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Original Research Article

Fresh frozen plasma utilization pattern in tertiary care hospital of North Western India

Nippun Prinja*, Sarita Sharma, Rachna Narain

Department of IHTM, SMS Medical College, Jaipur, Rajasthan, India

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***Correspondence:**
Dr. Nippun Prinja,
E-mail: gmchprinja@yahoo.com

ABSTRACT

Background: Fresh Frozen Plasma (FFP) is mainly used in treatment of coagulation derangements; trauma emergencies. It is the most inappropriately used blood component. Since the guidelines for FFP use in a clinical setting are not well defined, this study aims at defining the appropriateness of use of FFP in the light of its risks and adverse effect. Audit of institute FFP usage with specific aim of assessing appropriate use, based on clinical indications and laboratory parameters in requisition form.
Methods: Retrospective analysis of 10,753 FFP supplied in 3072 patients from June 2016 to December 2016 in SMS Hospital, Jaipur, Rajasthan, India was done in Department of Immunohaematology and Transfusion Medicine, SMS Hospital, Jaipur, Rajasthan, India. Detailed analysis of clinical indication, INR value, specialty, age, gender of patient was done.
Results: 10,753 FFP was supplied to 3072 Patients. 6990 FFP was supplied to 1995 males. 3763 FFP was supplied to 1077 females. Clinical use of FFP for medical and surgical conditions was highest seen in Blood Cancers (13%) and Cardiosurgery (22.3%). 15.2% was available from Emergency Department. 1.9% of FFP was returned back. Patients with Deranged Coagulation Profile (DCP) require maximum transfusion (49.3), Bleeding patients (37.6%), DIC (3.3%). FFP used for plasmapheresis (2.6%). No information available about diagnosis (7.2%) was available from Emergency Department.
Conclusions: FFP is most inappropriately used blood component (39.57%) and should be used judiciously. Regular audit of blood components serves as tool for accomplishment of quality tools and to understand clinical transfusion practices.

Keywords: Audit, Inappropriately, Plasma

INTRODUCTION

Fresh frozen plasma (FFP) has been available since 1941 and was initially often used as volume replacement. Fresh-Frozen Plasma (FFP) is component that is prepared by whole blood and freezing various plasma factors or from the plasma collected through.

FFP contains stable coagulation factors, immunoglobulin and albumin at same level as of typical plasma. This being the case, FFP can be considered a costly and effective component, the source of which is the human body.[1] FFP is now used in cases of massive bleeding or to prevent bleeding in patients with abnormal coagulation profile undergoing an invasive procedure.[2]

The major indications are replacement therapy for documented coagulation factor deficiency in a patient undergoing an invasive procedure, bleeding patient, reversal of warfarin effect, antithrombin III massive

blood transfusion, immunodeficiency and thrombotic thrombocytopenic purpura.[3,4]

Inappropriate requests for plasma transfusions, exposes patients to risks of transfusion reduce the availability of FFP which can be allocated to the production of plasma derivates, still remains insufficient to cover national needs.[5-8] Unnecessary use of FFP is increase the risk of side effects from the transfusion in patients, wasting sources. Excess volume replacement, anaphylaxis, diseases transmitted through transfusion and transfusion - based lung injury (TRALI) are the complications likely to develop out of the use of FFP.[9]

Hence, the use of FFP is not without potential danger. In this study, we analyzed appropriateness of transfusion requests in our tertiary care hospital.

METHODS

Retrospective analysis of 10,753 FFP supplied in 3072 patients from June 2016 to December 2016 in SMS Hospital, Jaipur, Rajasthan, India was done in department of Immunohaematology and transfusion medicine, SMS Hospital, Jaipur, Rajasthan, India.

Detailed Analysis of requisition form which is sent to blood bank for issue of blood/blood components was done. It includes all parameters such as Clinical Indication, INR value, Specialty, Age, gender of the patient. It is written on requisition form by clinician and undersigned by him. INR values written on requisition form were crosschecked by the written report issued by hospital.

RESULTS

3072 patients were included in present study.1995 patients were male, and 1077 patients were female.

Table 1: Gender based analysis of patients.

Male	1995
Female	1077
Total Patients	3072

10753 FFP was supplied. 6990 was supplied to male patients and 3763 was supplied to female patients.

Table 2: Gender based analysis in terms of FFP supplied.

Male	6990
Female	3763
Total FFP	10753

Maximum FFP supplied were to patients of age group 50-59 years.

Table 3: Age based analysis of FFP supply.

Age group (years)	FFP supply	Percentage
0-9	102	0.95
10-19	358	3.33
20-29	668	6.07
30-39	1142	10.52
40-49	1732	16.10
50-59	3127	29.08
60-69	1539	14.61
70-79	1032	9.60
80-89	516	4.79
90-99	459	4.23
>100	78	0.72

Table 4: Diagnosis on requisition forms for FFP supply.

Diagnosis	No. of subjects	%	95% CI
Deranged coagulation profile (DCP)	1514	49.3	46.8-51.7
Bleeding patients	1155	37.6	35.7-39.4
DIC	101	3.3	3.1-3.4
Therapeutic plasma exchange	80	2.6	2.4-2.7
No diagnosis written	222	7.2	6.8-7.5
Total	3072	100	

Maximum FFP were supplied to patients diagnosed with Deranged coagulation profile. Least number of FFP was supplied to patients undergoing Therapeutic Plasma Exchange (TPE). In 7.2% cases no diagnosis was written on requisition form.

Table 5: Departmental audit of FFP supply.

	No. of FFP	%	95%CI
Medical conditions			
Blood cancer	1398	13	12.35-13.65
Cardiology	645	6	5.7-6.3
Nephrology	505	4.7	4.46-4.93
Medical Oncology	570	5.3	5.03-5.55
Gastrology	537	5	4.75-5.25
Surgical condition			
CTVS	2398	22.3	21.18-23.41
Emergency trauma	1636	15.2	14.44-15.96
Neurosurgery	1548	14.4	13.68-15.12
OBG	828	7.7	7.31-8.08
Ortho	387	3.6	3.42-3.78
Urology	183	1.7	1.61-1.78
ENT	118	1.1	1.04-1.15

Maximum use of FFP was seen in blood cancer patients and in cardiothoracic surgeries.

62.33% FFP was supplied to patients having INR values greater than 1.5 and remaining to patients having INR value less than 1.5.

Table 6: Supply on basis of INR on requisition form.

INR (on requisition form)	No. of FFP supplied	Percentage
>1.5	6703	62.33
<1.5	2840	26.41
No coagulation status	1210	11.26
Total	10753	100

In 11.26% FFP supplied, request form had no coagulation screening status. In 26.41% FFP supplied, request form had INR<1.5%. About 1.9% of FFP was returned back from the ward, hence were discarded (once thawed) and rest all were transfused. Out of 10,753 FFP supplied, 62.33% FFP were transfused appropriately while 39.57%were transfused inappropriately over 6 months time from June 2016 to December 2016.

Table 7: Transfusion status of FFP supplied.

Transfusion status	No. of FFP	Percentage
Transfused	10548	98.1
Not Transfused	205	1.9
Total	10753	100

DISCUSSION

Clinical audit of the use of FFP is considered a valid method for improving the use of this blood component. Patients receiving FFP unnecessarily have the risk of allergic reactions, viral transmission, transfusion-associated lung injury and volume overload without any clinical benefit. The result of the retrospective audit of transfusion requests for the use of FFP showed 62.33 were appropriate and 39.57 were inappropriate requests.

Many Studies have been carried out with variable results from 73% inappropriate (Chng et al) to 23.10% (Kakkar et al).[10,11] A study done by Vishwanathan et al showed 30.39% of FFP requests received were with questionable indications.[12] Basu et al found 42% FFP were inappropriate issued.[13] Chatterjee et al found 61% appropriate FFP among surgical oncology patients.[14] A study by Eagleton et al showed 66% appropriate FFP usage.[15] But the finding of Hui et al suggests more appropriate usage that is 72%, in comparison to this study.[16] The appropriate use of FFP in the prospective study by Luk et al was only 47%, which is significantly less than this finding. Inappropriate FFP usage in various studies is given in Table 8.[10-17]

This study showed us FFP usage both in paedetric population and adult population. FFP usage/patient ratio was seen almost same in both males (3.51/male patient) and females.

Clinical use of FFP was more seen in surgical conditions than medical conditions. FFP for medical conditions was highest seen in leukemic patients. FFP for surgical conditions was highest seen in cardiac surgeries mostly in CABG patients. Most appropriate use of FFP was also seen in CABG patients as seen in different studies.

Table 8: Different studies showing inappropriate FFP usage.

Studies/Authors	Inappropriate FFP usage
Chng et al	73.00
Luk et al	53.00
Basu et al	42.00
Chatterjee et al	39.00
Eagleton et al	34.00
Vishwanathan et al	30.39
Hui et al	28.00
Kakkar et al	23.10
Present study	39.57

DCP (Dearranged Coagulation Profile) is the most common indication in our study for which FFP was used followed by Bleeding patients and DIC. All leukemic patients were seen as having DIC and FFP was transfused. 2.6% of FFP used were for Therapeutic Plasma Exchange as in our settings patient is not financially affordable so FFP are used on regular basis.

Salient findings in present study on analysis of 10,753 FFP supplied in 3072 patients from June 2016 to December 2016. Inappropriate usage of FFP is 39.57%.

Maximum number of FFP used in surgical department is by CTVS. Maximum number of FFP used in medical department is by ONCOLOGY. Departmental study is being done to improve plasma usage so that critical areas/departments can be targeted and side effects of inappropriate use can be explained to medical personnel.

Critical areas that should be targeted by interventions to improve plasma usage are those related to the appropriateness of the indication, the completeness of the data entered in the request forms and the data recorded in the clinical charts.

FFP usage plays a significant role in DCP, DIC, CABG, Oncology patients, so if used appropriately serves as boon and can reach more patients in need.

CONCLUSION

The results of this study show that FFP prescription be improved, procedural aspects need to be uniformed, from the requisition form to the management of the information and documents in clinical records, since data produced by the measurement and evaluation systems are important from clinical, epidemiological and management point of view.

The completeness of the compilation of both the request forms and the clinical records, as well as the appropriateness of the indication and the dose of FFP is

found to be the most critical issue to deal with during the production of hospital transfusion guidelines and those most necessary to constant evaluation, through periodic auditing by hospital transfusion committee in order to determine the appropriateness of the use of FFP.

Only regular audits, conducted by a multidisciplinary working group, will be able to monitor and verify the efficacy, if any, of the interventions that must be implemented to produce improvements, from the acceptance of the request forms to the recording of data in the clinical charts. This would help in better inventory management and to understand clinical transfusion practices.

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