



“EFFECT OF FRESH FROZEN PLASMA ON THE PRE-TRANSFUSED INTERNATIONAL NORMALIZED RATIO”

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ABSTRACT This study aims to determine the effect of fresh frozen plasma on the pre-transfused international normalized ratio by use of ERBAECL 760 AUTOMATED COAGULATION ANALYSER to estimate Prothrombin Time (PT) and International Normalized Ratio (INR) at Assam Medical College Hospital. The pre and post-transfusion PT/INR were calculated in order to study the effect of FFP. The unit of INR per unit of FFP was calculated. Appropriateness and Inappropriateness was calculated. For all analyses, the statistical significance was fixed at 5% level (p value <0.05). The statistical analysis of data was carried out to SPSS for Windows version 21.0 and Microsoft Excel 2010. A total of 110 cases were selected who received FFP. In our study Pre transfusion INR value in appropriate cases was 3.04 ± 0.59 , whereas after transfusion value was 1.48 ± 0.38 . This change in Mean INR value was statistically significant. In our study Pre transfusion INR value among inappropriate users before transfusion 1.46 ± 0.12 , which defied the guidelines laid down by the authority. The post transfusion INR value was 1.14 ± 0.17 . However, changes in Mean INR value was statistically insignificant as p-value was >0.05.

KEYWORDS : AABB, aPTT, FFP, INR, PT

INTRODUCTION-

FFP is a blood product that has been available since 1941. 'Fresh Frozen Plasma' is a confusing term as plasma cannot be 'fresh' and 'frozen' at the same time. 'Fresh' refers to timing from collection to freezing, and 'frozen' refers to long term storage condition. When transfused, FFP should be ABO compatible.⁽¹⁾

Fresh frozen plasma contains all coagulation factors and great care must be taken during collection of blood, freezing and thawing to preserve their activity. This study aims to evaluate the effect of fresh frozen plasma on the pre-transfused international normalized ratio.

AIM-

To study the effect of fresh frozen plasma on the pre-transfused international normalized ratio.

OBJECTIVE-

1. To assess the clinical usage of fresh frozen plasma as per National and Medical Research Council (NHMRC) and the Australasian Society for Blood Transfusion (ASBRT) Fresh Frozen Plasma guidelines 2002.
2. To assess changes International normalized ratio (INR) after administration of fresh frozen plasma.

FFP dosing-

The typical dose of FFP used in adults is 1–2 units, with a unit of FFP being the amount of plasma isolated from a unit of whole blood donated from a single donor.

The typical volume of a unit of FFP is about 200 ml. Holland and Brooks looked at a group of adults who had a PT (INR) measured prior to and following transfusion of FFP. They determined that the amount of reduction in the PT (INR) is based on how high the INR is prior to receiving the FFP⁽²⁾.

Segal and Dzik⁽³⁾ suggested that inappropriate FFP orders occurs because of 3 assumptions-

- Elevations of PT/INR will predict bleeding in setting of a procedure.
- Pre-procedure administration of FFP will correct the prolonged clotting time.
- Prophylactic transfusion results in fewer bleeding events.

Current guidelines published by multiple organizations consider fresh frozen plasma (FFP) transfusion appropriate only under specific circumstances.

Although these guidelines vary in the laboratory, definition of appropriate FFP transfusion, most suggest a cut-off of a prothrombin time (PT) and/or partial thromboplastin time (PTT)

greater than 1.5 times the normal value.⁽⁴⁾

Efforts have been made, mostly in developed countries to lay down various available national and international guidelines for FFP transfusion and rationalize its usage, but it still continues to be used inappropriately.⁽⁵⁻⁷⁾

National Health And Medical Research Council (NHMRC) and The Australasian Society For Blood Transfusion(ASBT) Fresh Frozen Plasma,2002 Guidelines.⁽⁸⁾

Appropriate if any one of the following applicable, likely to be inappropriate if none applicable:

- *INR or APTT high and liver disease before major surgery or invasive procedure.
- *INR or APTT high and liver failure.
- *INR or APTT high and acute disseminated intravascular coagulation (DIC).
- *INR or APTT high and excessive bleeding.
- *INR or APTT high before an invasive procedure.
- *INR or APTT high before, during or after major surgery.
- *INR high and warfarin effect present and massive blood loss or emergency surgery.
- *Correction of single factor deficiency when a specific factor was not available.
- *Treatment of thrombotic thrombocytopenic purpura.

MATERIAL AND METHOD-

To determine the effect of fresh frozen plasma on the pre-transfused international normalized ratio, analysis was done in 110 patients receiving FFP transfusions at Assam Medical College Hospital from May 2019 to July 2020.

Requisition for FFP transfusion was based on the decision of the clinicians. Following details were collected from the patient's requisition records: demographic data including age and gender, clinical diagnosis, indication for FFP transfusion, time of requisition, and specialty of requesting clinical unit.

Institute's guidelines were used as standards for transfusion. A usual dose of plasma of 10–20 mL/kg was considered for transfusion. To study the effect of FFP, patient's laboratory parameters of pre- and post transfusion PT, aPTT, and INR were analyzed.

The improvement in the INR per dose of FFP was calculated. Pre transfusion INR was correlated with the improvement in INR per dose of FFP. SPSS software was used for statistical analysis.

RESULTS-

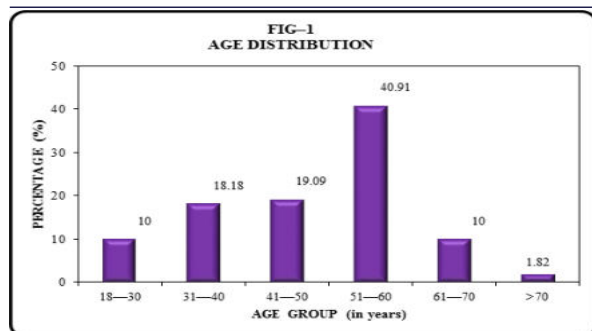


Figure 1: The most common age group was between 51-60yr(40.91%) followed by 41-50yr (19.09%).

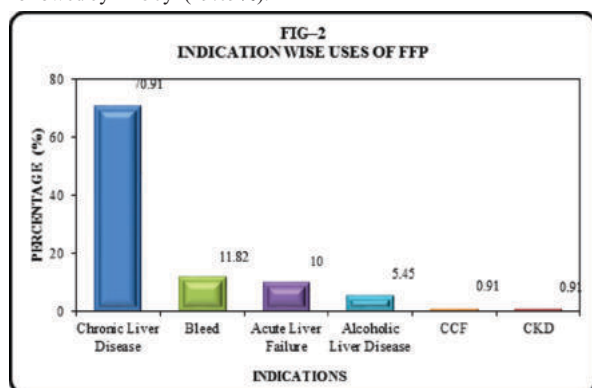


Figure 2: The most common indications for use of FFP was chronic liver disease(70.91%) followed by bleeding(11.82%).

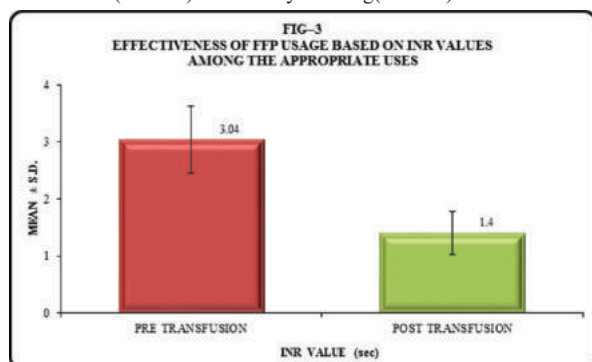


Figure 3: Pre transfusion INR value in appropriate cases was 3.04 ± 0.59 , whereas after transfusion value was 1.4 ± 0.38 .

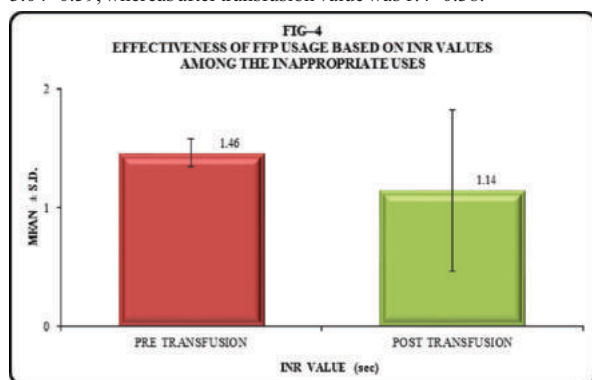


Figure 4: Pre transfusion INR value among inappropriate users before transfusion was 1.46 ± 0.12 and the post transfusion INR value was 1.14 ± 0.17 .

DISCUSSION-

In the present study maximum number of cases were found in the age group 51-60 years (40.91%) i.e. 45 cases. A study by Nisha Lekshmy et al found maximum cases in the age group of 46-60 years which is 36.3% cases.⁽⁹⁾ In the present study male patients constituted

89.09% i.e. 98 cases. While Female patients constituted 10.91% i.e. 12 cases. Similar to our study, Agarwal N et al found 88% male and 12% female in their study.⁽¹⁰⁾

Appropriateness of FFP is in 80% i.e. 88 cases out of 110 cases. The appropriate cases belong to Liver diseases, coagulation disorders with high PT/INR or high aPTT according to National Health and Medical Research Council and Australasian Society for Blood Transfusion, Fresh Frozen Plasma 2002 guidelines. Jayanthi N et al found appropriateness of FFP usage in their study as 74%.⁽¹¹⁾

In our study FFP without any appropriate indications were transfused in 22 cases i.e. 20%. It was maximum in chronic liver disease patients. It accounted for 15 cases i.e. 68.18% of all inappropriately used FFP uses.

In our study Pre transfusion INR value in appropriate cases was 3.04 ± 0.59 , whereas after transfusion value was 1.4 ± 0.38 . This change in Mean INR value was statistically significant.

Jayanthi N et al who found mean INR value before transfusion to be 3.768. Post transfusion mean INR value was 1.621 and similar to our study the changes in values were statistically significant (p-value was <0.001).⁽¹¹⁾

In our study Pre transfusion INR value among inappropriate users before transfusion was 1.46 ± 0.12 , which defied the guidelines laid down by the authority. The post transfusion INR value was 1.14 ± 0.17 . However, changes in Mean INR value was statistically insignificant as p-value was >0.05 . Jayanthi et al reported Mean INR before transfusion to be 1.251 which was also defying the guidelines. Post transfusion Mean INR was 1.132.

Hence it is noted that Mean INR value is within the normal range in pre transfusion group and it is assumed that no guidelines have been followed regarding transfusion of FFP in this patient group.

Current Ffp Use-

Several reviews and guidelines have been published over the past decade highlighting the limited data on the beneficial effects of FFP and calling for limitation of FFP use to a few indications.⁽¹²⁻¹⁴⁾ Preliminary reports suggest an association between FFP use and thrombotic events.⁽¹⁵⁾ Although several guidelines exist concerning FFP use, there is no consensus regarding indications.⁽¹⁶⁾ For instance, the AABB guideline recommends using FFP for Warfarin-related intracranial hemorrhage while other guidelines suggest vitamin K and/or four factor prothrombin complex concentrates as better choices for this indication.⁽¹⁷⁾ One area of consensus is that FFP should be given to replace coagulation factor deficiencies associated with bleeding when a specific coagulation factor concentrate does not exist, such as factor V deficiency, or in developing countries where factor concentrates are in limited supply.

CONCLUSION-

The most common reason for inappropriate use of FFP seems to be based on the assumption that the PT or aPTT are predictive of bleeding, and that FFP can normalize these tests and stop or prevent bleeding. In spite of improvement in quality control, standardization and available guidelines about use of FFP, there are many studies which report a high frequency of inappropriate use of this blood component. The appropriate use of FFP requires an understanding of the properties of FFP and its inadequacies as well as an appreciation of the complications.

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