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Immunohaematology

ADVERSE REACTIONS IN PLATELETPHERESIS DONORS: OUR EXPERIENCE

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ABSTRACT

INTRODUCTION: Plateletpheresis is the term specifically refers to the method of collecting the platelets, which is performed by a device used in blood donation that separate the platelets and return other portion of blood to the donor. Our goal was to retrospectively analyse the adverse reactions occurred during and immediately after palateletpheresis procedure.

METHODS: From November 2015 to December 2018, a total of 1983 procedures were preformed on COM TEC Apheresis machine at Blood Bank, M.G. Hospital, Jodhpur.

RESULTS: Overall 1983 procedure were performed during our study period. Out of which 96 adverse reactions were reported with an overall adverse reaction rate of 4.8%. All adverse reactions reported during study period was of mild to moderate intensity and no severe reactions were reported.

CONCLUSION: The adverse reactions are mild and easily treatable, no severe reaction were noted.

KEYWORDS :

INTRODUCTION

Plateletepheresis is the removal of platelets from a donor with the return of donor red cells, white cells and plasma. The yield of platelets is related to the donor initial platelet count and the amount of blood processed[1]

Apheresis procedures are usually well tolerated. Adverse events of variable severity may occur during or after procedure. Adverse events that occur in donors can be divided into local reactions and systemic reactions.[2,3]

Local reactions are usually haematomas due to extravasation from the veins, caused by incorrect placement of the needle during the venipuncture. Pain hyperaemia and swelling may develops at the site of the extravasation. Local phlebitis and thrombophlebitis are very rare.[3,4]

Systemic reactions are mainly vasovagal reactions that can be triggered by the pain of the venipuncture or by the anxiety and state of tension of undergoing the donation etc. These are characterized by the pallor, sweating, dizziness, nausea, hypertension bradycardia and syncope. Citrate toxicity can also occur because of the use of acid-citrate-dextrose in apheresis.[4,5]

MATERIAL & METHODS

Plateletpheresis procedures from November 2015 to December 2018 (1983 donors) were performed on COM TEC Apheresis machine Single needle procedure at Blood Bank, M.G. Hospital, Jodhpur. Donors were selected as per following criteria –

(1) Weight - > 60 Kg
(2) Age - 18-60 years
(3) Hb - > 12.5 gm/dl
(4) Total Platetlet Count - > 1.5 Lakhs/cumm
(5) Absence of any illness
(6) No consumption of non-steroidal anti-inflammatory drugs for last 7 days
(7) Negative test for HIV, Hepatitis-B, Hepatitis-C, Syphilis & Malaria
(8) Donor having prominent vein
(9) Interval between procedures be atleast 48 hrs. A donor not have undergo the procedure more than 2 times in a week or 24 times in a year.
(10) All donations were collected using a 16 gauge needles inserted into a vein in the antecubital fossa

All adverse reactions were recorded. The adverse reaction by plateletepheresis procedure, were classified as vasovagal reactions, Citrate toxicity, local reactions and other severe events. Vasovagal reactions were divided into mild (pallor, weakness, dizziness, sweating nausea, vomiting, hypotension, light headedness, irregular breathing and bradycardia), Moderate (the above symptoms accompanied by transient unconsciousness) or severe (long standing loss of consciousness, convulsions, tetany and incontinence) reactions, citrate toxicity was divided into mild/moderate (paraesthesia, flushed sensation, nausea/vomiting) or severe (tetany, seizure and cardiac arrythmia). Local reaction were divided into mild/ moderate (haematoma, pain, hyperaemia) and severe (thrombophelibitis) reaction.

OBSERVATIONS

Over all 1983 procedure were performed during our study period. Out of which, 96 adverse reactions were reported with an overall adverse reaction rate of 4.8%.

Types of adverse reaction/events occurred by plateletpheresis procedure:

- Venipuncture related (Multiple pricks, haematoma, hyperaemia)
- Citrate toxicity related
- Vasovagal

Among 96 Adverse reactions:

- 32 (1.68%) of them had venipuncture related adverse reactions like multiple pricks, small haematoma and hyperaemia with slight pain.
- 43 (2.1%) had citrate toxicity (after giving chewable calcium tablet) related adverse reaction like tingling sensations and Perioral paraesthesia.
- 21 (1.05%) had mild vasovagal reaction like nausea, dizziness, and light headedness.

All adverse reactions reported during study period was of mild to moderate intensity and no severe reactions were reported.

DISCUSSION

The aim of this study was to assess the frequency of and the predictive factor for adverse reactions during apheresis procedure. The adverse events during the process of plateletpheresis have been broadly divided into[3,6,7,]

- Venipuncture related
- Syncope/sweating/faintness
- Citrate reaction

Although these procedure are considered safe for donors with a low incidence of adverse reactions but in some cases adverse events occur which are mostly mild and resolved rapidly.

Slight pain at the venipuncture was noted, this may be related to the increased sensation of vibrations induced by the subjectively cruder centrifugation forces. In our study the increased percentage of haemotoma, hyperanemia and multiple pricks (venipuncture related) could be as a result of the fact that the same vein in one arm is used for inflow and returns resulting haematoma to the vein.

Citrate is used as the primary anticoagulant in donor apheresis procedures.

The non-availability of calcium ion hinders the coaglutation cascade. The result of such a decrease in ionized calcium is that excitability of nerve membrane increase to the point where spontaneous depolarization can occur.[3] This produces signs and symptoms of citrate toxicity including Perioral paraesthesia shivering, light headedness, twitching and tremors. As the ionized calcium level falls, further these symptoms may progress to carpopedal spasm, tetany and seizures.[8]

It is therefore important to elicit the presence of early symptoms from the donor so that intervention can be taken prior to the more severe symptoms. In our study calcium supplement was given to the all donors when they complained about paraesthesia, tingling or numbness sensations. All these reactions were mild most of the patients had only complain of paraesthesia. There was no severe form of reactions noted in our study. The administration of oral calcium carbonate and its effect on citrate toxicity have been examined.[3]

In our study vasovagal reaction occurred in the form of sweating, dizziness and syncope. This can be attributed to apprehension. Hypocalcaemia may be involved in the onset of vasovagal reaction in apheresis donors.[6]

The overall rate of acute adverse reactions among healthy donors undergoing plateletpheresis procedure in our study was 4.8% (96/1983) which was less than the study done at Jammu.[9] In their study the adverse reaction rate was 6.06% (4/66). The frequency of venipuncture related (local reaction), Citrate Toxicity reaction, Vasovagal reaction in our plateletpheresis procedure was 1.68%, 2.1%, 1.05% respectively. In study done at Jammu[9] the frequency of venipuncture related (Local reaction) Citrate Toxicity reaction, Vasovagal reactions was 1.5%, 3.03%, 1.5%, showing higher frequency of Citrate Toxicity reaction i.e. 3.03%. Whereas in our study it was 2.1% only. Same in our study the Vasovagal reaction frequency of Venipuncture related reaction was at par i.e. in our study it was 1.6% and in their it was 1.5%.

The overall adverse reaction among healthy donor undergoing Platelepheresis procedure in Joseph Philip's[10] study was 2.7% which is less than our study. The frequency of Venipuncture related reaction was 1.6% which is exactly same with our study. The frequency of citrate toxicity in their study was 0.96% which is less than our study which was 2.1%. The frequency of Vasovogal in their study was also less i.e. 0.1% as compare to our study which was 1.05%. Table no 2

In all three studies the adverse reaction frequency in Venipuncture related was approximately same but the Citrate toxicity and Vasovagal reactions frequencies are different in all three studies. In all studies no patients developed serious reactions.

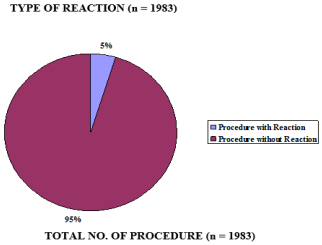
The frequency of adverse reaction by Plateletpheresis procedure in Isabelia[11] study was only 0.68% (18/2641) which is very less from our study which was 4.8% (96/1983) Table no 1.

Table No 1: Comparative study of Total Adverse Reaction of Plateletpheresis procedure

	Total No. of Cases	No. of Donors had Adverse Reaction	% of Donor had Adverse Reaction
Our study	1983	96	4.8%
Isabelia et al	2641	18	0.68%
Khajuria et al	66	4	6.06%
Joseph Philip et al	3120	85	2.72%

Table No 2: Comparative study of the various types of Adverse Reaction of Plateletpheresis procedure

	Veni-puncture related reaction	Citrate reaction	Vasovagal reaction
Our study	1.6% (32)	2.1% (43)	1.05% (21)
Khajuria et al	1.5% (1)	3.03% (2)	1.5% (1)
Joseph Philip et al	1.6% (52)	0.96% (30)	0.1% (03)



CONCLUSION

The over all adverse reaction among healthy donors under going plateletpheresis procedure are safe and have acute reaction. The reactions are mild and easily treatable. No severe reaction noted.

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