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Pattern of Utilization of whole Blood And Packed Cell Volume in A Teaching Hospital in western India

*Atul Bhanudas Hulwan[1], Sunil Vitthalrao Jagtap[2], Sujata R. Kanetkar[3], Pradnya P. Kale[1], Pramod D. Borade[1]

[1]*Assistant Lecturer, Department of Pathology Krishna Institute of Medical Sciences and Research Centre, Karad, Satara.*
[2]*Professor, Department of Pathology Krishna Institute of Medical Sciences and Research Centre, Karad, Satara.*
[3]*Professor and Head, Department of Pathology Krishna Institute of Medical Sciences and Research Centre, Karad, Satara.*
Corresponding author*: *Atul Bhanudas Hulwan1

Abstract: *The emphasis has shifted from the use of whole blood to component therapy. It is important for the blood bank to be able to fulfill the demands for this life-saving product and at the same time, evaluate and assess the existing trends of blood ordering. Hence, periodic review of blood component usage is essential to assess the blood utilization pattern in any hospital.*
Objectives: *To study the utilization pattern of whole blood and PCV in a teaching hospital.*
Material And Methods: *This observational descriptive study for 18 months (July 2014- December 2015) on pattern of utilization of whole blood and PCV was carried out in the Blood Bank in a Krishna Institute of Medical Sciences, a teaching hospital.*
Results: *Total transfusions carried out were 10358 in this study period. Whole blood transfusions were only 139 (1.35%) of all transfusions. The maximum whole blood use was for operative purpose (55.39%). PCV was the most commonly used component (66.33%), with common indications being for anemia patients as well as for thalassemic patients. During the study period whole blood use was significantly reduced from 10.63% to 0.32%, analysed month wise. Along with decrease in use of whole blood, PCV use was significantly increased for transfusions.*
Conclusion: *The pattern of utilization of whole blood and PCV is relevant for quality management of transfusion practice, cost analyses and for planning local and regional blood donation programs.*
Keywords: *Transfusion, Blood utilization, Blood Bank Audit*

I. Introduction

Blood transfusion has come a long way from early 20th century when it was a complex and risky procedure. Currently transfusion medicine is a speciality in its own right. Blood is an amazing fluid. Blood is the most precious and unique gift that one human being can give to another human being. The blood transfusion service is the very vital component of healthcare services used in a broad range of hospital procedures, accidents, emergency obstetric services, and other surgeries. The demand for blood is increasing day by day because of urbanization and industrialization, road traffic accidents, advancement of medical science, advancement of surgical procedure like cardiac surgery, transplant surgery. Till date we are not able to prepare blood artificially and no effective substitute is invented so blood donor is very precious.

The primary responsibility of blood transfusion services is to provide safe, sufficient and timely supply of blood and blood products. At the same time the blood transfusion services should ensure the blood donation is safe and causes no harm to the donor. [1,2] The whole blood which is a mixture of cells, colloids and crystalloids can be separated into different blood components namely packed cell volume (PCV), platelet (PLT) concentrate, fresh frozen plasma (FFP) and cryoprecipitate (CRYO). Each blood component is used for a different indication. The component separation has maximized the utility of one whole blood unit.[3] The emphasis has shifted from the use of whole blood to component therapy, as blood is a scarce and precious resource. Currently Good Clinical Practice (GCP) guidelines mandate transfusion therapy for specific well established indications and use of blood components rather than whole blood.It is important for the blood bank to be able to fulfill the demands for this life-saving product and at the same time, evaluate and assess the existing trends of blood ordering. The importance of an internal audit and education programs is that it emphases proper selection of blood components for patients and avoiding their overuse. [4, 5] Hence, periodic review of blood component usage is essential to assess the blood utilization pattern in any hospital.In addition, not many studies from India have evaluated the use of component therapy partially because components are not made available by most blood banks. The introduction of the paper should explain the nature of the problem,

previous work, purpose, and the contribution of the paper. The contents of each section may be provided to understand easily about the paper.

II. Material And Methods

- This observational descriptive study for 18 months (July 2014- December 2015) on pattern of utilization of blood and blood components was carried out in the Blood Bank of Department of Pathology in a teaching hospital.
- Data regarding sex of the patient, indication of transfusion, whole blood or blood component to be used, different blood groups used, department and units where transfusion to be carried out etc. were noted down from the daily records of blood bank.
- Inclusion criteria
- All the transfusions of blood or blood components during the study period in our Hospital.
- Exclusion criteria
- Units issued out-side hospitals other than our hospital for transfusion.
- The data was analyzed for the pattern of whole blood and PCV usage by different specialities, for different indications in different patients.

III. Results

There were total 10358 transfusions which were carried out during the study period of 18 months. Whole blood and component utilization was calculated in all these transfusions. Out of all transfusions,139 were whole blood transfusions, 6871 were packed cell transfusions, 1674 fresh frozen plasma transfusions, 1670 platelet transfusions, and 4 were cryo-precipitate. (Table No. 1) The pattern of utilization has shown reducing trend for whole blood use. Meanwhile, the utilization for the PCV was increasing. Total number of whole blood and PCV used during study period were 7010. The distribution of utilization according to the month is given in Table No. 2. Total transfusions were analyzed for the indications of transfusion. The most common indication was anemia (33.87%). For anemia commonly used component was PCV. Few times even whole blood was used for anemic patients. (Table No. 3) Another indication for transfusion was operative purpose (23.82%). Most common component used for operative purpose was PCV. The maximum whole blood use was for operative purpose (55.39%). (Table No. 3)

IV. Discussion

The availability of donated blood and the demand for blood components must be balanced to provide adequate supply. At present the supply of donated blood is unable to keep up with demand. Considering this, in many nations whole blood transfusion is reduced and instead whole blood is separated in to components. These components are then used separately, as indicated in according to patient's need. It is important to study the pattern of utilization of blood and blood components in the hospital. It helps to find out trend of usage which decreased the cost of treatment, reduce wastage of blood components and improves the infrastructure for storage of blood components for future. The present study was conducted over 18 months period. Total number of transfusions observed during study period was 10358. The most common component use was attributed to PCV (66.33%), followed by platelets (16.12%) and fresh frozen plasma (16.17%). Similar findings were noted by studies done by Richa Gerg et al[6], and Mohammad Z Q et al.[7] Rarely used component was cryoprecipitate (0.03%). This is comparable with study done by Mohammad Z Q et al[7] in 2015. In our study the whole blood use was only 1.35% out of whole transfusions. Similar finding was noted by Venkatachalapathy et al [8](8.55%) in 2012. The data of transfusion for 18 months was analysed overall. We observed that Whole blood use has been replaced by PCV transfusions. (Graph No. 1)

The use of whole blood form July 2014 has reduced till December 2015 from 10.63% to 0.32%. There was marked decline in utilization of whole blood as observed by Ambroise M et al. [9] The whole blood utilization was limited to few indications such as heavy blood loss and emergency. Also noted was in given period the use of whole blood reduced gradually indicating the impact of transfusion medicine in teaching. However, this was not in concordance with study done by Guar DS et al[4], indicating lack of awareness. (Table No. 4) The pattern of utilization of blood and blood components is relevant for quality management of transfusion practice, cost analyses and for planning local and regional blood donation programs. The study provides data regarding requirement of blood and blood component use in this teaching hospital. It is necessary to study different component requirement so as to improve component separation to avoid wastage and shortage. Regular clinical meetings on transfusion medicine for indication of different components are necessary to achieve judicial use of components. More such studies are needed to standardize the component utilization to improve patient care.

Figures and Tables

Table No. 1: Utilization of blood & blood components in 18 months

Blood and Blood Component	Number	Percentage
WB	139	1.35
PCV	6871	66.33
FFP	1674	16.17
PLT	1670	16.12
CRYO	4	0.03
TOTAL	10358	100

Table No. 2: Month wise use of whole blood and PCV in 18 months

Month & year	WB	PCV
July 2014	55	305
Aug 2014	19	362
Sept 2014	05	419
Oct 2014	16	411
Nov 2014	17	314
Dec 2014	11	314
Jan 2015	03	372
Feb 2015	00	377
Mar 2015	01	436
Apr 2015	01	383
May 2015	01	431
Jun 2015	00	428
Jul 2015	00	382
Aug 2015	01	407
Sept 2015	01	339
Oct 2015	03	408
Nov 2015	03	363
Dec 2015	02	420
Total	139	6871

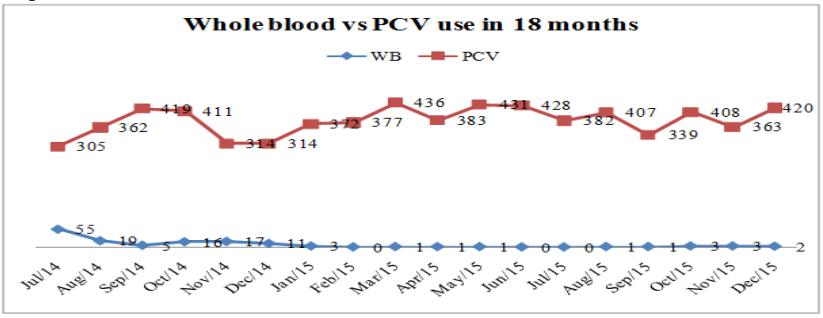
Table No. 3 : Common indications for transfusions observed in the study

Indication of Transfusion	WB	PCV
Anemia	47	3461
Thalassemia	-	478
Malignancy	-	594
Bleeding	-	-
Operative	77	1916
Shock	15	317
Dialysis	-	105
Total	139	6871

Table No. 4: Utilization of whole blood and PCV (Comparison with different studies)

Author and year of study	Whole blood (%)	PCV (%)
Gupta S et al (2007)	77.7	22.3
Bhatnagar S et al (2007)	64.88	32.82
Gaur S et al (2009)	49.3	24.29
Venkatachalapathy (2012)	8.55	53.83
Present study (2017)	1.35	66.33

Graph No. 1: Pattern of utilization of whole blood and PCV in 18 months study



V. Conclusion

The pattern of utilization of whole blood and PCV is relevant for quality management of transfusion practice, cost analyses and for planning local and regional blood donation programs.

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