International Journal of Community Medicine and Public Health
Handa A et al. Int J Community Med Public Health. 2020 Nov;7(11):4526-4529
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20204756

Original Research Article

Utilization pattern of blood and its components in a tertiary care super speciality hospital

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Received: 24 August 2020
Revised: 12 October 2020
Accepted: 13 October 2020

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ABSTRACT

Background: Blood is the most precious gift for human life. Blood transfusion services play a vital role in managing health care services. There is no substitute for blood and its components till date, therefore blood donation drive is very crucial. The primary responsibility of blood transfusion services is to provide safe, sufficient and timely supply of blood and blood products. There has been shift for usage of blood and blood components from the use of whole blood so that maximum utilization of this precious resource could be done. Aim and objectives was to study pattern of utilization of blood and blood components in a super speciality hospital with the indications for transfusions for different components during the study period.
Methods: This retrospective study for 12 months (January 2019- December 2 019) on pattern of utilization of blood components was carried out in the department of immunohaematology and transfusion medicine in a super speciality hospital.
Results: There were total of 90237 transfusions which were carried out during the study period of 12 months. During the study period, 366 stored whole blood units, 55300 Packed RBC units, 19111 FFP units, 14298 Random Donor Platelet units, 1119 single donor platelets and 43 cryoprecipitate units were issued for use in patients admitted to our hospital.
Conclusions: Periodic review and audit of blood component usage becomes essential to assess the blood utilization pattern in any hospital.

Keywords: Audit, Blood components, Blood transfusions, Utilization pattern

INTRODUCTION

Blood transfusion services aims to supply safe, uninterupted and timely blood and blood components such that there is minimum wastage of this precious drug.[1] Blood must be transfused cautiously because blood and its components have the propensity to cause immunomodulation in the recipient.[2] Transfusion of donated blood remains the main stay of treatment in various clinical conditions as there is no substitute for this precious drug.[3] Periodic review of blood component usage is essential to assess the blood utilization pattern in any hospital.[4]

Nowadays, good clinical practice guidelines make sure transfusion therapy is given specifically for well-established indications and there should be use of blood components rather than whole blood.[5] With this background, the present study was designed to evaluate use of blood components in our institution.

METHODS

This retrospective study was done in our 2500-bedded tertiary care superspeciality teaching hospital in North western India. In the present study, all the requests for various blood products from January 2019 to December 2019 were evaluated retrospectively.

Data was collected retrospectively for all patients who had been issued stored whole blood, packed red blood cells (PRBCs), fresh frozen plasma (FFP), platelets and cryoprecipitate.

All transfusions included in the study were allogenic. The clinical data and transfusion details of all transfusion's requests were obtained from blood bank records, request forms and computerized patient registration information. The data included age, gender, type and numbers of each blood component issued, diagnosis requiring transfusion. The International Classification of Diseases (ICD-10) version was used for classification of the diagnoses requiring transfusion of blood products. The most likely diagnosis requiring transfusion was selected.

All transfusion requests within the hospital were included in the study. Transfusion requests from any other outer hospital were excluded from the study.

The data were analysed for the pattern of blood and blood component usage by different specialties, for different indications in different patients. The results obtained were tabulated and pattern of utilization was noted.

Statistical analysis

Statistical analysis was done using SPSS software version 20.0. Charts and tables were prepared in Microsoft excel sheet. Mean (± Standard Deviation (SD)) was used for normally distributed continuous data. The study does not contain any patient identifiers and has been carried out as per ethical guidelines of the institute.

RESULTS

During the study period, there were total 90237 transfusions which were carried out during the period of 12 months. Whole blood and component utilization were calculated in all these transfusions.

366 stored whole blood units, 55300 packed RBC units, 19111 FFP units, 14298 random Donor Platelet units, 1119 single donor platelets and 43 cryoprecipitate units were issued for use in patients admitted to our hospital. We excluded cryoprecipitate and whole blood from further analysis since the total number of units was markedly less compared to other blood products (Figure 1).

Table 1 describes the utilization of blood components as per different speciality /superspeciality departments in this hospital.

Table 1: Utilization of blood components as per different speciality /superspeciality departments in this hospital.

Ward	PRBCs	WB	FFP	RDP	SDP	Cryoppt	Total
Medcine department	7503	9	5664	5952	477	12	19617
General surgery department	6449	5	6166	2172	33		14825
Thalassemia ward	11091		203	250	349		11893
Ctvs department	6820	298	2570	2953	34	20	12695
Neurosurgery department	6133	4	949	461	21		7568
Nephrology department	3911	5	552	99	4		4571
Medical oncology department	1173	1	114	1368	155		2811
Plastic surgery department	2192		340	71	0		2603
Gastroenterology department	1491	-	728	129	-	11	2359
Urology department	2102	3	161	81	3		2350
Orthosurgery department	1695	2	282	90	1		2070
Radiotherapy department	1598	3	148	292	9		2050
Cardiology department	934	12	253	191	7		1397
Ent department	799	0	45	43			887
Neurology department	172	8	430	23	1		634
Surgicaloncology department	384	0	185	40			609
Gastrosurgery department	473	1	87	31	16	0	608
Trauma	274		221	43	9		547
Pmr department	45	2	7	3			57
Skin department	30	11	6	1			48
Endocrinology department	25	1		5			31
Eye department	6	1					7
Total	55300	366	19111	14298	1119	43	90237

Variation in the usage of blood and its components over the 1-year study period is summarized in Figure 2. It shows variable usage of PRBCS throughout the year. Random donor platelet and Single Donor Platelet demand increases during months of October and November which indicates peak dengue season. FFP utilization was variable throughout the year.

Table 2. Blood group wise distribution of various components supplied.

Blood group	PRBCs	FFP	PLC	SDP	WB	CRY-OP
A+	11725	4414	3077	250	63	10
B+	18898	6476	4890	325	97	20
O+	16237	5606	4669	335	60	10
AB+	4742	1487	1054	105	39	3
A-	908	256	122	25	22	
B -	1439	452	279	34	22	
O -	1045	333	175	41	55	
AB -	306	87	32	4	8	
Total	55300	19111	14298	1119	366	43

Table 3: Distribution of blood products used in the diagnosis groups (ICD-10 headings).

Diagnosis	PRBCs	FFP	RDP	SDP
Infection (A00-B99)	2500	2000	4000	377
Neoplasm (C00-D48	3384	446	1700	166
Blood (D50-89)	12091	203	1202	349
Nervous (G00-99)	6305	1379	484	22
Circulatory (I00-99)	7954	2823	3144	41
Digestive (K00-K93)	7913	6981	2203	33
Skin/subcutaneous (L00-L99)	2222	346	79	8
Musculoskeleton (M00-M99)	1740	282	90	2
Genitourinary (N00-N99)	6013	161	180	7
Injury/poising	2778	3664	1000	109
Others (eye/ent)	2400	826	216	5

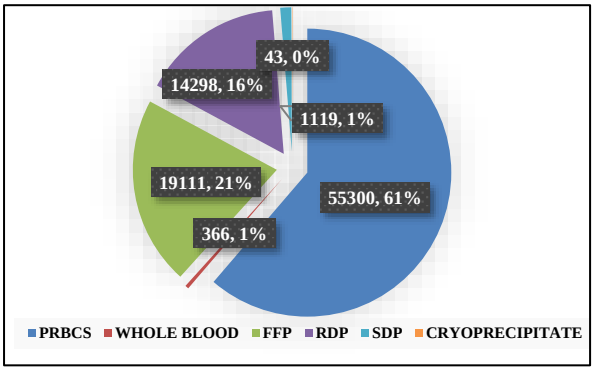

Figure 1: Utilization of different blood components.

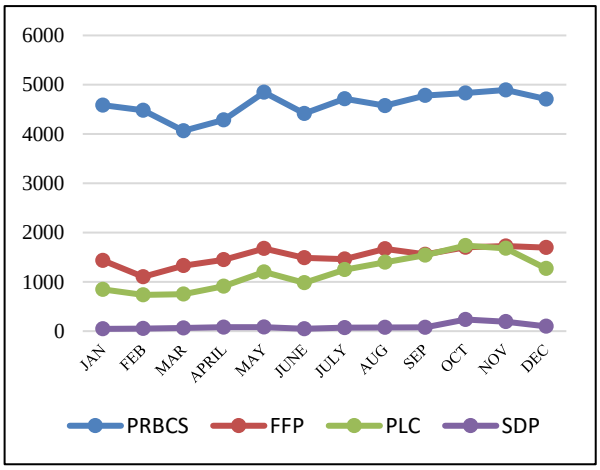

Figure 2: Trend of different components throughout the year.

Distribution of various components according to blood group is given in Table 2. B Positive was the most common blood group supplied followed by O positive. Distribution of blood products used in the diagnosis groups (ICD-10 headings) is represented in Table 3.

DISCUSSION

The total number of whole blood and its components issued from our blood bank in 1 year (1st January 2019 to 31st December 2019) was 90237 units; with a monthly average of 7519 units. The supply showed some seasonal variation, with lesser units supplied near year ends and peak observed around mid-year (Figure 2).

A breakup of the supply for whole blood and various components (n=90237) showed that packed red cell (n=55300) was the maximum utilized product followed by fresh frozen plasma (n=19111) and then random donor platelet units (n=14298), 1119 single donor platelets and 43 cryoprecipitate units (Table 1).

Similar findings were seen by studies done by Garg et al and Qureshi et al.[6,7] A rarely used component was cryoprecipitate (0.04%). This is comparable with the study done by Qureshi et al.[7] Supply of PRBCs in the surgical departments was 48.90% (n=27047/55300) of total supply. Requests for supply of PRBCs to medical wards constituted 51.09% (n=28253/55300) of all demands, with highest requirement from thalassemia ward (n=11091). A study done by Agrawal et al also shows similar results (44.13%) for medicine department.[8]

Fresh frozen plasma was mainly used in surgical departments followed by medicine department which clearly shows the demand increases in case of any bleeding during surgeries. Random donor platelets and single donor platelets were mainly used in medicine department followed by thalassemia patients specifically in transplant patients.

B Positive was the most common blood group supplied followed by O positive which was similar to the distribution of most common blood group in the area. Among the indications as ICD 10 classification for all blood products taken together, Blood (D50-89) was the most common indication followed by Circulatory (I00-99).

Among blood components PRBCs were used frequently for blood disorders (21.86%), circulatory disorders (14.38%), digestive diseases (14.30%), neurological diseases (11.04%), genitourinary diseases (10.87%), neoplasms (6.11%) and injury and poisoning conditions (5.86%) respectively.

Infectious and parasitic diseases (27.97%) were the most important indication for use of platelets transfusion followed by circulatory diseases (21.98%), disorders of blood (15.40%), neoplasms (11.88%), injury and poisoning (6.99%). FFP was used commonly for disorders of the digestive system (36.50%), injury and poisoning (19.17%), infectious and parasitic diseases (10.40%) followed by circulatory diseases (14.77%). FFP was mainly used to treat bleeding and to treat coagulation disorders.

However, the utilization of whole blood is currently very minimal in our institute. The total demands for whole blood were 366 units out of 90237 units (0.40%). The most common indication for whole blood was surgical procedures mainly in CTVS department. Usage of whole blood has been replaced mostly by blood components. The pattern of usage of blood products reflects the frequency of varied diseases conditions. Infectious diseases are more prevalent in developing countries.[9]

Usage of PRBCs is quite significant in thalassemia patients which shows the increase burden on transfusion services to arrange for blood in these patients.

Limitations

There was separate hospital for trauma and obstetrics and gynecology which has separate blood banks, therefore that data is not included in this study.

CONCLUSION

The pattern of utilization of blood and blood components is significant for quality management of blood transfusion services, do the cost analyses for planning of local and regional blood donation camps so that demand can be met. Our study provides data regarding requirement of blood and blood component use in this teaching super speciality hospital. To avoid wastage and shortage. It has become necessary to study the different component requirement so that component separation could be well managed. Judicial usage of blood should be ultimate goal for any blood transfusion services therefore regular meetings of hospital transfusion committee should be made and strict monitoring regarding over usage and wastage should be done.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Handa A, Bundas S, Pal A. Utilization pattern of blood and its components in a tertiary care super speciality hospital. Int J Community Med Public Health 2020;7:4526-9.