Study of Blood Transfusion Practice at P.D.U. Medical College, Rajkot

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ABSTRACT

Introduction: Blood transfusion is a crucial and often life-saving procedure and it is a common care method. Without blood, the management of many medical conditions such as trauma, cardiac surgeries, organ transplantation and obstetric hemorrhage, would have been difficult or nearly impossible.

Aims and Objectives: The aim of this study is to correlate component prescribed to the patient with clinical diagnosis of patient.

Material and Method: The study was a retrospective study of one year from 1 September 2018 to 31 August 2019 carried out in Blood bank, Department of Pathology, Pandit Deendayal Upadhyay Medical College, Rajkot, Gujarat, India. Data were collected from blood bank requisition form of admitted patient who required transfusion.

Result: Total number of blood and blood component utilized during study period were 29802. Female received more transfusion compared to Male. Age group received maximum transfusion was 21-29 years. The most transfused blood component was Red Cell Concentrate (RCC) followed by Fresh Frozen Plasma (FFP), Platelet Concentrate (PC) and Whole blood (WB) respectively. Cryoprecipitate were least transfused blood component.

Conclusion: This study provides information of pattern of usage of blood and blood components in our hospital. This also enables internal quality control for better functioning of blood bank.

Keywords: Blood Transfusion; Fresh frozen plasma; Platelet concentrate; Red cell concentrate

INTRODUCTION

Blood transfusion with hopes to benefit patients is an ancient practice and the available records date back to the thirteenth century, from then and till date transfusion of blood and blood components remain an important and indispensable part of patient management.

Blood transfusion is a crucial and often life-saving procedure and it is a common care method. Without blood, the management of many medical conditions such as trauma, cardiac surgeries, organ transplantation and obstetric hemorrhage, would have been difficult or nearly impossible.

This and the fact that blood is a very limited and precious resource and the attempts to come up with substitutes have not yielded any satisfactory results, the judicious and appropriate use of blood and its component becomes imperative. Number of studies has started due to increase in demand for blood and its blood products with rising transfusion associated cost and morbidity to review appropriate utilization and usage of blood ordering practice [1,2].

MATERIALS AND METHODS

The study was a retrospective study of one year from 1 September 2018 to 31 August 2019 carried out in Blood bank, Department of Pathology, Pandit Deendayal Upadhyay Medical College, Rajkot, Gujarat, India. All the patients who are admitted to hospital and required transfusion of blood or its component are included in this study.

Data were collected from blood bank requisition form of admitted patient who required transfusion. All data regarding demographic details of the patient, unit or specialty in which the patient was admitted, blood group of the patient, diagnosis, type of blood and its product requested and along with indication for

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transfusion and number of component transfused were noted down.

Relevant laboratory parameters (Hemoglobin,Prothrombintime, Activatedpartial.Thromboplastin time, factor VII, platelet count) to type of blood and its product requested were also reviewed.

OBSERVATION AND RESULT

Total 29802 units of blood and its component were utilized during the study period of one year (1 September 2018 to 31 August 2019).

Male to female ratio for number of issue were 1:1.4. Total issue in males were 12401 (42%) and for females it were 17401 (58%) over the study period respectively. As given in Figure 1.



Maximum number of issue were in age group of 20-29 years 7489 (25%) followed by 0-9 years 6683 (22%). Least number of issues was in above 80 years (1%). As given in Table 1.

Table 1: Age wise distribution of total is	sue.
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Age in years	Total	Percentage		
0-9 years	6683	22		
10-19 years	4341	15		
20-29 years	7489	25		
30-39 years	2634	9		
40-49 years	2522	8		
50-59 years	2898	10		

60-69 years	2313	8		
70-79 years	709	2		
>80 y ear s	213	1		
Total	29802	100		

Total 29802 blood and blood components were issued out of which 75% (22471) were RCC, 15% (4375) were FFP, 7% (2097) were PC, 2% (628) were WB and 1% (213) were cryoprecipitate. As given in Figure 2.



Figure 2: Component wise distribution of total issue.

Out of 29802 products 27766 units were positive and 2036 were negative. Overall maximum issued blood group was B positive (33.36%) and least issue blood group was AB negative 0.47%. As given in Table 2.

Table 2: Blood group wise distribution of total issue.

Blood Group	Total Issue	Percentage		
A Positive	6622	22.22		
B Positive	9942	33.36		
O Positive	8490	28.49		
AB Positive	2712	9.10		
A Negative	392	1.32		
B Negative	793	2.66		
O Negative	708	2.38		
AB Negative	143	0.47		
Total	29802	100		

During the study period, maximum issue were from medicine ward 8015 (26.89%), followed by thalassemia ward 7752 (26.01%) than Obstetrics and gynecology ward 5234 (17.56%). Least were from ENT ward 24 (0.08%) and other wards including Skin, Psychiatrics and Ophthalmology ward 20 (0.07%). As given in Figure 3.



Maximum RCC were issued in age group of 20-29 years (25.67%), followed by 23.3% in 0-9 years age group and 17.63% in 10-19 years age group. Least RCC were issued in above 80 age group (0.86%).

Maximum FFP were issued in age group of 0-9 years (22.69%), followed by 20.04% in 20-29 years age group. Least was in 70-79 age groups (2.14%).

Maximum PC were issued in age group of 20-29 years (28.51%), followed by 19.65% in 0-9 years age group. Least was in above 80 age group (0.72%).

Out of 628 WB issued maximum were issued among age group of 60-69 years (23.40%), followed by 50-59 years (18.63%). Least WB was issued in above 80 years age group (0.79%).

Out of total 231 Cryoprecipitate issued maximum were issued in age group of 20-29 years (62.77%) and least Cryoprecipitate were issued in 0-9 year (0.87%). As given in Table 3.

Table 3: Age wise distribution of blood and blood components.

Age	RCC	FFP	PC	WB	CRYO	TOTAL
0-9 years	5236	993	412	40	2	6683
10-19 years	3962	158	174	29	18	4341
20-29 years	5769	877	598	100	145	7489
30-39 years	1803	454	234	87	56	2634
40-49 years	1723	517	217	65	0	2522
50-59 years	1941	645	189	117	6	2898
60-69 years	1278	637	247	147	4	2313
70-79 years	566	94	11	38	0	709
>80 years	193	0	15	5	0	213
Total	22471	4375	2097	628	231	29802

DISCUSSION

Blood components are amongst the most valuable and expensive commodities in transfusion medicine. The demand is increasing and as such proper practice guidelines would be helpful in reducing or avoiding inappropriate transfusion of blood components since the preparation of blood components is a tedious and relatively expensive affair, the judicious request and use of blood components must be practiced [3]. Total 29802 transfusions were done among 16095 patients in our study from 1 September 2018 to 31 August 2019. Age: In our study the age group that received the maximum number of the transfusions was from 21-29 years (25%). Among this most of blood was used due to obstetrics cause. Least was issued in above 80 years age group. Our study is comparable to Gadag, Karnataka study [4], in which 21-30 year age group received 38.90% of transfusions and above 80 years age group received 0.60% of transfusions. Similar results were also found in Venkatachalapathy et al study [5]. In our study 58% of transfusion were in female and 42% were in male which is comparable to other studies are as given in Table 4.

Table 4: Gender wise comparison in various studies.

Study	Study year	Percentage of Female	Percentage of Male
Present study	2018-19	58.00%	42.00%
KIMS, Hubballi, Karnataka	2015	61.81%	38.19%
Sampat Kumar et. al., Gadag, Karnataka	2019	69.40%	30.60%
SAQR Hospital, UAE	2011	52.00%	48.00%
Zimmermann R et. al., Erlangen, Germany	1994-96	40.80%	59.20%
Cook SS et. al., Central Virginia	1991	52.00%	48.00%
Friedman BA et. al., United states	1981	57.00%	43.00%
Tshering Yangdon et. al., Bhutan	2018	65.33%	34.66%
Vamvakas EC et. al., Olmsted, Minnesota	1989-92	55.00%	45.00%
Tshering Yangdon et. al., Bhutan	2018	65.33%	34.66%
Vamvakas EC et. al., Olmsted, Minnesota	1989-92	55.00%	45.00%

In our study most transfusion were of blood group B positive (33.36%) followed by O positive blood group (28.48%) [9,10]. Least transfused blood group was AB negative (0.48%) [11-13]. Our study is comparable to SMS, Jaipur [17,18] and Gadag, Karnataka [4] as given in table 5.

 Table 5: Blood group wise comparison in various studies.

In study pattern slightly differs as percentage of WB transfusion were maximum (50%) and RCC 20.10% .Same pattern as of KIMS, [6,21] in which WB-77.7% and RCC 22.3%, [22] WB 64.88% and RCC 32.82% and [23] WB- 49.3% and RCC 24.29%. As given in Table 6.

Table 6: Component wise comparison in various studies.

Study	Study year	A +Ve	B +Ve	O +Ve	AB +Ve	A Neg	B Neg	O Neg	AB Neg	Study	Study year	Total Number of units issued	% of RCC	% of FFP	%of PC	% of Cryo- precipi ta	% of WB te
Present study	2018- 2019	22.22%	33.369	%28.48	% 9.109	%1.32%	6 2.669	%2.38%	% 48.00%	Present study	2018-2	2019 298	802 75%	5 159	% 7%	5 1%	2%
Handa et al., SMS, Jaipur	A2019	9 21.65 %	34.0 3%	29.8 3%	8.23 %	1.48 %	2.47 %	1.83 %	0.48 %	KIMS, Hubbal Karnata	2015 li, aka	12555	20.10 %	17.90 %	9.50%	0%	50%
										Karad, Mahar ashtra	2014- 2015	10358	66.33 %	16.16 %	16.12 %	0.03%	1.34%
Sam pat Kum ar et. al., Gada g,	2019	23.9 0%	32.10 %	31.10 %	8.80 %	1.00 %	1.30 %	1.50 %	30.0 0%	SAQR Hospit al, UAE	2011	7045	49.25 %	25.55 %	18.45 %	8.16%	0%
Karn atak a										Handa A. et al., SMS,	2019	90237	61.28 %	21.18%	17.09 %	0.05%	0.04%
The p	attern	in c	our st	udy d	iffers	with	Brazili	ian stu	udy by	Jaipur							
In a st	ncalez udy in	z at el north	[14], Engla	62% nd [15	transfu 6] male	isions were <u>f</u>	were 50.709	among 6.	g male.	Zimme rman R.	1994- 1996	48024	72.31 %	21.33 %	6.35%	0%	0%
Karad, most t followe positiv	Maha transfu ed by 2 e. Leas	urashtra Ision v 29.63% st comi	a study were c 6 trans mon w	y [16] of O ₁ sfusior ras AB	slightly positive n of A negati	y diffe e bloc positiv ve (0.2	r from od gro ve and 28%).	our s up (30 29.50	tudy as).26%), % of B	et al., Erlang en, Germa ny							
In our were Cryopp in table	study RCC, recipit e 6.	29802 15% ate and	2 tran 9 wer 1 2% v	sfusio1 e FFI were W	n were P, 7% VB wh	done 6 wei ich is 6	out o ce PC compa	of whic C, 1% rable a	h 75% were s given	Cook SS et al., Centra l Virgini a	1991	18713	56.14 %	17.65 %	26.21 %	0%	0%

Similar pattern of transfusion of blood and component also seen in Venkatachalapathy TS and Subhashish das study, karnataka [5,19,20].

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In our study maximum number of transfusion were in Medicine ward (26.89%) which is comparable to studied as given in Table 7.

Table 7: Ward wise comparison in various studies.

Stud y	Study year	Medi cine	OBGY	7 Ortho pedics	Pedia trics	Surg ery	Thala- ssemia	ENT	Other
Prese study	nt 2018	3. 2019	26.8 9%	17.56 %	6.58 13 %	.41 7.7 % %	25 26.0 1%	0.08 %	1.72 %
KIMS Hubb Karnat	2015 palli, raka	18.3 2%	34.4 4%	18.9 7%	11.48 %	16.07 %	0%	0.74 %	0%
Kara d, Mah arash tra	2014- 2015	34.9 4%	15.12 %	6.10 %	9.59 %	24.3 0%	0%	0%	0%
SAQ R Hosp ital, UA E	2011	16%	11%	27%	12%	33%	0%	1%	0%
Zim mer man R. et al., Erlan gen, Ger many	1994- 1996	29.10 %	3.70 %	0%	7.60 %	50.10 %	0%	0%	2%

A study done at Gadag, Karnatak [4] also shows similar results 44.49% transfusion were in medicine ward. A study done by [24] show similar results 44.13% in medicine ward. Study by [25,26] also shows medicine ward has maximum transfusion.

Maximum transfusion was in obstetrics and gynecology 34.44% and in our study it was 17.56%. Least transfusion in our study

was in ENT 0.08% which is comparable with KIMS, Hubballi study in which least common ward is ENT 0.74% [6].

In study at SAQR Hospital, UAE (2011) [7,8], maximum transfusion were in Surgical ward 33% and in a German study transfusion in Surgical ward were 50.10% and our study it was 7.75%.

Most common indication in RCC transfusion in our study is anemia (Including all anemia i.e. nutritional anemia, sickle cell anemia, aplastic anemia, G6PD deficiency anemia and thalassemia). Similar findings were also found in Karad, Maharashtra study [16] where anemia was most common indication (33.87%). Other study including [23,27,28] also shows anemia as most common indication.

Total 22471 RCC issued in 14879 patients. Out of them 9965 patients were transfused single units, 3125 patients had 2 units transfused, 931 patients had 3 units transfused and 858 patients had 4 or more units transfused.

Most common indication for FFP transfusion in our study is hepatic disorder (30.67%) including hepatic encephalopathy and cirrhosis of liver. Similar findings were also seen in Gadag, karnatak study [4].

CONCLUSION

Blood is a precious and scarce resource and as healthcare becomes accessible to more of the population. Blood and its components are routinely ordered and utilized in many hospitals.

This retrospective study provides information on blood and its products usage in our tertiary care hospital. An analysis of transfusion practice in a hospital set up can be of help to identifying key areas where there is a need to change policy and formulates strategies for clinician education.

It is important for Blood bank to be able to fulfill the demands for this life saving products and at the same time, evaluate and access the existing trends of blood ordering.

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