



Transfusion Medicine

USAGE OF FRESH FROZEN PLASMA – A RETROSPECTIVE AUDIT IN A TERTIARY CARE HOSPITAL

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ABSTRACT **BACKGROUND:** Fresh Frozen Plasma (FFP) is mainly used in treatment of coagulation derangements, the reversal of warfarin effect & trauma emergencies. Unnecessary use of FFP is known to increase the risk of side effects in plasma transfusing patients like anaphylaxis, TRALI (transfusion related acute lung injury) & risk of TTI (transfusion transmitted infections) etc. Therefore, it is important to use FFP appropriately and rationally to make safer transfusion. **AIM:** Our aim of this study was to analyse the appropriate and inappropriate usage of FFP, Indications for FFP transfusion in our tertiary care hospital. **METHODS:** Retrospective audit was conducted at our tertiary care hospital over a period of 6 months. Analysis of 2285 FFP supplied in 715 patients from January 2022 to June 2022 was done. Detailed analysis of INR value, speciality, clinical indication, clinical diagnosis, gender of patient, blood group was done. All FFP transfusions evaluated according to FFP transfusion guidelines of Directorate general of health services (DGHS), as we classified them appropriate or inappropriate. **RESULTS:** A total of 2285 FFP's were issued to 715 patients, out of which 462 patients were males and 253 patients were females. 1461 FFP were supplied to male patients and 824 were supplied to female patients. The maximum number of FFPs were supplied to bleeding patients and minimum to patients of therapeutic plasma exchange. The maximum number of FFPs were issued by the department of medicine. 71.03% FFP's were transfused appropriately while 28.97% were transfused inappropriately. **CONCLUSIONS:** Study showed that 71.03% were appropriate and 28.97% were inappropriate use of FFP's in patients. After evaluating the usage of FFP, we were found that there is generalized irrational use of FFP among specialists. To reduce this inappropriate use of FFP's,

- ✓ Awareness program should be conducted for the clinician.
- ✓ Establish the hospital transfusion guidelines.
- ✓ Appropriate indication for FFP transfusion should be written on requisition forms.

KEYWORDS : Audit, Fresh Frozen Plasma, appropriateness, Transfusion

INTRODUCTION

Blood transfusions are an important part of medical management in the modern Health Care System.^[1] Fresh frozen plasma (FFP) has been available since 1941 and was initially often used as volume replacement.^[2] Blood and blood products are collected from healthy donors after conducting an appropriate selection procedure and special clinical lab tests. The Blood components that are available mostly include red cell concentrates, platelet concentrates, FFP & cryoprecipitate.^[1] Fresh frozen plasma is plasma frozen within 6-8 h of collection, and it is stored at -18°C or lower for up to 1 year to preserve all factors at hemostatic levels, including the labile factors V and VIII. FFP is thawed in a water bath at $30-37^{\circ}\text{C}$ for 30 min and can be stored after thawing for up to 24 h at $2-8^{\circ}\text{C}$.

FFP is the primary source of coagulation factors for patients with coagulation factor deficiencies.^[2] The major indications for FFP are replacement therapy for documented coagulation factor deficiency in a bleeding patient or before a procedure, emergent reversal of warfarin, deficiency of antithrombin III, massive blood transfusion, and thrombotic thrombocytopenic purpura.^[3,4] Without any indication it is the most common blood component to be used in clinical practice. Unnecessary use of FFP is increase the risk of anaphylactic reactions, viral transmission, transfusion-related acute lung injury (TRALI), immune hemolytic transfusion reactions and volume overload without any clinical benefit. Also irrational use of FFP may lead to shortage of this blood component. Hence, it should be used when clearly indicated as per guidelines.

METHODS

A Retrospective study was done in the Department of Immunohematology and Blood Transfusion, SSG Hospital, Vadodara, Gujarat. From January to June 2022. Total 2285 FFP units were issued to 715 patients during this study. All requisition forms for the issue of blood/blood components were analyzed. It includes parameters like INR value, speciality, clinical indication, clinical diagnosis, gender of patient, blood group. All FFP transfusions evaluated according to FFP transfusion guidelines of Directorate general of health services (DGHS), as we classified them appropriate or inappropriate. Infusion of 10-15ml/kg body weight of FFP's with INR >1.5 in patients and in

whom clinical criteria for FFP usage were fulfilled were classified as appropriate, otherwise inappropriate.

RESULTS

A total of 715 patients were included in the present study of which, 462 patients were males and 253 patients were females.

Table 1: Gender based analysis of patients

Total Patients	715
Males	462
Females	253

A total of 2285 FFP were supplied, out of which 1461 were supplied to male patients and 824 were supplied to female patients.

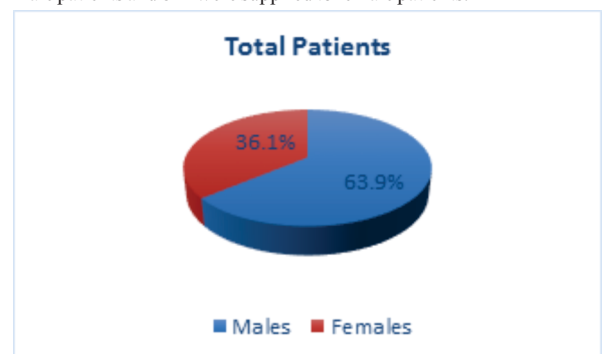


Figure 1: Percentage of FFP's issued to Males and Females

Patients age range from new-born baby to 83 years old with a mean age of 33 years. FFP was most commonly transfused in the age group of 22-38 years.

The maximum number of FFPs were supplied to bleeding patients and minimum to patients of therapeutic plasma exchange.

Table 2: Indications for Fresh Frozen Plasma

Indications	Number of patients	Percentage
Deranged coagulation profile	146	20.42%
Disseminated intravascular coagulation	84	11.75%
Bleeding patients	363	50.76%
Hypovolemia	29	4.05%
Therapeutic plasma exchange	07	0.98%
Liver disease without active bleed	21	2.94%
No diagnosis written	65	9.10%
Total	715	100

The maximum number of FFPs were issued by the department of medicine.

Table 3: Departmental audit of FFP issued

Department	No. of FFP issued	Percentage
General Medicine	656	28.71%
General Surgery	346	15.14%
Neurosurgery	174	7.61%
Gastroenterology	70	3.10%
Nephrology	237	10.40%
Cardiothoracic and vascular surgery	216	9.45%
Obstetrics and Gynaecology	302	13.22%
Orthopedics	223	9.76%
Others	61	2.67%

A 71.03% FFP's were issued to patients having INR values greater than 1.5 and 21.27% FFP's were issued to patients with INR values less than 1.5 and 7.70% FFP's were issued to patients with requisition form where no coagulation status was written. About 0.5% of FFP were returned without usage were discarded. Out of 2285 FFP's supplied, 71.03% FFP's were transfused appropriately while 28.97% were transfused inappropriately.

Table 4: Issue of FFP based on INR value written on requisition form

INR (on requisition form)	No. of FFP issued	Percentage	Category
>1.5	1623	71.03%	Appropriate usage
<1.5	486	21.27%	Inappropriate usage
No coagulation status	176	7.70%	Inappropriate usage

DISCUSSION

It is very essential that blood and its components should be used cautiously and appropriately. Many studies have shown an incidence of inappropriate use of FFP. Unnecessary use of FFP can have a serious impact on patient's safety as its transfusion may lead to viral transmission, allergic reactions, TRALI, volume overload without any clinical benefit. So, clinical audit of the FFP usage is considered an important method for improving the use of this blood component.

Many Studies have been carried out with variable results from 73% inappropriate (Chng et al) to 23.10% (Kakkar et al).^[9,10] A study done by Vishwanathan et al showed 30.39% of FFP requests received were with questionable indications.^[11] Basu et al found 42% FFP were inappropriate issued.^[12] Chatterjee et al found 61% appropriate FFP among surgical oncology patients.^[13] A study by Eagleton et al showed 66% appropriate FFP usage.^[14] But the finding of Hui et al suggests more appropriate usage that is 72%, in comparison to this study.^[15] The appropriate use of FFP in the prospective study by Luk et al was only 47%, which is significantly less than this finding.^[16] Inappropriate FFP usage in various studies is given in table.

Table 5: Inappropriate use of FFP in various studies

Studies	Inappropriate use of FFP
Chng et al	73%
Luk et al	53%
Basu et al	42%
Chatterjee et al	39%
Eagleton et al	34%
Vishwanathan et al	30.39%
Hui et al	28%
Kakkar et al	23.10%
Present study	28.97%

In our study inappropriate usage includes following indications like no diagnosis written on request forms, hypovolemia, bleeding or non-

bleeding patients with PT/INR non-availability or within normal limits, liver disease with or without deranged PT/INR but no evidence of bleeding and with no indications. Luk et al. found maximum patients to be inappropriately transfused with FFP in the presence of normal coagulation profile. However, Kakkar et al. in their prospective study from India have found Hypoproteinemia state to be the most common cause of inappropriate use whereas use of FFP for volume expansion has been quoted as the most common cause of inappropriate use by shinagare et al.^[10,17]

CONCLUSION

Study showed that 71.03% were appropriate and 28.97% were inappropriate use of FFP's in patients. After evaluating the usage of FFP, we were found that there is generalized irrational use of FFP among specialists. To reduce this inappropriate use of FFP's,

- ✓ Awareness program should be conducted for the clinician.
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