

DETERMINATION OF FREQUENCY OF APPROPRIATE FRESH FROZEN PLASMA (FFP) TRANSFUSION IN ADMITTED PATIENTS

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ABSTRACT

Objectives: To assess frequency of appropriate Fresh Frozen Plasma (FFP) transfusion in admitted patients in tertiary care of South Punjab.

Material & Methods: This descriptive cross-sectional study, was conducted in the Department of Pathology and Blood Bank at Combined Military Hospital Multan from 2nd May 2019 to 1st November 2019. A total of 119 patients from 3 months of age to 50 years of age of both male and female, for whom Fresh Frozen Plasma transfusion was advised were included. Demographic data (age and gender), requesting department, and clinical parameters for the appropriateness of FFP transfusion for example, history of drug intake, surgery or invasive procedures, coagulation profile, number of FFP units transfused, were recorded on case record form. Case record form was attached. Appropriate FFP transfusion was labeled.

Results: In this study, age of study population was ranged from 30 months to 50 years with 24.25 ± 12.65 years mean age. Out of 119 patients 64 (53.78%) were between ages of 3 months to 25 years while 89 (74.89%) were male and 30 (25.21%) female with female to male ratio of 1:3. In this study, we have found the frequency of appropriate Fresh Frozen Plasma (FFP) transfusion in 71 (59.66%).

Conclusion: Fresh frozen plasma should be transfused appropriately according to requirement to secure reserve and prevent unnecessary use. Percentage of appropriate fresh frozen plasma (FFP) transfusion in admitted patients in our study is 59.66%.

Key Words: Fresh frozen plasma, Appropriate usage.

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INTRODUCTION

Fresh Frozen plasma, a blood product which is prepared from whole blood or apheresis, contains normal levels of coagulation factors, albumin and Immunoglobulins [1]. Plasma is termed Fresh Frozen Plasma (FFP) if it is frozen within 8 hours of phlebotomy to preserve labile clotting factors [2]. Fresh frozen plasma transfusion is indicated for the treatment of active bleeding in coagulation factors deficiencies when specific factor concentrate is not available [3]. The recommended therapeutic dose of FFP is 10-15 ml/Kg body weight. The dose of FFP however depends on the clinical situation and laboratory parameters [4]. It also has its hazards like transmission of infections, transfusion reactions, volume overload and transfusion related acute lung injury (TRALI) latter is the most fatal one [5].

Constituents of FFPs are fibrinogen (400 to 900 mg/unit), protein C, protein S, anti-thrombin, albumin and tissue factor pathway inhibitor [6]. It is free of erythrocytes and leukocytes. A dose of 10 to

20 ml/kg (4 to 6 units in adults) will have raised levels of coagulation factors by approximately 20% [7]. Approximately 10% of several coagulation factors are sufficient to effect hemostasis.

FFP should have to be injected intravenously only and it must have been compatible with ABO blood grouping to the recipient's red cells. -30°C should be used for storage before use. FFP should have been thawed in a water bath at 30o to 37o C for 20 to 30 minutes or in an FDA-approved device as quickly as 2 to 3 minutes. Re-administration might have been considered every 6 to 8 hours after initial administration, if indicated due to half-life of factor VII which is 2 to 6 hours [8].

Various guidelines are published for the proper use of FFP such as NHMRC/ASBT guidelines [9], CAP guidelines [10], and BSH guidelines [11]. These guidelines recommend indications and contraindications of FFP transfusion, but due to malpractice or neglectance of these guidelines, FFPs are transfused in many conditions for which these are not indicated which lead to shortage of FFP and its products at the time of need [12]. Clinical audit seems to be an effective way to improve the use of FFP. The Purpose of our study is to identify and evaluate indicators of appropriate-ness for FFP

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requests. Guidelines by British Society of Hematology [13] will be used for this study as standard. Rationale of our study was to access inappropriate use of FFP in our hospital. Under the light of result of this pilot audit, repeated audits will be done after education sessions which would help us in making strategies to improve the utilization and to decrease the unnecessary consumption of this important blood constituent.

MATERIAL AND METHODS

It is a cross-sectional, descriptive study had been conducted in Pathology department and Blood Bank, Combined Military Hospital, Multan from May 2019 to November 2019. The sample size is calculated as 119 transfusion episodes while keeping the confidence level (1- α) 95%, absolute precision required(d) equal to 0.09 and taking the anticipated population proportion (p) of appropriate. Fresh Frozen Plasma usage as 52%. Non-probability, Consecutive sampling technique was used. Patients from 3 months of age to 50 years of age either gender, for whom Fresh Frozen Plasma transfusion was advised by physician were included, while FFP issued to patients of other hospitals and patients having missing data were excluded. Patients receiving FFP transfusion in different clinical units of Combined Military Hospital were selected for study. Informed consent was taken, and patient identity was not be disclosed. A separate ID was assigned to each case. This study was approved by Institutional Ethics Committee. Data collection tools were transfusion request forms, patient files, physician's contact and laboratory data whenever required.

Demographic data (age and gender), requesting department, and clinical parameters for the appropriateness of FFP transfusion for example, history of drug intake, surgery or invasive procedures, coagulation profile, number of FFP units transfused, were recorded on case record form. Data was entered and analyzed in SPSS version 21. Descriptive statistics were calculated. Mean \pm SD was calculated for age of the patient and units of FFP used. Frequency and percentages were calculated for gender, active bleeding, invasive procedure, and appropriateness of FFP transfusion. Data was stratified for age, gender, active bleed and invasive procedure. Post stratification chi square test was used taking p-value \leq 0.05 as significant

RESULTS

In this study, age of study population was ranged from 3 months to 50 years with 24.25 ± 12.65 years mean age. 53.78 % (64) belonged to age of 3

months to 25 years and 46.22 % (55) were of 26 to 50 years. Out of 119 patients, 64.71 % (77) had undergone invasive procedure while 35.29 % (42) had not. Out of the 119 patients, 74.89% (89) were male and 25.21% (30) were females with male to female ratio of 1:3. Mean units of FFPs used were 3.00 ± 1.00 .

In 59.66 % (71) of total patients (119), FFPs were transfused appropriately according to guidelines. Stratification of appropriate Fresh Frozen Plasma (FFP) transfusion with respect to age and gender (shown in Table 1 & 2) respectively. Table 3 is showing the stratification of appropriate Fresh Frozen Plasma (FFP) transfusion with respect to active bleed and invasive procedure. P value indicates the level of significance between transfusion of FFP and age, gender, active bleeding and invasive procedure

Table-1: Stratification of appropriate fresh frozen plasma (FFP) transfusion with respect to age groups.

Age (years)	Appropriate fresh frozen plasma (FFP) transfusion		p-value
	Yes	No	
3 months-25 years	35	29	0.233
26-50 years	36	19	

Table-2: Stratification of appropriate fresh frozen plasma (FFP) transfusion with respect to gender.

Gender	Appropriate fresh frozen plasma (FFP) transfusion		p-value
	Yes	No	
Male	52	37	0.636
Female	19	11	

Table-3: Stratification of appropriate fresh frozen plasma (FFP) transfusion with respect to invasive procedure.

Invasive procedure	Appropriate fresh frozen plasma (FFP) transfusion		p-value
	Yes	No	
Yes	47	30	0.679
No	24	18	
Active Bleed			
Yes	41	25	0.542
No	30	23	

DISCUSSION

The requirements of FFP has been significantly enhanced in the past 10 years, and its requirements increases continuously. There are certain conditions where usage of FFP are indicated, such as in patients with coagulation disorders which ranges from DIC to active bleed, in patients with thrombotic thrombocytopenia and liver disease. Fresh frozen plasma is widely used in ICU patients and prescribed for the treatment of bleeding or the prevention of bleeding in critically ill patients.

Data published in various studies show inappropriate or non-indicated utilization of fresh frozen plasma varies from 37 to 66%. In developing countries like Pakistan, we have limited blood bank services and resources that need to be managed properly. In a study performed in Islamabad, appropriate transfusion of FFP were 52% while 46% were transfused inappropriately [12]. In addition to inappropriate transfusion, inappropriate requests for FFP transfusion, also reduces the availability of FFP which exposed the patients to risk of transfusion. Furthermore, excessive utilization may be responsible for decreased accessibility for the albumin and immunoglobulin products. Therefore, FFPs should be used with great cautions to avoid shortage.

Several indications for transfusion of FFP have been given by professionals and consensus have been reported in the literature since 1985 [14]; however there exists some limitations. First, these guidelines were old and had been published a decade or more ago. Second, they were mainly consensus of professional rather than recommendations, which had not been consequential of well-directed and well-studied randomized controlled trials. Various studies had pointed out unnecessary utilization of FFP [15]. Appropriate use of FFP must be warranted on irrefutable grounds till availability of better evidences. A systematic review by Stanworth *et al.* for identification and analysis of all RCTs examining the clinical effectiveness of FFP, mentioned that the FFP prophylaxis had not been indicated effective in different clinical settings. Recently similar review by Kozek-Langenecker *et al* [16] had been concluded that showed that published evidence had not appeared to support the clinical efficiency of FFP in many situations, and even suggests that it might be unfavorable.

Our study has reported an appropriateness of FFP to be 59.6%, and inappropriateness of 40% for FFP usage which had also been reported by Luk *et al* in 2002 [17]. Similarly, Pratibha *et al* had conducted a study in which they demonstrated 40% appropriateness and 60% inappropriateness. Another retrospective study by Iorio *et al* for request of 221 FFP had been reported that appropriate requests were 31.5% and inappropriate requests were 68.5% [18]. A recent prospective analysis by Akkaş M *et al* had also been reported that inappropriate use of FFP was 137 (67%) of 204 patients [19].

A research has reported a 5.2% decrease in inappropriate FFP usage following an educational program. Thus, regular routine audits and outcome audits after educational intervention will provide necessary information required to improve

transfusion practices. The transfusion audits should also aim at educating the clinicians to improve transfusion documentation which in turn will increase the effectiveness of the audit

CONCLUSION

This study concluded that percentage of appropriate Fresh Frozen Plasma (FFP) transfusion in admitted patients is 59.66%. So, we recommend that there is a need of educational programs for appropriate use of this important blood product and reducing its wastage.

AUTHORS CONTRIBUTION

Waqas Hanif: Manuscript writing

Muhammad Iqbal: Study Design

Hamid Iqbal: Statistical Analysis

Misbah Aziz: Sample collection

Muhammad Younas: Manuscript reviewing

Naeem Raza Hamdani: Sample Analysis

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