

## A Clinical Audit of Fresh Frozen Plasma request in a Tertiary Care Hospital Of North-Western India

Niti Maheshwari<sup>1\*</sup>, Sonia Tanwar<sup>2</sup>, Ravi Kant Sunaria<sup>2</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Senior Demonstrator,  
Blood Bank, Department of Pathology, J.L.N. Medical College, Ajmer, Rajasthan, India.

### ABSTRACT

**Introduction:** Clinical audit of Fresh Frozen Plasma (FFP) uses is having a major role in improving the quality of transfusion services, as patients receiving Fresh Frozen Plasma unnecessarily will have the risk of allergic reactions, viral transmission, transfusion-associated lung injury and volume overload.

**Aim & Objectives:** To audit the appropriateness and inappropriateness of transfusions of fresh frozen plasma according to clinical indications.

**Material and Methods:** A retrospective study for six months has been done in the blood bank of J.L.N Medical College and Hospital, Ajmer Rajasthan regarding Fresh Frozen Plasma use in patients admitted in various departments. The results are evaluated according to British Committee for Standards in Hematology (BCSH) guidelines for appropriateness of Fresh Frozen Plasma uses.

**Results:** A total of 2257 Fresh Frozen Plasma were transfused to 1120 patients admitted in our hospital during the study period of six months out of which only 33.65% transfusions were found to be appropriate and most common appropriate

indication was bleeding with normal coagulation profile.

**Conclusion:** Fresh Frozen Plasma is one of the most inappropriately used blood component due to lack of knowledge among clinicians regarding guidelines of appropriate usage. This increases the risk of side effects of Fresh Frozen Plasma transfusion as well as treatment cost.

**Key words:** Appropriate, Fresh Frozen Plasma (FFP), Transfusion.

### \*Correspondence to:

Dr.Niti Maheshwari,  
617, B. K. Kaul, Ram Nagar, Ajmer, Rajasthan, India.

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### INTRODUCTION

Effective blood transfusion therapy depends upon on the availability of different blood components. These components, used separately or in combinations, can meet most patients transfusion need and keeping the risk of transfusion to a minimum. A blood donor donates the product known as whole blood, from which components are prepared.

- Component preparation allows transfusing only specific blood component that the patient requires.
- Transfusion of only the specific constituent of the blood needed avoids the use of unnecessary component, which could be contraindicated in a patient.
- By using blood components, several patients can be treated with the blood from one donor, giving optimal use of every unit of donated blood.
- Use of blood components, supplements blood supply - adds to blood inventory.

The blood plasma components can be prepared in blood bank by conventional methods (e.g. centrifugation, freezing and thawing) for therapeutic use while plasma derivatives (fractions) are prepared by biochemical or other manufacturing process under

pharmaceutical manufacturing conditions in a well equipped Plasma Fractionation Laboratory. Plasma components are used widely in clinical practice then plasma derivatives (fractions) due to easy availability and cost effectiveness.

FFP is plasma obtained from a single donor either by normal donation or by plasmapheresis and rapidly frozen within 6-8 hours of being collected. It contains all coagulation factors and great care must be taken during collection of blood, freezing and thawing to preserve their activity.

### Dosage of FFP

About 10 ml / Kg of body weight. Post transfusion assessment of levels of aPTT, PT and fibrinogen is done for monitoring the effect of FFP. FFP should be thawed at 30-37°C in circulating water bath. Thawed plasma should be transfused as soon as possible, or within 12 hours, if stored at 2-4°C.

Contrary to the general belief among clinicians, FFP transfusions are not risk free. Allergic reactions<sup>1</sup>, infectious complications, hemolysis, fluid over load, transfusion related acute lung injury (TRALI) and immune suppression can be caused by FFP administration.<sup>1</sup>

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

## MATERIALS AND METHODS

This retrospective study was conducted in the blood bank of J.L.N. Hospital Ajmer, Rajasthan.

The requests for FFP transfusion during the study period between

July 2017 and December 2017 were analyzed for appropriateness as per British Committee for Standards in Hematology (BCSH). (Table 1)<sup>2</sup>

Data of age, gender of the patient, provisional clinical diagnosis, indication for FFP, Department of the requesting clinician, Date of transfusion and number of unit collected. A transfusion episode in this study was defined as one when any number of FFP was transfused after each individual request.

**Table 1: Criteria for the use of fresh frozen plasma (BCSH, 1992)**

### Definite indications for the use of FFP:

- 1- Replacement of single coagulation factor deficiency where specific factor concentrate is not available
- 2- Immediate reversal of warfarin effect
- 3- Acute DIC
- 4- Thrombotic thrombocytopenic purpura

### Conditional uses of FFP: in the presence of bleeding and disturbed coagulation:

- 1- Massive transfusion
- 2- Liver disease
- 3- Cardiopulmonary bypass surgery

### No justification for the use of FFP:

- 1-Hypovolemia
- 2-Plasma exchange
- 3-Nutritional support
- 4-Treatment of immunodeficiency states

**Table 2: Gender based analysis of patients and FFP supplied**

Gender	No. of patient	No. of FFP's Supplied
<b>Male</b>	545	900
<b>Female</b>	575	1357
<b>Total</b>	<b>1120</b>	<b>2257</b>

**Table 3: Age wise distribution of patients according to FFP uses**

Age group (in years)	FFP supplied	%
<b>0-9</b>	454	20.0
<b>10-19</b>	323	14.3
<b>20-29</b>	711	31.5
<b>30-39</b>	309	13.7
<b>40-49</b>	157	7.0
<b>50-59</b>	103	4.6
<b>60-69</b>	88	3.9
<b>&gt;70</b>	112	5.0
<b>Total</b>	<b>2257</b>	<b>100</b>

**Table 4: Department-wise issue of fresh frozen plasma**

Department	No. of patients	%
<b>Surgery</b>	220	19.7
<b>Medicine</b>	107	9.5
<b>Orthopedic</b>	18	1.6
<b>Pediatrics</b>	578	51.7
<b>Obs &amp; Gynae.</b>	183	16.3
<b>Others</b>	14	1.2
<b>Total</b>	<b>1120</b>	<b>100</b>

## RESULTS

A total of 2257 units of FFP were transfused to 1120 patients during the study period out of which 545 patients were male, and 575 patients were female. 2257 FFP was supplied, 900 were supplied to male patients and 1357 were supplied to female patients. (Table 2)

Maximum FFP were supplied to patients of age group 20-29 years. (Table 3) The breakdown of these results according to the individual departments shows that maximum request was made by Pediatrics Medicine and followed by surgery unit. (Table 4)

Total number of transfusion episodes were 1120 (no. of supplied FFP 2257) out of which 22 episodes (no of FFP 43) were not having indication mentioned so we have taken 1098 episodes (no. of FFP supplied 2214) for clinical audit. (Table 5)

**Table 5: Evaluation of FFP uses according to the clinical indications**

	No. of transfusion episodes	No. of FFP infused
<b>APPROPRIATE USES</b>		
Liver disease	19	48
DIC	334	532
Post op bleeding with deranged coagulation profile	8	31
Massive transfusion	22	118
Reversal of warfarin effects	3	11
Factor deficiency	2	5
<b>INAPPROPRIATE USES</b>		
Surgery related with normal profile	158	325
Bleeding cause with normal coagulation profile	285	432
Hypoproteinaemia	14	22
Hypovolaemia	184	604
Dengue	55	68
Snake Bite	11	15
Poisoning	3	3
<b>Total</b>	<b>1098</b>	<b>2214</b>

**Table 6: Comparison of Different studies showing appropriate FFP uses**

Studies	Appropriate FFP Usage
Schofield et al <sup>[3]</sup>	37
Chaudhary R et al <sup>[4]</sup>	33
Chng WJ et al <sup>[5]</sup>	27
Agarwal et al <sup>[6]</sup>	49.5
Kakkar N et al <sup>[7]</sup>	40
Luk C et al <sup>[8]</sup>	47
Shinagare et al <sup>[9]</sup>	60.6
<b>Present study</b>	<b>33.65</b>

## DISCUSSION

Clinical audit of FFP uses is having a major role in improving the quality of transfusion services, as patients receiving FFP unnecessarily will have the risk of allergic reactions, viral transmission, transfusion-associated lung injury and volume overload.<sup>2</sup> Inappropriate use will lead to wastage of limited resources as well as will lead to increased healthcare cost and risk of transfusion related complications like viral transmission which could lead to significant morbidity and mortality.<sup>3,4</sup>

Present retrospective study showed that total 2257 FFP were supplied to 1120 patients in blood bank of J.L.N. Medical College & Hospital, Ajmer from July to December 2017. The male to female ratio was 1:1.05 while FFP supplied to male and female ratio was 1.65: 2.36. Maximum numbers of FFP were supplied to age group of 20-29 years.

In this study of clinical audit of FFP Transfusion identified 33.65% requests for transfusion were appropriate. The most common appropriate indication was DIC followed by massive transfusion and liver disease (BCSH Guidelines 1992). The common indications of misuse (66.35%) were bleeding cause with normal coagulation profile followed by Hypovolaemia Surgery related with normal profile transfusion in dengue and Hypoproteinaemia.

Many studies have been carried out about appropriate and inappropriate uses of FFP transfusion showing appropriate indications from 27% Chng WJ et al to 60% Shinagare et al which was comparable to present study (Table 6).

Sufficient guidelines and recommendations for the transfusion of FFP are available in medical literature, but FFP usage remains often misused due to lack of knowledge among clinicians.

## CONCLUSION

After evaluating the usage of FFP, it was found that there is a generalized and widespread irrational use of FFP among specialists. To reduce the inappropriate usage of FFP our recommendation are:

- Periodic reinforcement of hospital transfusion guidelines in clinic pathological conferences and hospital blood transfusion committees meeting should be done.
- Regular clinical auditing conducted by a multidisciplinary working group, about the use of blood components is required.
- Proper education of medical staff about the use of blood components is needed.
- The appropriate indication for FFP transfusion should be mentioned regularly in the requisition forms.

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