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The Study of Peripartum Transfusions of Blood and its Products in A Tertiary Hospital

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Abstract
Objective: *To study the incidence of transfusions in peripartum period, risk factors for transfusion, maternal outcome and perinatal outcome of women receiving transfusions of blood & blood products in peripartum period in a tertiary hospital.*
Methods: *A study of 582 women who received blood and its components during peripartum period was conducted over a period of 6 months in Gandhi Hospital, OBG department from June, 2015 to November, 2015.*
Results: *Incidence of transfusions in peripartum period was 14.4% in this study. Out of 582 women, 73% of cases were unbooked, 66.3% cases were in age group 21-30years. 42.3% of women were multiparous and had at least two previous viable births. 62.5% women underwent cesarean delivery. 48.6% women received transfusions during postpartum period.*
Conclusion: *The risk factors for transfusion during pregnancy and postpartum period were poor antenatal care resulting in anemia, multiparity, caesarean delivery, ante partum hemorrhage including placenta previa, post partum hemorrhage.*
Keywords: *Transfusions, blood transfusions, blood products.*

I. Introduction

Blood transfusion is recognised as one of the eight essential components of the Comprehensive Emergency Obstetric Care module, which has been designed to reduce maternal mortality rates. Postpartum haemorrhage is a major contributor which accounts for 25% of all pregnancy-related deaths[1].

Availability of blood transfusion in developing countries depends on infrastructure, economics and social and religious taboos and practices, and this could cause transfusion practices to vary from those in the developed countries[2].Indications for blood transfusions in obstetrics include anaemia of pregnancy, haemoglobinopathies, obstetric haemorrhage, surgeries where significant blood loss is expected. Anaemia during pregnancy is responsible for 15% of maternal mortality. Obstetric haemorrhage continues to be the leading cause of maternal mortality, ranging from 13% in developed countries to 34% in Africa[3].

Blood loss results in hypoxia, metabolic acidosis, ischaemia and tissue damage, resulting in eventual global organ dysfunction. Massive blood loss results in consumptive coagulopathy and this is difficult to distinguish from dilutional coagulopathy, caused by transfusion with packed red cells and crystalloids, which in turn is difficult to differentiate in the acute setting from DIC. Dilution impairs coagulation and leads to further blood loss. All soluble clotting factors are absent in packed red blood cells (PRBCs) and stored whole blood is deficient in platelets and factors V, VII and XI. Thrombocytopaenia is the most common defect found in women with blood loss and multiple transfusions[4].

Role of blood transfusion in acute haemorrhage is to maintain tissue oxygenation and reversal or prevention of coagulopathy using appropriate blood components. Simultaneously, the cause of the bleeding should be identified and controlled, by medical means, surgery or invasive radiography.

The conclusive consensus from various protocols and guidelines suggest that the transfusion is rarely indicated in Hb >10 g/dl. If Hb is <6 g/dl transfusion is indicated irrespective of cause and condition of the patient. If Hb is between 6 and 10 g/dl, the indication will depend upon whether patients is actively bleeding or having history of previous excessive haemorrhage or having some medical condition where optimal Hb is >7 g/dl is required[5,6].

While it has been observed that patients receiving <10 units of PRBCs rarely need component replacement, the lowest mortality occurs in the patients where ratio of plasma and PRBCs is 1:1. Both the CMQCC Toolkit (California Maternal Quality Care Collaborative) and the RCOG Green top Guideline No 52 recommend a ratio of PRBC, fresh frozen plasma and Platelet of 6: 4:1 in cases of massive haemorrhage[7,8].

II. Aims & Objectives

The aim of the study is

1) To study incidence of transfusions during peripartum period.
2) To study the risk factors associated with transfusions
3) To assess the indications for peripartum blood transfusion
4) To study maternal and perinatal outcome of women receiving blood transfusions in peripartum period.

III. Materials & Methods

An observational study of 582 women who received blood and blood components during peripartum period was conducted over a period of 6 months in Gandhi Hospital, OBG department from June, 2015 to November, 2015.

In the situation of obstetric hemorrhage early resuscitation was done with crystalloids and/or colloids with oxygenation while simultaneously, all steps were done to control bleeding and reduce the transfusion requirement. The decision to transfuse blood and it's components was based on both clinical assessment and hematological parameters. Consent for blood transfusion was taken.

The goals for transfusion in the obstetric patient was to achieve hemoglobin >8 g/dl, Platelet count >75000/cumm, Prothrombin time (PT) <1.5 × mean control, Activated PT <1.5 × mean control and Fibrinogen >1.0 g/l. To avoid dilutional coagulopathy, concurrent replacement with coagulation factors and platelets was done.

Blood was transfused within 4 hours of leaving the storage unit. Patients were closely observed for 1st 15minutes after commencement of each unit and were closely observed from start of each individual blood component pack throughout the transfusion, to detect any adverse effects. Blood transfusion reactions, minor and major, if any were recorded. Prescription of blood and its components was retained within a patient's medical record following completion of a transfusion.

Different parameters like age, parity, booking status, mode of delivery, indication for transfusion, time of transfusion in relation to delivery, type of blood component transfused, maternal and perinatal outcome were studied.

IV. Results

Out of 4030 women admitted, 582 women received transfusions of blood and its components due to various indications. Incidence of transfusions during peripartum period was 14.4%.

Table 1: Distribution in relation to booking status

Variable	No. of cases	Percentage
Booked	157	27
Unbooked	425	73

Out of 582 women who received blood transfusions, 73% cases were unbooked.

Table 2: Distribution in relation to age

Age (in years)	No. of cases	Percentage
≤20	98	16.8
21-30	386	66.3
>30	98	16.8

66.3% of women who received blood transfusions were in age group 21-30 years

Table 3: Distribution in relation to parity

Parity	No. of cases	Percentage
Nullipara (G1)	138	23.7
Para 1(G2)	198	34.0
≥Para2(≥G3)	246	42.3

42.3% of women who received transfusions were multiparous and had at least two previous viable births.

Table 4: Distribution in relation to mode of delivery

Mode of delivery		No. of cases	Percentage
Vaginal	Normal	93	16.0
	Instrumental(forceps/ventouse)	125	21.5
Cesarean	Elective	133	22.8
	Emergency	231	39.7

Out of 582 women who received transfusions, 16% of women had normal vaginal delivery, 21.5% of women had instrumental assisted vaginal delivery, 22.8% of cases underwent elective cesarean delivery and

39.7% cases underwent emergency cesarean delivery. Cesarean delivery compared to vaginal delivery poses increased risk of transfusions.

Table 5: Distribution in relation to time of transfusion

Time of transfusion	No. of cases(n=582)	Percentage
Antepartum	219	37.6
Intrapartum or intra operative	80	13.8
Postpartum or postoperative	283	48.6

37.6% of cases received transfusions during antepartum period, 13.8% of women received transfusions during intrapartum or intraoperative period and 48.6% received transfusions during postpartum or postoperative period.

Table 6: Distribution in relation to type of blood component transfused

Blood component	No. of transfusions(n=1024)	Percentage
Whole blood	48	4.7
Packed red cells	812	79.3
RDPs	78	7.6
FFPs	86	8.4

Out of 1024 transfusions done in 582 women, 79.3% of transfusions were of packed red cells, 8.4% of transfusions were of fresh frozen plasma, 7.6% were of RDPs and 4.7% transfusions were of whole blood.

Table 7: Distribution in relation to no. of units transfused

No. of whole blood/ packed red cells transfused	No. of transfusions(n=860)	Percentage
≤ 2 units	530	94.6
3- 4 units	300	34.9
≥ 5units	30	3.49

Table 8: Distribution in relation to indication for transfusion

Indication for transfusion		No. of cases	Percentage
Anemia of pregnancy		263	45.2
Ante partum hemorrhage	Accidental haemorrhage	61	10.5
	Placenta previa	23	4.0
	Thrombocytopenia/HELLP	14	2.4
Post partum haemorage	Atonic	152	26.1
	Traumatic(including rupture uterus)	30	5.2
	Retained placenta	24	4.1
	DIC/coagulopathy	5	0.9
Other causes		10	1.7

Most common indication for transfusion of blood and blood products was anemia of pregnancy (45.2%) followed by PPH (36.3%).

Table 9: Distribution in relation to transfusion reactions

Clinical type of transfusion reaction	No. of women with transfusion reactions(n=58)	Percentage
Mild	50	86.2
Moderate	7	12.1
Severe/Life threatening	1	1.7

Out of 582 women who received transfusions, 58 women had transfusion reactions (10%). Most of the transfusion reactions were mild reactions (86.2%).

Table 10: Maternal mortality

	No. of cases	Percentage
Maternal deaths	17	2.9

There were a total of 17 maternal deaths (2.9%).

Table 11: Causes of maternal death

Causes of maternal deaths	No. of deaths(n=17)	Percentage
Hemorrhagic shock	5	29.4
DIC	3	17.7
Sepsis with MODS	2	11.8
Acute renal failure	3	17.7
Cardiac failure	3	17.7
Transfusion reaction(anaphylaxis)	1	5.9

Most common cause of maternal death was hemorrhagic shock.

Table 12: Perinatal outcome

Perinatal outcome	No. of cases	Percentage
Intrauterine deaths	40	6.9
Live births	542	93.1

6.9% of cases had IUDs and 93.1% of cases had live births.

V. Discussion

This study consists of analysis of 582 women, who received blood and its components during peripartum period, at Gandhi hospital, obstetric and gynecology department from June 2015 to November 2015. Different parameters like age, parity, booking status, mode of delivery, indication for transfusion, time of transfusion in relation to delivery, type of blood component transfused, transfusion reactions, maternal and perinatal outcome were studied and their relation to risk of transfusion were studied.

In this study, incidence of transfusion was found to be 14.4%. Patterson et al[9] reported transfusion rate of 1.4%. Jou et al[10] reported the incidence of blood transfusion was 1.43%.

Majority of transfusions of blood and its components were done in unbooked cases (73%). This indicates the importance of regular antenatal visits in providing iron prophlaxis which prevents anemia of pregnancy, early detection and treatment of anemia with both oral or parental iron therapy and screening for high risk cases at earlier stage. So that blood transfusions and risks of blood transfusions can be avoided.

Most of the women who received transfusions were in age group 21-30 years and most of them were multiparous. Jou et al[10] reported that the risk of blood transfusion was more in extremes of age.

In this study, out of 582 women who received transfusions, 16% of women had normal vaginal delivery, 21.5% of women had instrumental assisted vaginal delivery, 22.8% of cases underwent elective cesarean delivery and 39.7% cases underwent emergency cesarean delivery. This indicates cesarean delivery is associated with more number of transfusions as compared to vaginal delivery. So, vaginal delivery should be encouraged in all cases when there is no contraindication to vaginal delivery. Patterson et al[9] showed that among vaginal deliveries, risk of transfusion was increased for forceps or vaccum births compared with non operative births. Jou et al[10] showed that cesarean delivery, vaginal birth after cesarean(VBAC), and repeat cesarean delivery had higher rates of blood transfusion than vaginal delivery.37.6% of cases received transfusions during antepartum period, 13.8% of women received transfusions during intrapartum or intraoperative period and 48.6% received transfusions during postpartum or postoperative period. Majority of transfusions were done in postpartum or postoperative period indicating the importance of preventing PPH by active management of 3rd stage labour. In Patterson et al study[9], 91% of transfusions occurred during birth admission.

Out of 1024 transfusions done in 582 women, 79.3% of transfusions were of packed red cells, 8.4% of transfusions were of fresh frozen plasma, 7.6% were of RDPs and 4.7% transfusions were of whole blood.

Most common indication for blood transfusion was anemia of pregnancy followed by PPH. Early correction of anaemia avoids the need for transfusion and reduces maternal mortality. Active management of 3rd stage labour should be employed to prevent PPH. In Patterson et al study[9], 81% of transfusions were associated with hemorrhage and women with bleeding or platelet disorders and placenta previa were at highest risk of transfusion. In Jou et al study[10], the risk factors for transfusion were pregnancies complicated by prepartum hemorrhage, placenta previa, preeclampsia, eclampsia, anemia and systemic lupus erythematosus.10% of women had transfusion reactions. 86.2% of transfusion reactions were minor.There were a total of 17 maternal deaths (2.9%). Most common cause of maternal death was hemorrhagic shock.Hebert *et al*[11] showed that restrictive transfusions and liberal transfusions were of equivalent value in critically ill patients while relatively stable patients undergoing liberal transfusions had a higher 30-day mortality.

VI. Conclusion

The study evidently shows that anemia is the main contributing factor for maternal morbidity and mortality which could have been prevented by antenatal care, which includes iron prophylaxis. Antenatal care

can be provided by strengthening PHCs, CHCs which in turn will prevent wastage of human resources (blood and blood products). The risk factors for transfusion during pregnancy and postpartum period were poor antenatal care resulting in anemia, multiparity, caesarean delivery, ante partum hemorrhage including placenta previa, post partum hemorrhage.

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