



An Audit On Fresh Frozen Plasma(FFP) Utilization In a Tertiary Hospital

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Abstract

Introduction

Like all blood components, FFP transfusion is not without risk. Therefore, careful assessment of all FFP transfusion is essential to promote rational use. This study was taken up to analyse the trend of FFP usage in different departments in our institute and to assess the appropriateness of each FFP transfusion.

Methodology

This is a cross sectional study conducted between August 2020 to August 2021 in the Department of Transfusion Medicine at a Tertiary care centre, Imphal, Manipur. All requisition forms that come to the department for FFP are analysed for appropriateness. To see for appropriateness, we followed the guidelines of American Association of Blood Banks (AABB).

Results

A total of 363 requisitions were received for FFP transfusion. Total no. of FFP units issued was 1347, out of which 705(54.06%) were found to be appropriate, 625(45.93%) inappropriate and 17 indeterminate. Among the inappropriate requisitions the commonest reason was raised PT/INR without bleeding. Common appropriate indications were DIC with bleeding, raised PT/INR with bleeding, correction of warfarin effect, raised PT/INR before invasive procedure, massive transfusion with correct PRBC:FFP ratio, and lastly therapeutic plasma exchange.

Conclusion Regular evaluation of FFP transfusion is recommended. The hospital transfusion committee should frame proper transfusion guidelines. Regular awareness programs regarding blood component therapy should be conducted. All these measures will ensure that FFP is properly utilized and benefits the right patients.

Keywords: Appropriate, Inappropriate, FFP, Requisition, Rational

Introduction

Fresh frozen plasma(FFP) contains near normal levels of most plasma proteins, including procoagulant and inhibitory components of the coagulation system.^[1] However, FFP is not without risk, and indeed may be among the most high risk of all blood components.^[2,3] Therefore, careful

assessment of all FFP transfusion is essential to promote rational use.

Aims and objectives

The study aimed to analyse the trend of FFP usage in different departments in the institute and to assess the appropriateness of each FFP transfusion.

Method

This is a cross-sectional study conducted in the Department of Transfusion Medicine at a Tertiary care centre, Imphal, Manipur, between August 2020 to August 2021. It was conducted after getting due approval from the Institutional Research Ethics Board. All requisition forms for FFP that came to our blood bank were examined. For each requisition, the data collected were clinical diagnosis, indication for FFP transfusion, age and gender of the patient, department under which the patient was admitted and number of FFP transfused. Each requisition was categorized into appropriate and inappropriate. To see for appropriateness, we followed the guidelines of American association of blood banks(AABB)^[4]

FFP dose of 10-15ml /kg body weight was taken as adequate dose. FFP transfusion following the guidelines of AABB and in adequate dosage was taken as appropriate transfusion.

Appropriate FFP transfusion as per AABB guidelines are

1. Active bleeding or before an invasive procedure with acquired or congenital deficiencies of one or more coagulation factors as demonstrated by increased PT, APTT, INR when no alternative therapies are available or appropriate
2. Immediate correction of vitamin K deficiency or removal of warfarin effect in a patient with active bleeding or before surgery or any invasive procedure(in conjunction with use of prothrombin complex concentrate)
3. DIC or consumptive coagulopathy with active bleeding
4. TTP
5. Massive blood transfusion
6. Therapeutic plasma exchange
7. Congenital deficiency of “C₁ esterase inhibitor”

Massive transfusion can be defined as ^[5]

1. One blood volume replacement within 24 hour period (which is roughly equal to 10 RBC units with any accompanying crystalloid, colloid, platelet or plasma transfusions) or
2. Replacement of >50% blood volume in 3 hours or
3. 4-5 units of RBC in one hour.

In massive transfusion FFP is usually transfused along with PRBC in the ratio of 1:1(FFP:PRBC).^[6]

Results

A total of 363 requisitions for FFP transfusion were received, out of which 262 requisitions were for males and 101 for females. Total number of FFP units issued was 1347. Highest number of FFP was transfused to patients from Medicine department with 1003 units. Next, was Surgery patients with 151 units of FFP, followed by Obstetrics and Gynaecology patients with 61 units. Paediatric patients consumed 46 units of FFP, Nephrology and Neurology patients 32 units each and orthopaedic patients consumed 22 units of FFP.

Maximum number of units of FFP was transfused to age between 41 to 50 years with 95 units, followed by age range of 51-60 years with 75 units, 31-40 years with 69 units, >60 years with 47 units, 1-10 years with 40 units, 21-30 units with 26 units and lastly 11-20 units with 11 units.

According to blood group , 131 A+ , 118 O + , 86 B +, 24 AB +, 2 O negative and 2 A negative FFP units were issued. 705 FFP transfusions were found to be appropriate and 625 FFP transfusions inappropriate. We could not determine the appropriateness of 17 FFP transfusions due to incomplete requisition forms.

Among the inappropriate requisitions, the commonest reason was raised PT/INR without bleeding(102), followed by haemorrhage with normal PT/INR(43), incorrect PRBC:FFP ratio(10), prophylactically without any bleeding(5), hypoproteinaemia(2) and lastly during surgery without rise in PT/INR.

Common appropriate indications were DIC with bleeding, raised PT/INR with bleeding, correction of warfarin effect, raised PT/INR before invasive procedure, massive transfusion with correct PRBC:FFP ratio and lastly therapeutic plasma exchange.

Departmentwise, surgery department has the highest percentage of inappropriate requisitions (66.7%) followed by medicine (45.2%), obstetrics and gynaecology(45%), nephrology (37.5%), paediatrics (30%), orthopaedics (28.6%) and lastly neurology(20%).

Table 1: Departmentwise FFP requisitions

Department	No. of request	No. of FFP units
<i>Medicine</i>	241	1003
<i>Surgery</i>	42	151
<i>Paediatrics</i>	40	46
<i>Obstetrics ,gynaecology</i>	20	61
<i>Nephrology</i>	8	32
<i>Orthopaedics</i>	5	32
<i>Neurology</i>	7	22
<i>Total</i>	363	1357

Table 2: Age wise transfusion of FFP

Age range(years)	No. of FFP requisitions
1-10	40
11-20	11
21-30	26
31-40	69
41-50	95
51-60	75
>60	47

Table 3: Blood group wise distribution of FFP issued

Blood group	No. of FFP issued
O+	118
A+	131
B+	86
AB+	24
O NEGATIVE	2
A NEGATIVE	2

Table 4: Indications for transfusions

Inappropriate Indications	No. of requisitions
Raised PT/INR without bleeding	103
Bleeding with normal INR	43

Incorrect PRBC:FFP ratio	10
Prophylactically without bleeding	5
hypoproteinaemia	2
During surgery without raise in PT/INR	2
Appropriate indications	
Raised PT/INR with bleeding	145
DIC with bleeding	18
Massive transfusion	18
TPE	6
Raised PT/INR before surgery	5
Correction of warfarin effect	1

Table 5: Departmentwise FFP transfusions

Department	Appropriate requisitions	Inappropriate requisitions	Incomplete forms
Medicine	131(54.4%)	109(45.2%)	1(0.4%)
Surgery	12(28.8%)	28(66.7%)	2(4.8%)
Paediatrics	27(67.5%)	12(30%)	1(2.5%)
Obstetrics, gynaecology	9(45%)	9(45%)	2(10%)
Nephrology	5(62.5%)	3(37.5%)	0
Neurology	4(80%)	1(20%)	0
Orthopaedics	5(71.4%)	2(28.6%)	0
Total	193(54.06%)	164(45.93%)	

NHMRC: National health and medical research council, ASBT:Australian society for blood transfusion, AABB: American association of blood bank, CAP: College of American pathologist and BCSH:British committee for standards in hematology.

Study	Years	Place	Guidelines	Appropriate usage percentage
Kakkar et al ¹³	2004	India	BCSH	39.7%
Chaudhary et al ¹⁴	2005	India	BCSH	29.5%
Hui et al ⁹	2005	China	NHMRC/ASBT	72%
Makroo et al ¹¹	2007	India	CAP	69.8%
Shinagare et al ¹⁸	2010	India	NHMRC/ASBT	60.6%
Kulkarni ¹⁹	2012	India	CAP/NHMRC/AST	48%

Pahuja et al ¹⁵	2012	India	BCSH/CAP	21.8%
Agarwal et al ¹⁶	2014	India	CAP	49.5%
Patel et al ¹⁷	2015	India	AABB	38%
N. Jayanthi ⁸	2015	India	NHMRC	74%
Lingegowda et al ⁷	2016	India	NHMRC/ASBT	59.3%
Puri V et al ¹²	2016	India	BCSH/CAP	67%
Yadav et al ¹⁰	2017	India	BCSH/CAP	70.91%
Shah SN et al ²⁰	2018	India	DGHS	66.44%
Current study	2021	India	AABB	54.06%

Discussion

FFP is a very useful blood component, however it carries all the risks of blood transfusion, infectious as well as non infectious. Therefore it should be judiciously used. In our study, the percentage of appropriate FFP transfusions was found to be 54.06%. Similar finding was reported by Lingegowda et al^[7] whose study showed 59.3% appropriateness. Higher percentages of appropriate FFP transfusions were reported by N. Jayanthi^[8] (74%), Hui et al^[9] (72%), Yadav et al^[10] (70.91%), Makroo et al^[11] (69.8%) and Puri V et al^[12] (67%), Kakkar et al^[13] (39.7%), Chaudhary et al^[14] (29.5%), Pahuja et al^[15] (21.8%), Agarwal et al^[16] (49.5%) and Patel et al^[17] (38%). Different authors used different guidelines as shown below.

In our study, requisitions for male patients were 262 (72.2%) and female requisitions were 101 (27.8%). Yadav et al^[10] also found more number of FFP transfusion in male (162) patients as compared to female (94) patients. But Patel et al^[17] found 176 (42%) FFP requisitions in male patients as compared to 244 (58%) in females. 95 (26.2%) requisitions came for the age group of 41-50 which was the highest among all the age groups. Puri et al^[12] found average age of FFP transfusion to be 27 years. Patel et al^[17] found maximum FFP transfusion in the age range between 18-34 years.

Among all the blood groups, O+ patients formed the highest number with 118 (32.5%) requisitions. Puri et al^[12] also found the highest requisitions among O+ patients. However, Yadav et al^[10] found highest requisitions in B+ patients. Medicine department

consumed the highest number of FFP (1003 units) from 241 (66.4%) requisitions. Similar finding was reported by Patel et al.^[17]

In our study, appropriate FFP transfusions (53.2%) were more than inappropriate FFP (45.2%) transfusions. Deranged coagulation profile with bleeding (145) topped the list of reasons for appropriate transfusion. This was followed by other reasons which were DIC with bleeding (18), massive transfusion (18), therapeutic plasma exchange (6), before an invasive procedure with deranged coagulation profile (5) and correction of warfarin effect (1).

Among the inappropriate reasons, raised PT/INR without bleeding (102) topped the list. Similar finding was reported by Patel et al^[17] and Yadav et al.^[10] In our study, we found other reasons for inappropriate FFP transfusions which were hemorrhage with normal INR (43), incorrect PRBC:FFP ratio (10), prophylactically without bleeding (5), hypoproteinemia (2), during surgery with normal coagulation profile (2).

Puri et al^[12] found the most common cause of inappropriate FFP transfusion to be severe anaemia with anticipated bleeding. Kakkar et al^[13] found hypoproteinemia as the commonest cause and Shinagare et al^[18] found volume expansion as the commonest cause of inappropriate FFP transfusion.

Conclusion

The percentage of inappropriate FFP transfusion (45.93%) is still high in our Institute. We recommend continuation of regular evaluation of FFP transfusion, because this will bring to light whether rational use of

blood component is being followed or not. The hospital transfusion committee should frame proper transfusion guidelines for FFP transfusion. This will help in making decisions regarding FFP transfusion easy.

We can also conduct awareness programs regarding component therapy. This will greatly reduce inappropriate FFP transfusion, because lack of proper knowledge seems to be the leading cause behind inappropriate FFP transfusion. All these measures will ensure that FFP, which is a precious blood component, is properly utilized and benefits the right patient.

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