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Audit of platelet utilization among patients in a tertiary health care center – A descriptive study

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Abstract

Background: Platelet concentrate is an important treatment modality for bleeding disorders. As platelet component can be lifesaving in certain circumstances, there has been an increase in its demand. Platelet transfusion may expose patients to various risks and there is no alternative to transfusion of platelet concentrates therefore it warrants judicious use of this component.

Objective: To assess the pattern of utilization of Random Donor Platelet (RDP) concentrate in our hospital

Materials and method: This retrospective study was conducted in the Department of Transfusion Medicine at MGM Medical College and Hospital Aurangabad over a period of one year from October 2018 to September 2019. Relevant clinical details with diagnosis, pre and post transfusion platelet count and number of component supplied were analysed. Out of 256 requisitions, 16 were excluded due to insufficient data availability.

Result: A total of 818 units of platelets were prepared from 3120 whole blood units collected from healthy volunteer donors. Out of this, 52 Units of platelets were not utilised.

766 RDP were supplied to 180 patients. Major platelet consumers were patients admitted in the paediatrics department (40.5%). The most common indications for platelet transfusions were infectious etiology (Dengue – 29.1%) and haematological diseases (27%) and malignancies (18.75%). In our study, 70 % of platelets were appropriately utilized according to the BCSH guidelines. Limitation of the study was non-inclusion of SDP component which will be included in future studies.

Conclusion: Use of standardised transfusion guidelines, training programmes for physicians and surgeons as well as regular audits are necessary for rational and judicious use of platelet products.

Keywords: Platelet transfusion, audit, RDP, appropriate utilization

Introduction

Blood transfusion is an important procedure that may at times be used as a measure to save lives. When required, individual component therapy should always be preferred over whole blood transfusions. A key factor in the maintenance of hemostasis is platelets. The platelet components are an important treatment modality for bleeding disorders. The commonly implemented method for the preparation of Random donor platelet (RDP) component is usually PRP (platelet Rich plasma) or buffy coat method. As platelet component can be lifesaving in certain circumstances, there has been an increase in its demand. [1]

There is no alternative to transfusion of platelet concentrates but overzealous platelet transfusion may expose patients to various risks such as transfusion reactions and transfusion transmitted diseases. Unwarranted use can also deplete this precious resource. Therefore, it warrants judicious use of this component[2]. Appropriate utilization of platelet component can be assessed using the platelet transfusion guidelines such issued by various Societies such as the British Society for Hematology Guideline (BCSH), American Association of Blood Banks (AABB), or the Italian Society of Transfusion Medicine and Immunology (SIMTI)[3]. Audits act as important tools that help in reducing the inappropriate transfusions to patients, as well as guide in rectifying transfusion practice guidelines, and identifying areas where further improvements can be made.[4] This present study was undertaken to evaluate the current platelet transfusion practices in our hospital.

Material and methods

This study is a retrospective, descriptive study conducted in the Department of Transfusion Medicine at MGM Medical College and Hospital Aurangabad over a period of one year from October 2018 to September 2019. The aim of our study was to assess the production and consumption of platelets at our health care center. The study population included all patients for whom RDP component was issued from our blood bank.

Blood component requisition forms and patient data software system were used to collect data. Relevant clinical details including age, gender, indication of transfusion, pre and post transfusion platelet count and number of component supplied were analysed. Any patient with insufficient clinical data was rejected from this study.

Data in regards to platelet wastage including leaks/bag rupture, TTI reactive and expiry were also analysed from the records to estimate the wastage and expiry rate. Platelets issued in our hospital were RDP concentrate prepared by PRP method of fresh whole blood; a light spin is given first at 1100 rpm for 12 mins (350 mL bags) or 1400 rpm for 8 mins (450 mL bags) and then after separation of the PRP into satellite bags, a hard spin is given at 3600 rpm for 7 mins. The supernatant is collected in plasma bag as FFP and platelets are re-suspended in 50-70 mL of plasma. RDPs prepared were stored for a period of 5days with a temperature maintained at 20-24^{0}C in a platelet incubator-cum-agitator with continuous, gentle agitations of 70±5 oscillations/minute.

We made an assessment about appropriate transfusions according to the BCSH guidelines given in Table 1. as follows:

Table 1: BCSH Guidelines for Platelet Transfusion.

	Prophylactic
1	Prevention of spontaneous bleeding (e.g. Dengue): when platelet count <10,000/uL
2	In the presence of risk factors like sepsis (fever) or haemostatic abnormalities; when platelet count <20,000/uL
3	Prevention of bleeding associated with invasive procedure: Pre procedure transfusion. Raise count to >50,000/uL (e.g. lumbar puncture or liver biopsy) and >1,00,000/uL for ophthalmic surgery or neurosurgery
4	Critical care/ Major surgery: Aim to maintain platelet count >50,000/uL
	Therapeutic
	Bleeding from oral cavity, mucous membrane or any other site with platelet dysfunction irrespective of the platelet count

Results

During the study period, 3120 whole blood bags were made from voluntary donations; These 3120 units were separated into components. Out of this, 818 platelets were prepared. Of these, 766 platelets were utilized and 52 were discarded. The reasons for discarded platelet component are given in Figure 1

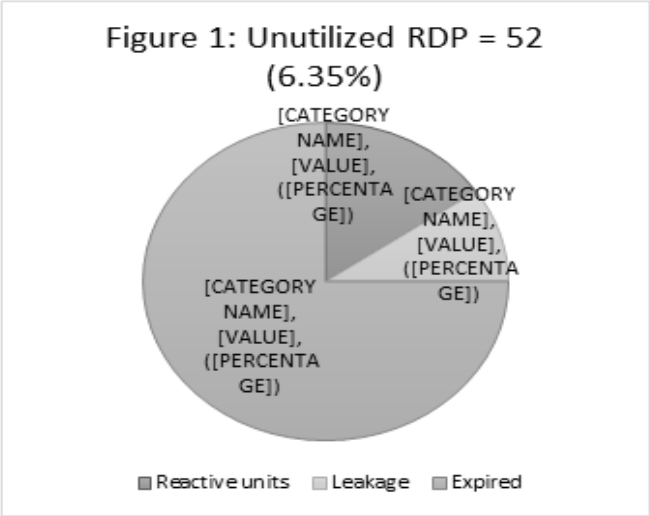

Figure 1: Unutilized RDP

256 requisitions were received in the study period, out of which 240 were evaluable as they had all required clinical details. These 240 platelet requisitions were received for 180 patients, of which 120 (66.6%) were males and 60 (33.3%) were females. The age of patients ranged from neonates to 81 years with a mean age of 35 years. 51.11% of the study population was paediatric while 49.9% was adult. The most common indication for platelet transfusion was dengue which together accounted for 29.1%. The indications are summarized in Table 2.

Table 2: Indications from platelet transfusion:

Indication	N	N %
Dengue haemorrhagic fever	70	29.1 %
Thrombocytopenia	45	18.75 %
Pancytopenia	35	14.5 %
Anaemia+thrombocytopenia	30	12.5 %
Trauma	25	10.41 %
Sepsis	20	8.3 %
Post-operative bleed	12	5 %
Others (chronic renal failure, pneumonia, pancreatitis)	8	3.3 %
Total	240	

We received maximum number of requisitions from the Department of Paediatrics, follows by Haematology. Yet, most number of components (240) issued were for Haematology department, as each patient required nearly 4-6 RDPs. Table 3 lists the department wise consumption of RDP.

Table 3: Department wise consumption of RDP.

Dept	Number of patients	N%	RDP	N%
Paediatrics (NICU+PICU +Ward)	20+25+28	40.5 %	160	20.88 %
Haematology (Paediatric + Adult)	15+18	18.3 %	240	31.3 %
Medicine	25	13.8 %	124	16.18 %
ICU	20	11.1 %	110	14.3 %
Surgery	16	8.8 %	80	10.44 %
OBGY	5	2.7 %	22	2.87 %
Nephrology	3	1.6 %	11	1.43 %
Cardiology	2	1.1 %	6	0.78 %
Outside	3	1.6 %	13	1.71 %
TOTAL	180		766	

Discussion

Internal audits play an elemental role in the quality control in a blood bank. Quality assurance in blood banks aims to provide safe and effective blood component to the patients.

As there is advancement and improvement in the blood bank practices, there is now a constant availability of platelets for utilization. This easy access has warranted indiscriminate use inspite of sufficient guidelines applied in clinical practice. Platelet concentrates are evaluated as a therapeutic drug under the food and drug association (FDA). FDA lays high emphasis upon quality control and assurance in various procedures like collection, testing, preparation, storage and supply of safe blood and platelet concentrates. [5]

In our study, we received 240 platelet requisitions for 180 patients, of which 120 (66.6%) were males and 60 (33.3%) were females. In a study conducted by Mahapatra et al [6] ,60.09% patients were males and the rest were females. Our study revealed that age of patients ranged from neonates to 81 years with a mean age of 35 years. In a study conducted by Sharma et al [7], patients ranged from 06 months to 78 years, with the mean age of 27 years. In our study, most of the platelets were utilized for patients suffering from dengue (infectious aetiology) i.e., 29%. This can be due to the fact that a majority of the patients admitted in our hospital come from the rural areas. Hence, infectious diseases. The second most common indication was haemato-oncology. This was similar to the results obtained in a study conducted by Gupta et al [8] who found that dengue was the most common clinical indication (39.9%).

In our study, the main consumption of RDP was in the paediatrics department (40.5%). However, in a study conducted by Verma et al [9] in 2008, Haematology department was the main consumer of platelet concentrates (34%). In different studies, the percentage of inappropriate platelet use ranges from 7.3% in Gomathi et al to 38.1% in Birchal et al. It was found to be 30% In our study. Table 4 shows comparison of various studies in terms of inappropriate usage.

Table 4: Percentage of inappropriate platelet use:

Authors	Percentage of inappropriate use
Gomathi et al [10] (2012)	7.3%
Saluja et al[4] (2007)	12%
Bhat et al [11](2012)	17.7%

Mahapatra et al[6] (2016)	31%
Pallavi et al [12] (2011)	36.6%
Birchal et al [13] (2011)	38.1%
Our study	30%

This high percentage of inappropriate use may be due to multiple reasons like lack of awareness regarding transfusion guidelines, emergency situations wherein lab results are not available and decision to transfuse is to be made on clinical grounds. In an attempt to reduce the inappropriate transfusions, training programmes are arranged for interns and resident doctors. An elective posting for interns is arranged in the blood bank. Transfusions guidelines are also printed in reverse of requisitions forms.

In this audit platelet expiry rate of 5.76%, was encountered. This rate falls within the range of 5.8-6.4% quoted by Q-probe study, while evaluating 1639 hospitals throughout U.S.[14] This could be due to the fact that the study was conducted when there was a high demand for platelet so most of the prepared component could be utilized. Apart from this, our institute utilises bags with a longer shelf life of 5 days for platelets. The hospital policy also allows us to issue platelets across the ABO blood group barrier.

Conclusion

Use of standardised transfusion guidelines, training programmes for physicians and surgeons as well as regular audits are necessary for rational and judicious use of platelet products.

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