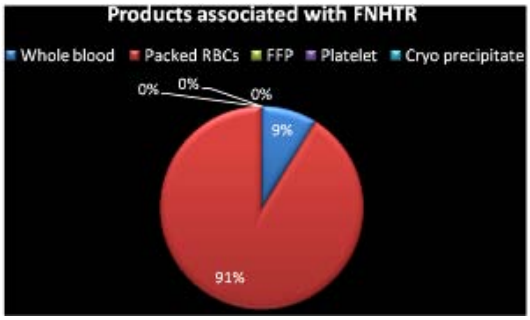
	2008	2009	2010	
Whole blood	0.38	0.09	0.00	0.15
Packed RBCs	0.32	0.40	0.39	0.37
FFP	0.10	0.22	0.22	0.18
Platelets	0.10	0.38	0.17	0.22
Cryoprecipitate	0.00	0.00	0.20	0.07

Table 6 - Year wise distribution of ANHTR

1. FNHTR	10	15	9	34
1. Allergic reactions – mild, uncomplicated	18	22	23	63
1. Anaphylactoid reaction	0	2	1	3
Total	28	39	33	100

Table 7 - Components associated with ANHTR

1. FNHTR	3	31	0	0	0	34
1. Allergic reactions – mild , uncomplicated	6	16	18	22	1	63
1. Anaphylactoid reaction	0	0	3	0	0	3
Total	9	47	21	22	1	100



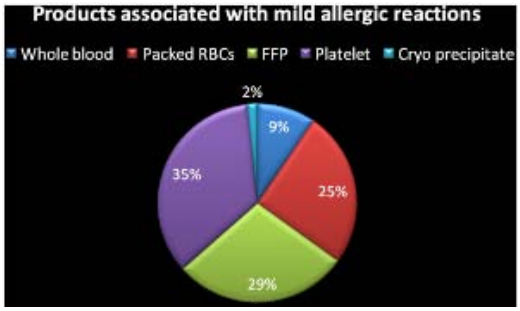


Figure 2 **Figure 3**

DISCUSSION AND CONCLUSION

The medical college hospital blood bank is a licensed blood bank with facilities to manufacture, store and issue whole blood and blood products such as packed RBCs, FFP, platelets (random donor) and cryoprecipitate. It also enjoys the status of regional transfusion centre and therefore conducts blood camps in and around the city. About 90percentage of the blood products are consumed by the affiliate medical college hospital, while the rest is issued to other hospitals and nursing homes.Transfusion of whole blood or blood components is associated with infrequent but significant morbidity[4]. All appropriate measures are therefore taken to minimize such risks. An audit of transfusion reactions serves as a tool to assess the predefined safety standards set by blood banks. The occurrence of acute transfusion reactions during the three year study period was 0.23 percentage. This is similar to an observation made by C.Michlig, D-H.Vu et al, where a similar three year audit showed it to be 0.42 percentage[5]. The slightly lower occurrence in our Institute could be due to failure of return of transfusion reaction forms by other hospital users of our blood products.Of all the blood products, packed RBCs were associated with the highest occurrence of acute adverse events (3.9 per 1000 issues). Most of these reactions (91percentage) are febrile non hemolytic transfusion reactions (FNHTR). These reactions are due to white cell antibody in the patient's plasma that interacts with the leukocytes in the red cell product. These reactions are mild and respond to supportive care (eg. Antipyretics). Two general suggestions for prevention of FNHTR in subsequent packed cell transfusions are premedication with antipyretics or use of leukoreduced blood products. The general tendency for the treating physician is the former as leukoreduction involves an additional expenditure of about Rs 1,200 towards the cost of the leukocyte filter. Platelet units were second to packed RBCs in the occurrence of acute transfusion reactions (0.22percentage). All the platelet reactions were mild allergic reactions. These reactions were caused by soluble antigens in the donor plasma which react with the IgE bound to mast cells causing histamine release. Future occurrence of these events can be prevented by premedication with antihistaminics. In the audit report of C.Michlig et al, platelet units gave rise to statistically more transfusion reactions (1.07percentage) than RBCs (0.35percentage). This could be due to the fact that in the developed world, all packed RBCs are leukoreduced prior to the issue. Further, they observed that platelet units were associated with FNHTR also, an event not reported with platelet transfusion in our study. 97 of the total 100 transfusions reported during the study period were either FNHTR or mild allergic reactions. The total issue during the study period was 42209. Thus only 0.2percentage of all transfusion reactions resulted either in FNHTR or an allergic reaction. Anaphylactic reactions are severe life threatening systemic reactions characterized by flushing, urticaria, respiratory distress, angioedema, hypotension and shock[6]. These reactions are most commonly due to class specific recipient anti IgA to infused donor IgA proteins in patients with IgA deficiency. The term anaphylactoid is used in transfusion medicine to denote reactions in between mild allergic reactions and severe anaphylactic reactions[7]. It is also used to denote reactions

that have clinical similarities to anaphylaxis but caused by different mechanisms. These reactions are most commonly observed with plasma containing blood products such as FFP, platelet pools and apheresis platelets. However these reactions have also been reported with red cells contaminated with large quantities of plasma. In our study all the three reported events of anaphylactoid reactions were associated with the use of FFP. Ideally, patients who have had anaphylactic reactions require avoidance of all plasma containing products if the reaction is due to anti IgA. Our audit did not look into the outcomes of the transfusion reactions at the clinical end.

Cryoprecipitate is generally used for the control of bleeding with factor VIII deficiency, for Von Willebrands's disease and replacement of fibrinogen or factor XIII. Potential reactions to cryoprecipitate include allergy, FNHTR, alloimmunisation and anaphylaxis[8]. Of the 879 issues of cryoprecipitate only one issue was associated with a mild allergic reaction.

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