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Original Research Paper

Anesthesiology

BLOOD TRANSFUSION A BLESS OR CURSE-A SINGLE INSTITUTION RETROSPECTIVE STUDY

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ABSTRACT

Background: An adverse blood transfusion reaction (ABTR) is an unfavorable, unwanted reaction to the transfused unit. It may be acute or delayed , immune or non immune and infections .

Materials and methods: A study was conducted to detect the frequency of various ABTRs (both immunologic and &infections) and associated morbidity in a surgical oncology tertiary care centre for the past 2 years.

Results: A total 7823 units of blood and blood components was issued for entire hospital, out of these 1120 units of blood and blood products was transfused in surgical oncology department over a period of two years. In these transfusions one patient(0.89%) was developed ABTR for that transfusion immediately stopped. A total 30patients (2.67%) developed minor transfusion related reaction that was managed with antihistamine and steroids. The most common adverse event was allergic reactions –20/30(66.6%) followed by febrile episodes – 10/30(33.3%). We noticed that out of 27 recently positive hepatitis virus patients 7 patients had previous blood transfusion history. Within the 7 patients 6 patients also received chemotherapy and 1 patient had previous history of surgery.

Conclusion : The most common adverse reactions to blood transfusions reported here are allergic reactions and febrile episodes. Clerical error is the commonest cause for mismatch transfusion. Hepatitis B&C virus may be transmitted during window period. It can be prevented by using nucleic acid tests (NAT) as screening tests to prevent window period transmission.

KEYWORDS : Blood transfusion , Adverse blood transfusion reaction (ABTR), HBV & HCV infections.

INTRODUCTION

The transfusion of blood and blood products has become commonplace since the first successful transfusion in 1818. And it increases survival in certain population groups (trauma, malignancy). Supplies are also limited, and therefore the use of blood and blood products must always be judicious and justifiable for clinical need. And it is vital to ensure that it as a life saving than threat to life. The present study was conducted to study the adverse blood transfusion reaction and blood transfusion related hepatitis virus transmission. We found some patients who where previously hepatitis B virus (HBV) , hepatitis C virus(HCV) negative and subsequent admission found positive serology by the same test previously used. We conducted this study to find possible mode of acquisition of hepatitis virus .

OBJECTIVES

1. **To ensure safe transfusion protocol**
2. **To reduce complications related to transfusion especially infectious.**
3. **To detect the association between blood transfusion and hepatitis virus transmission**

MATERIALS AND METHODS

All Adverse blood transfusion reaction (ABTR) and hepatitis virus positivity seen in subsequent admissions occurring over a period of 2 years at a surgical oncology tertiary care center in Tamilnadu were studied retrospectively. A transfusion-related adverse reaction was taken when adverse response in the patient after administration of blood or blood components. Hepatitis B & C positive after initial negative by same serological tests were taken and analyzed using standard statistical methods. Transfusion form to record the details of transfusion given along with blood bag . It need to be filled -including timings, vital parameters, and record of transfusion reaction if any. In case of ABTR, transfusion form which was sent along with bag was returned to the blood bank with patient's blood samples-Ethylenediaminetetraacetic acid and plain. These ABTR were worked up according to a institutional protocol-includes clerical checks, repeat blood grouping (patient and blood bag), cross-match (major and minor), culture and Coomb's test (direct and indirect). The results were recorded. Details of all such cases over a period of 2 years were collected and analyzed. The analysis was done using standard statistical methods.

RESULTS

Out of 7823 units of blood and components that had been consumed in entire hospital , oncology department consumed 1120 units(14.21%). In our study among 31 patients developed ABTR(2.76%), 1 patient (0.89%) needed discontinuation of transfusion and 30 cases (2.67%) continued with antihistamine and steroid medication.

Table -1

Total blood transfusions	7823	
Oncology ward	14.21%	n=1120
ABTRs	2.76%	N=31

In our study the most common ABTR was allergic(n=20) 64.5% followed by febrile episodes accounts for (n=10)32.2%. Reactions were seen in all age groups and no gender predilection was found. No further ABTR occurred even in patients who experienced ABTR in previous transfusions. No clerical errors reported in our study. The common adverse reactions were usually presented as chills and rigor, itching and utricarial rashes. Transfusion related acute lung injury(TRALI), delayed reaction, acute hemolysis and mismatch transfusions were not found in our study. All ABTR was noticed within first 30 minutes of transfusion. Frequent symptoms found in the study depicted in table-2.

Table -2 symptoms reported in ABTR

Allergic reactions	64.5%
Utricaria alone	50%
Utricaria +rashes/ hives	50%

Febrile reactions	32.2%
Dyspnoea	0%
Palpitation	0%
TRALI	0%
Facial swelling	0%
Blood stained urine	0%
Muscle ache	0%

Severe ABTR were reported in 1(3.2%) patient. Blood transfusion was stopped, and blood bag along with patients blood was sent to blood bank for tests (cross matching , coombs test ,culture) and possibility of clerical errors were checked. Cross matching found correct, coombs test was negative and culture reported as no growth. No clerical error was reported.

We also took datas of hepatitis virus positivity on subsequent admissions who were initially negative by same serological tests. And reported 27 patients were serologically positive on subsequent admissions with initial negative tests. Out of 27 patients 7 patient had previous blood transfusion. Among 7 patients 6 patients also received chemotherapy, and 1 patient had previous blood transfusion during surgery no chemotherapy was received.

DISCUSSIONS

ABTRs are reported in various institutions 1 to 8%. We found 2.76% in our study. Incidence of ABTR in Various studies depicted in table-2

Table-2 ABTR of various studies

	ABTR%	Allergic reactions	Febrile episodes	Others
Arewa *et al*	8.7%			
Sovic *et al*	1%	49.5%		
Our study	2.76%	64.5%	32.2%	
Kumar *et al*		55.1%	35.7%	
Bhattacharya *et al*			41%	

In a study by Arewa *et al*. in Nigeria an overall incidence of transfusion reactions of 8.7% was seen.[1] Williamson *et al*. performed a SHOT analysis and found 52% cases were associated with incorrect blood transfusion, acute lung injury was seen in 8% cases and 15% patients suffered an acute transfusion reaction.[2]

As clerical errors are common causes of adverse reactions,[3] and multiple level checking before and also during transfusion**.** No clerical error was detected among the adverse reactions in this study.

The most common acute adverse reactions to blood component transfusions, febrile reactions, and allergic reactions, are fortunately among the least harmful. The most common bedside approach for the prevention of febrile nonhemolytic and urticarial transfusion reactions is premedication with an antipyretic and an antihistamine, most commonly acetaminophen, diphenhydramine and steroids. Most transfusions administered to pediatric oncology patients, were observed a rate of 68% opf ABTR.[4] In a study by Sovic *et al*., febrile nonhemolytic and allergic reactions were quite equally represented, 49.5% each and as for other reactions (1%), one transfusion-associated circulatory overload, and one TRALI were recorded.[5].

Allergic reactions also called utricarial reactions are common anaphylactic and anaphylactoid reactions occur immediately and are more severe. Histamine and Leukotrienes are the mediators of these reactions, and common signs and symptoms include redness, itching, and hives.

Febrile reactions usually occur in about 1% of transfusions.[3] It is defined as a 1°C temperature rise associated with transfusion and having no medical explanation other than blood/component transfusion. Leuco reduced components were indicated for their prevention. Bhattacharya *et al*. found febrile reactions in 41% of cases and fever, chills, and rigors were the main presenting symptoms.

Other transfusion reactions that may occur include circulatory overload, mismatch transfusion, post transfusion purpura, transfusion-associated graft-versus-host disease[9] and this was not seen in our series of patients

Donor blood is screened for hepatitis B, hepatitis C, HIV 1 and 2,. However, disease transmission may occur in the 'window period', that is, the time after infection when the donor is infectious but screening tests are negative(10) .

Table -3 Possiblity of transmission during window period(14)

Hepatitis A	Negligible
Hepatitis B	1 in 100,000
Hepatitis C	1 in 1,000,000
HIV 1&2	1 in 4,000,000

Hepatitis virus positivity after blood transfusion occurs when donor blood is in window period. It may occur when we use less specific tests like ELISA. We recommend to use nucleic acid tests (NAT) as screening tests to prevent window period transmission. Limitations for using NAT is it is much costlier than other tests.

Hepatitis B virus (HBV)may not be able to detect when the first time when HBcDNA is positive and Anti HBs Ag is negative. After chemotherapy hepatitis B reactivation causing viral replication and became positive which can be detected by serological tests.

Hepatitis C virus (HCV) test may not be able to detect during initial period when viral load is less. After chemotherapy HCV virus reactivated and viral load is high and it can be possibly detected by routine serology. Eventhough the blood transfusion related transmission neither confirmed nor ruled out by our study, we recommend that whenever possible blood transfusion is to be avoided in oncology patients.

CONCLUSION

The most common ABTRs reported here were febrile episode and allergic reactions. These were the least harmful. Avoid mismatch transfusion requiring multiple level checking

Hepatitis virus positivity after blood transfusion occurs when donor blood is in window period. It can be prevented by using nucleic acid tests (NAT) as screening tests to prevent window period transmission. Hence the blood transfusion related transmission of viral hepatitis was neither confirmed nor ruled out by our study, we recommend that whenever possible blood transfusion is avoided in oncology patients.

Conflicts of interest

Authors declare no conflict.

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