Original article:

Study of adverse reactions due to fresh frozen plasma transfusion among hemophilia patients

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Abstract:

Background: Almost all hemophilia patients are treated with fresh frozen plasma and other alternatives. As they are on multiple transfusion of FFP, majority of the patient experience adverse reaction to FFP transfusion. There are various types of adverse events occur that are documented in national and international data. My research activity targeted to explore commonly encountered adverse events among Bangladeshi population. This helps the physician to plan a management protocol. ***Objective:*** The objective of the study was to evaluate the adverse events of FFP transfusion who are receiving FFP for long time. ***Materials and Method:*** It was a prospective type of observational study. The study was carried out in the Department of Transfusion Medicine, BSMMU, Dhaka, Bangladesh. This study was conducted from July 2011 to June 2012 for a period of one (1) year. 60 patients with hemophilia were selected from patients attending at day care unit of Transfusion Medicine dept. of BSMMU. ***Results:*** Among 60 patients, 53.33% patients develop itching 36.67% patients developed urticaria, 6.67% patients develops fever and rigor and 3.33 patients developed nausea. ***Conclusion:*** In this study it was found that majority of the patients developed itching following transfusion of FFP. Adverese events like urticaria, fever and nausea ranked as 2nd, 3rd and 4th position respectively.

Keyword: Hemophilia, Fresh Frozen Plasma.

Bangladesh Journal of Medical Science Vol. 19 No. 01 January'20. Page : 148-151
DOI: https://doi.org/10.3329/bjms.v19i1.43888

Introduction

The conventional treatment of haemophilia is Fresh Frozen Plasma/ cryo. FFP is defined as the fluid portion of one unit of human blood that has been centrifuged, separated from PRP, and frozen solid at -18° C (or colder) within 6 hours of collection. The use of plasma and cryo has evolved over a period of four decades. The use of FFP has increased tenfold within the past 10 years and reached almost 2 million units annually. This trend may be attributable to multiple factors, possibly including decreased availability of whole blood due to widespread acceptance of the concept of component therapy. Although the recombinant factor VIII and IX is available but it is not affordable due to higher cost. In our country most patients of hemophilia are treated with FFP. FFP needed in large volume and transfusion of large volume of FFP in anemia is a hazard. The study is carried out with an intention to assess the adverse events occur in the hemophilia patients who receive

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multiple transfusion of FFP for the awareness of complication and its management.

Materials and method

It was a prospective type of observational study. The study was carried out in the Department of Transfusion Medicine, BSMMU, Dhaka, Bangladesh. This study was conducted from July 2011 to June 2012 for a period of one (1) year. **:** Patients who were diagnosed as cases of hemophilia attending in the day care service of the department of Transfusion Medicine, BSMMU for FFP transfusion. Adverse reactions were assessed clinically. 60 patients with hemophilia will be selected from patients attending at day care unit of Transfusion Medicine dept. of BSMMU.

Ethical Clearance: This study was approved by Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University.

Results: A total number of 60 patients who were diagnosed as a cases of Hemophilia at any age and who were admitted in BSMMU at day care center of Transfusion Medicine department for FFP transfusion were enrolled in this study.

Table I : Distribution of study population according to age(n=60)

Age(in years)	Frequency	Percentage
5-10 yrs	15	25.00
11-20 yrs	19	31.67
21-30 yrs	16	26.67
31-40 yrs	05	8.33
41-50 yrs	04	6.67
Above 50 yrs	01	1.67
Total	60	100
Mean ±SD(range)	10±7	

Table I shows the distribution of study population according to age. Among 60 patients maximum are in the age group of 11-20 years which is 19(31.67%) cases followed by 21-30 years of age group, 5-10 years of age group,31-40 years group,41-50 years group which are 16 (26.67%) cases,15 (25.00%) cases, 5 (8.33%) cases, 4 (6.67%) cases, respectively. In above 50 years age group are only 1 (1.67%) cases.

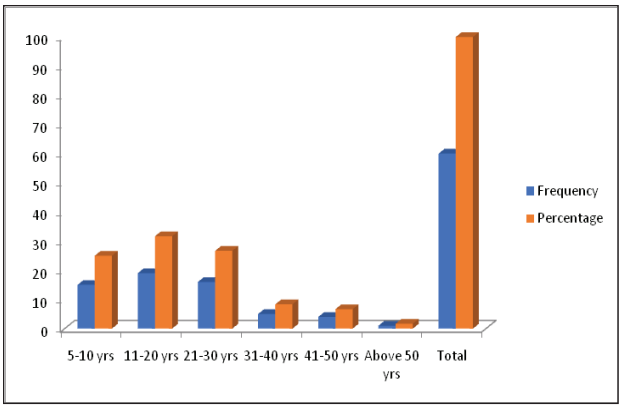

Fig I : Bar diagram of study population according to age

Table II : Distribution of adverse reactions due to FFP transfusion among study population. (n=60)

Adverse Reactions	Frequency	Percentage
Urticaria	22	36.67
Itching	32	53.33
Fever with rigors	4	6.67
Nausia	2	3.33

Table II shows the distribution of adverse reaction of FFP among study population. Itching was the most commonly encountered adverse reaction which was 53.33% cases followed by urticaria and fever with rigors which were 36.67% and 6.67 % cases respectively. Nausia 3.33 %,

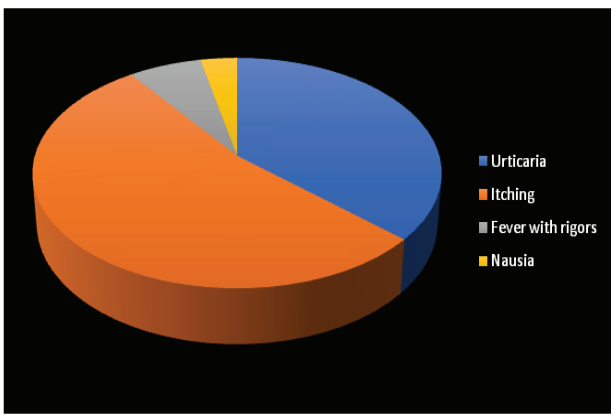

Fig II : pie chart of study population according to adverse reactions of FFP transfusion observed

Table III : Distribution of the study population according to interval of FFP transfusion.(n=60)

Interval of FFP Transfusion	Frequency	Percent
< 1 month	14	23.33
monthly	16	26.67
> 1 months	30	50
Total	60	100.0

Table III shows the distribution of study population according to interval of taking FFP transfusion. Among 60 patients, 30 (50%) cases has taken FFP at interval of more than one months, 16(26.67%) cases has taken monthly and 14(23.33%) has taken at interval of less than one month.

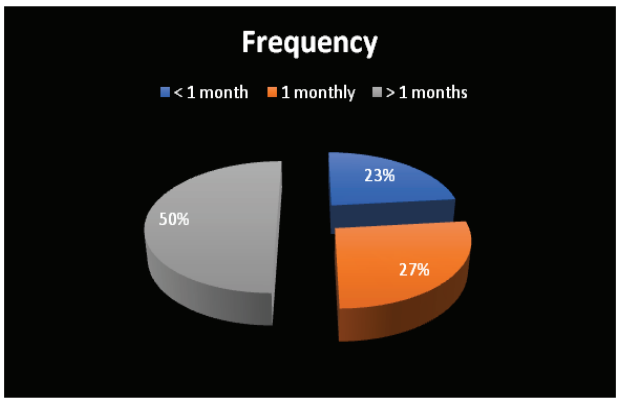

Fig III : Pie chart of distribution of population according to interval of FFP transfusion

Discussion

Fresh frozen plasma (FFP) for clinical use is separated from single units of blood and rapidly frozen within six hours after donation. **:** FFP is ABO and Rh group specific. It contains all coagulation factors. The volume of one unit of FFP prepared from a single donation is approximately 200 ml. Units of plasma collected by apheresis machine (Plasma donation) may have up to 500 ml and packs for pediatric use contain 50 to 100 ml. Storage and shelf-life: FFP kept in a deep freezer at a temperature below -30^{0}C has a shelf-life of one year. At a temperature of -80^{0}C it can be stored up to five years. Administration: FFP should be thawed in a 37^{0}C water bath with a stirrer with frequent agitation. It should never be thawed under the hot water tap. It should be administered within half an hour after thawing as the activity of coagulation factor V and VIII is rapidly lost on standing.FFP is given intravenously through a blood administration set with a filter, at a flow rate not greater than 10 ml/min. [Note: Once FFP has been thawed, it should never been refrozen again]. Methods of use FFP must be thawed between 30 °C and 37 °C in a water bath under continuous agitation or with another system able to ensure a controlled temperature. The plasma must be transfused as soon as possible after thawing, but in any case within 24 hours, if stored at 4 ± 2 °C. FFP must not be refrozen once it has been thawed.

The distribution of adverse reactions due to FFP transfusion among study population was recorded. In this study it has been found that predominant adverse reactions were due to allergic transfusion reactions. Itching was the most common adverse events which was 32(53.33 %) followed by urticaria 22(36.67 %), fever with rigor 46.67 %), nausea 2(3.33 %). In this finding it is observed that more serious adverse events like TRALI, TACO, GVHD, shock, were not documented. Over the past few years, multiple publications have documented a decrease in TRALI after implementation of these strategies. Data from the American Red Cross and SHOT demonstrated a TRALI incidence of 1:51,000 to 65,000 plasma units issued before mitigation versus 1:250,000 to 317,000 after mitigation.[1,2] German and Canadian hemovigilance systems also showed a decrease in the number of reported TRALI cases,[3,4] and a comparative cohort study from the Netherlands showed a 33% reduction of TRALI cases after implementation of a male-only plasma strategy.[5] Hemophilia patients treated with FFP frequently develops various types of adverse reactions which point out us that a pre medication protocol can minimize the occurrence of these events. The adverse reaction among the study population was assessed clinically. Among 60 cases 19(31.67%) were in the age group in between 11-20 years. The study also shows that 30 (60%) of population took FFP transfusion with the interval of more than 1 months 32(53.33%) case developed itching, 22(36.67%) case developed urticaria,4(6.67%) cases developed fever and 2(3.33%) cases developed nausea.

Limitation of the study:

There were limitations in the present study. The major difficulty encountered during this study was missing of the patients for proper follow up. Majority of the patients left the day care center immediately after taking transfusion. There was another limitation

faced that there were some adverse events occurred after leaving the hospital.

Conclusion

In this study it was found that majority of the patients developed itching following transfusion of FFP. Adverese events like urticaria, fever and nausea ranked as 2nd, 3rd and 4th position respectively.

Recommendation:

Further study is recommended with following proposal:

• This study will help the physicians and clinicians to take measure prevention and management of adverse reaction before and after transfusion of FFP.

• A large scale multi centered study should be done.

• Study period should be prolonged

Conflict of interest: None

Author's Contribution: Md. Rafiqul Haque was responsible for the study design and manuscript preparation. The author himself carried out the data and assess adverse reaction clinically and analysis of the result.

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