SRMS IMS
10.21761/jms.v8i01.10

ORIGINAL RESEARCH ARTICLE

To study the Transfusion Practice with respect to Component Therapy in Major Obstetric Hemorrhage

Chanchal Choudhary[1], Mridu Sinha[2*], Shashi B. Arya[2], Milan Jaiswal[2#]

ABSTRACT

Introduction: Peripartum hemorrhage is a major complication requiring emergency transfusion of packed blood or its components with quick decision-making. We describe our experience of transfusion practices in major obstetric hemorrhage.

Materials and Methods: Retrospective observational data of all the deliveries (n = 1837) over period of one year. All cases were assessed for obstetric hemorrhage and subsequent transfusion practices done. Demographic details, obstetric history, indications for transfusion, gestational age at transfusion, pre- and post-transfusion hemoglobin levels, nature and type of transfusion, units of transfusion, adverse events following transfusion and outcome in terms of morbidity and mortality were noted. Data was analyzed using SPSS 21.0 software. Chi-square test was used for analysis.

Results: Transfusion was required in 776 (42.2%) pregnant women. Obstetric hemorrhage was the indication in 432 (55.7%) of the women receiving a transfusion. Other indications were anemia during pregnancy (39.7%) and traumatic pph (10.5%), respectively. Among major obstetric hemorrhage cases (n = 432), the majority (n = 224; 51.9%) had antepartum hemorrhage (abruptio placentae/placenta previa) and the remaining 208 (48.1%) had postpartum hemorrhage change no significant change seen. A total of 138/432 (31.9%) cases had pre-transfusion hemoglobin level <8 g/dl in cases of moderate anemia. PRBC was transfused to 319 (73.8%) followed by platelets (212; 49.1%) and FFP (n = 29; 6.7%), respectively. The majority of cases required only 2 units of transfusion. There were 21 (4.9%) cases requiring more than 3 units. Post-transfusion hemoglobin levels were >10 g/dl in 319/432 (73.8%) cases, thus showing a significant change ($p < 0.05$). Most common adverse reactions (fever/shivering) were noted in 32 (7.4%) cases. There were 6 (1.4%) mortalities (all having pre-transfusion Hb <6 g/dl).

Conclusion: The study highlighted the significance of packed blood cells and component transfusion in reducing obstetric morbidity and mortality.

Submission: 15-05-2023; **Acceptance:** 20-06-2023; **Published:** 30-06-2023

[1]Junior Resident, [2]Professor,

Department of Obstetrics and Gynaecology, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India.

[#]Department of Transfusion Medicine, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India.

Corresponding Author: Mridu Sinha, Department of Transfusion Medicine, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India, e-mail: sinhamridu72@gmail.com

Keywords: Obstetric hemorrhage, Blood transfusion, Component transfusion, Antepartrum hemorrhage, Postpartum hemorrhage.

How to cite this article: Choudhary C, Sinha M, Arya SB, Jaiswal M. To study the Transfusion Practice with respect to Component Therapy in Major Obstetric Hemorrhage. SRMS J Med Sci. 2023;8(1):47-51.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Obstetric hemorrhage is one of the most important causes of peripartum maternal morbidity and mortality, especially in low and middle-income countries like India.[1] In a global context too, the problem is very serious. As per data available for the year 2015, there were a total of 8.7 million cases of obstetric hemorrhage throughout the world which contributed to a total of 83,000 maternal deaths.[2] Although guidelines for the prevention and management of major obstetric hemorrhage exist,[3,4] their implementation is very difficult in low-resource settings like developing countries where most of the deliveries are unbooked. In tertiary care centres with a high proportion of referrals for complicated pregnancies. There is high incidence of major obstetric hemorrhage in non-pregnant. The causes for obstetric hemorrhage may be both antepartum or intrapartum during delivery (placenta previa, placental abruption, coagulopathies, uterine rupture, lacerations during delivery) as well as postpartum (uterine atony, placenta accreta).[5] The complications associated with obstetric hemorrhage may affect both maternal as well as fetal well-being. It may affect the fetus by inducing hypoxemia, prematurity, growth retardation, intrauterine death, congenital malformations and birth asphyxia. In pregnant women, it may lead to hemorrhagic shock, acute kidney injury, premature labor, higher cesarean rates, postpartum hemorrhage, complications associated with massive blood transfusion, coagulopathy, lung injury, *etc.* which may lead to increased maternal morbidity and mortality.[5]

Management of major obstetric hemorrhage is done through need-based strategies with a mix of fluid resuscitation administration of blood and blood products. However, there are controversies regarding transfusion practices, especially with respect to use of single-unit versus multiple-unit transfusions whole blood versus

component usage. Moreover, whether clinical judgement regarding transfusion need should be given preference over measurement of hemoglobin levels for such decision-making. There are variable reports on such practices and their impact on the outcome in different centres.[6-10]

Our centre is a tertiary referral care centre catering to a semi-urban and rural population with a huge burden of unbooked deliveries and a high incidence of unprecedented major obstetric hemorrhage. In this communication, we describe our experience of obstetric hemorrhage, transfusion practices adopted and their outcome.

MATERIAL AND METHODS

This retrospective observational study was carried out at the Department of Obstetrics and Gynaecology, SRMS, Bareilly after seeking departmental permission to retrieve one-year record of deliveries. Data was screened for all the cases requiring transfusion at gestational age 32 weeks or above. Indications for transfusion were noted. Detailed records of all those requiring transfusion for obstetric hemorrhage (antenatal/postpartum) were noted. Obstetric hemorrhage was defined as blood loss ≥500 mL through the genital tract/vaginal route or a fall in hemoglobin levels by ≥2 g/dl during the peripartum period.

Cases with incomplete records were excluded. Pre and post-transfusion hemoglobin levels, nature and type of transfusion, units of transfusion, adverse events following transfusion (fever/shivering) and outcome in terms of morbidity and mortality were noted. Data gathered was analyzed using IBM Statistical Package for Social Sciences version 21.0. Fisher exact test and Independent samples t-tests were used to compare the data.

RESULTS

In this retrospective study over a period of one year, data for 1837 deliveries could be retrieved for transfusion needs. A total of 776 (42.2%) women required transfusion during this period (Figure 1).

Obstetric hemorrhage (antepartum/peripartum) contributed to a total of 432 of 1837 (23.5%) and 55.7% of total women requiring transfusion. Other indications were anemia during pregnancy (39.7%) and operative deliveries LSCS and instrumental delivery (10.5%), respectively (Figure 2).

The average age seen in obstetric hemorrhage cases was from 18 to 42 years and mean age was 26.58 ± 6.11 years in Figure 1. The majority (n = 224; 51.9%) had antepartum hemorrhage (abruptio placentae/placenta previa) and the remaining 208 (48.1%) had postpartum

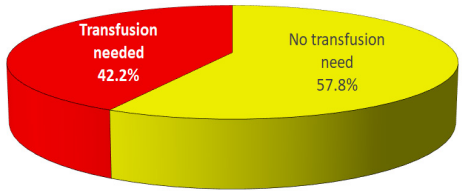

Figure 1: Pie Diagram showing transfusion need (n=1837)

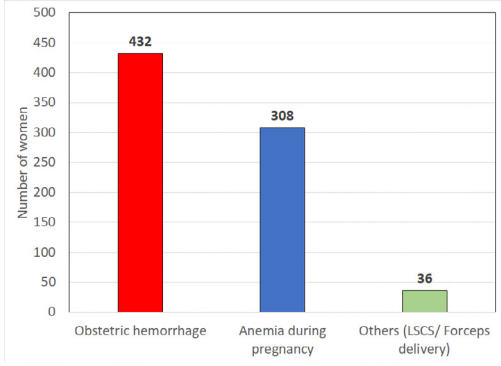

Figure 2: Bar diagram showing indications for transfusion

hemorrhage in Figure 2. Pre-transfusion hemoglobin levels ranged from 5.5 to 10.6 g/dl with a mean of 8.60 ± 1.47 g/dl. Almost one-third (31.9%) had pretransfusion Hb <8 g/dl. Packed blood cells was transfused to 319 (73.8%) followed by platelets (212; 49.1%) and FFP (n = 29; 6.7%), respectively. The majority of cases (50.5%) required only 2 units of transfusion. There were 138 (31.9%) cases who required only two units of transfusion, including PRBC, platelets, FFP, and cryoprecipitate. There were 21 (4.9%) cases requiring more than 3 units. The number of transfusions ranged from 1 to 6 units with a mean of 1.93 ± 0.87 in Figure 2. Following transfusion, hemoglobin levels ranged from 7.3 to 12.1 g/dl with a mean of 10.50 ± 0.75 g/dl. Mean post-transfusion hemoglobin level was 10.50 ± 0.75 g/dl. Post-transfusion hemoglobin levels were >10 g/dl in 319/432 (73.8%) cases, thus showing a significant change ($p < 0.05$) in Figure 2. Adverse reactions (fever/shivering) were noted in 32 (7.4%) cases. There were 6 (1.4%) mortalities (Table 1).

Mortality did not show a significant association with age, time of hemorrhage (antepartum/postpartum), though the proportion of postpartum patients was higher in those who expired (83.3%) as compared to those who survived (47.7%) ($p = 0.110$). However, mean pre-transfusion Hb level was significantly lower in those who expired (5.77 ± 0.16 g/dl) as compared to those who survived (8.64 ± 1.44 g/dl) ($p < 0.001$) in non pregnant. All the expired patients had pre-transfusion Hb<6 g/dl compared to only 5.2% of those who survived, thus showing a significant difference between two groups ($p < 0.001$). No significant difference with respect to type of blood product transfused was seen between the two groups for whole blood and packed cells. However fresh

Table 1: Profile of Obstetric Hemorrhage cases (n = 432)

S.N	Characteristic	Statistic
1.	Mean age ± SD (Range) in years	26.58 ± 6.11 (18-42)
2.	Type	
	Antepartum	224 (51.9%)
	Postpartum	208 (48.1%)
3.	Mean Pre-transfusion Hb ± SD (Range) g/dl	8.60 ± 1.47 (5.5-10.6)
4.	Pretransfusion Hb<8 g/dl	138 (31.9%)
5.	Type of blood product transfused	
	Whole blood	319 (73.8%)
	Packed cells	212 (49.1%)
	FFP	29 (6.7%)
6.	No. of units transfused	
	One	138 (31.9%)
	Two	218 (50.5%)
	Three	55 (12.7%)
	>Three	21 (4.9%)
	Mean number of units ± SD (Range)	1.93 ± 0.87 (1-6)
7.	Post-transfusion Mean Hb ± SD (Range) g/dl	10.50 ± 0.75 (7.3-12.1)
8.	No. of cases with post-transfusion Hb >10 g/dl	319 (73.8%)
9.	Mean change in Hb ± SD after transfusion	1.89 ± 1.37
10.	Adverse reactions	32 (7.4%)
11.	Mortality	6 (1.4%)

frozen plasma (FFP) was administered in a significantly higher proportion of those who expired (66.7%) as compared to those who survived (5.9%) ($p < 0.001$). Mean number of transfusion products was significantly higher in those who died (3.33 ± 1.37) as compared to those who survived (1.91 ± 0.85) ($p < 0.001$). Mean post-transfusion hemoglobin level was also significantly lower in those who expired (2.55 ± 1.02 g/dl) as compared to those who survived (1.88 ± 1.37 g/dl) ($p < 0.001$). However, no significant difference between two groups was observed for mean post-transfusion change in hemoglobin level ($p = 0.238$). The proportion of those showing adverse effects was also higher in those who died (66.7%) as compared to those who survived (6.6%) ($p <0.001$) (Table 2).

DISCUSSION

In the present study, obstetric hemorrhage was the main indication for transfusion in most (55.7%) cases. Overall, the incidence of obstetric hemorrhage was 23.5%. Chawla *et al.*[6] reported obstetric factors related to transfusion need in only 1.3% of deliveries compared to the present study. The reason for this could be the difference in settings. Our centre, being a tertiary care referral center most of the cases were unbooked women from lower socioeconomic strata, the majority having inadequate antenatal care and nutritional deficiencies. Their study was conducted in the Armed Forces Medical College, where most cases were booked. As such, preventive strategies play an important role in determining the incidence of obstetric hemorrhage, for which pre-emptive strategies for prevention play an important role. However, in our settings no such preventive strategies could be implemented. In different studies the incidence of obstetric hemorrhage has been reported to range from 4.7 to 27.4%, depending upon the settings.[7,11] However, similar to the present study, other studies also report obstetric hemorrhage as the most dominant cause for transfusion. Pancholi *et al.*[11] in their study reported obstetric hemorrhage to be contributory to 52% of total transfusions in obstetric cases. Fazal *et al.*[7] on the other hand reported it in all the cases reported by them. In the study by Singh *et al.*[8] too, obstetric hemorrhage was

Table 2: Association of mortality with different study variables (n = 432)

S. No	Characteristics	Mortality (n = 6)	No mortality (n = 426)	Statistical significance
1.	Mean age ± SD (Range) in years	22.50 ± 3.83	26.64 ± 6.12	t = 1.650; p = 0.100
2.	Type			
	Antepartum	1 (16.7%)	223 (52.3%)	Fisher p = 0.110
	Postpartum	5 (83.3%)	203 (47.7%)	
3.	Mean pre-transfusion Hb ± SD (Range) g/dl	5.77 ± 0.16	8.64 ± 1.44	t = 4.887; p <0.001
4.	Pretransfusion Hb<6 g/dl	6 (100%)	22 (5.2%)	Fisher p <0.001
5.	Type of blood product transfused			
	Whole blood	6 (100%)	313 (73.5%)	Fisher p = 0.347
	Packed cells	1 (16.7%)	211 (49.5%)	Fisher p = 0.216
	FFP	4 (66.7%)	25 (5.9%)	Fisher p <0.001
6.	Mean number of units transfused ± SD	3.33 ± 1.37	1.91 ± 0.85	t = 4.038; p <0.001
7.	Mean post-transfusion Hb ± SD (g/dl)	8.30 ± 0.96	10.53 ± 0.70	t = 7.704; p <0.001
8.	Mean post-transfusion Hb change ± SD (g/dl)	2.55 ± 1.02	1.88 ± 1.37	t = 1.183; p = 0.238
9.	Adverse effects	4 (66.7%)	28 (6.6%)	Fisher p <0.001

responsible for more than 25% of transfusions in obstetric patients. Abdoul-Samadou *et al.*[10] found >90% of their cases as obstetric hemorrhage. The reason for the higher prevalence of obstetric hemorrhage in our study could be the fact that we included the record of women who presented for delivery with GA >32 weeks and did not include transfusion cases in early pregnancy.

In the present study, the majority of cases had antepartum hemorrhage (51.9%) while the remaining 48.1% were postpartum hemorrhage cases, as such there was not much difference in the proportion of antepartum and postpartum hemorrhage cases. The proportion of antepartum to postpartum hemorrhage cases was 1.08. Similar to the present study, Pancholi *et al.*[11] also reported antepartum hemorrhage cases (23.57%) to be slightly higher than postpartum hemorrhage cases (21.42%) and the proportion of two was 1.10, which is close to that in ours. On the other hand, Fazal *et al.*[7] reported antepartum cases and peripartum cases as 27 and 73%, thus showing that unlike the present study they did not have dominance of antepartum cases. The reason for the dominance of antepartum hemorrhage cases in the present study could be owing to the fact that a high proportion of our cases were referrals from other primary and secondary care centres where this event has already taken place.

In the present study, nutritional deficiencies were highly prevalent and a large proportion of women had pre-transfusion hemoglobin levels suggestive of severe anemia (31.9%). Mean pre-transfusion hemoglobin levels were also suggestive of moderate anemia (mean 8.60 ± 1.47 g/dl). Such high prevalence of low hemoglobin was also indicative of a high risk of obstetric hemorrhage and transfusion need.

In the present study, whole blood was the most common blood produce used (73.8%) followed by packed cells (49.1%) while FFP was required in only 29 (6.7%). The reason for emphasizing the use of whole blood in the present study was the high prevalence of moderate to severe anaemia, thus forcing transfusion of whole blood as the first choice. Compared to the present study, Pancholi *et al.*[11] reported use of PCV (46.6%) as the most preferred transfusion option. They also reported use of FFP (21.4%) in a large proportion of their patients. On the other hand, Chawla *et al.*[6] reported whole blood use in 79% of patients but reported use of FFP in as high as 66% of patients. Compared to these studies, in the present study use of FFP was much lower. The findings in the present study were in concordance with the observations of Singh *et al.*[8] who reported whole blood use in 82.0%, packed cells in 58.1% and FFP in only 4.1% cases. In the present study, we used FFP in only those non-responsive cases where coagulopathies were suspected as it is a rich source of fibrinogen, however, extensive use of FFP was avoided as its administration may dilute the existent fibrinogen.[12]

In the present study, the majority of cases required one unit transfusion (50.5%) and only 21 (4.9%) required more than three units of transfusion. The mean number of units transfused was 1.93. Most of the other workers have also reported two units of transfusion in a maximum number of their cases and need more than three units in only a handful. Pancholi *et al.*[11] recorded 2 unit need in 42.85% and >3 units need in 25.71% patients. However, Fazal *et al.*[7] reported median units to be >3 in all the cases. However, Singh *et al.*[8] reported one unit need in most cases and more than three unit need in only a handful of cases. It must be needed that while calculating the number of units transfused, Singh *et al.*[8] made calculations for all the components separately. However, in the present study we made a combined assessment for all the products, hence the transfusion need in the present study seems to be slightly higher than theirs.

The present study observed a total of 6 (1.4%) mortalities. Pancholi *et al.*[11] did not report any mortality compared to the present study. However, it may be owing to dominance of non-hemorrhagic cases in their study. Moreover, the sample size of their study was much lower than the present study. Chawla *et al.*[6] too did not report any mortality in their small series of 32 patients. However, the transfusion decisions in their study were governed by the criteria (Hb < 7 gm%, and < 4 weeks for delivery or in labor). Compared to this, in the present study, hemorrhagic blood loss was also included as a criteria and most of the cases were in labor and there was not much time gap between delivery and transfusion. Fazal *et al.*[7] and Singh *et al.*[8] also did not report any mortality. However, Bhattacharya *et al.*[13] reported a mortality rate of 10%. The high mortality rate in their study could be owing to the inclusion of only critically ill obstetric patients in their study. In the present study, we also had 28 patients with hemoglobin levels <6 g/dl and all the mortalities took place in this category of patients only. Except for very severe anemic status of these patients, these patients also underwent massive transfusion, had other labor-related complications and hypovolemia which culminated in mortality.

In the present study, we identified low pre- and post-transfusion hemoglobin, FFP use, larger number of transfused units and emergence of post-transfusion adverse effects as the factors significantly associated with mortality. All these factors in turn indicate that high nutritional deficiency and sequelae of postpartum hemorrhage complications were the major contributory

factors. The possible role of coagulopathies in view of failure to achieve targeted hemoglobin levels despite higher transfusion units indicate some other possible reasons. More elaboration on this aspect is warranted in prospective studies. In view of the limitations of the study, we could not elaborate any further.

The present study's findings showed that blood transfusion (whole and/or component) help to manage obstetric hemorrhage effectively. However, very severe anemia at presentation and failure to achieve post-transfusion Hb levels >8 g/dl seem to be factors associated with the worst outcomes. Further studies on a larger sample size, considering more variables and conditions, are recommended.

CONCLUSION

The incidence of major obstetric hemorrhage in our study was 23.5%. Obstetric patients are the major consumers of blood bank services. Therefore, the appropriateness of utilization of blood and blood products lies with the physician's compliance with blood transfusion guidelines. In our set of patients, packed blood cells was more profoundly used due to high prevalence of moderate to severe anemia and was helpful in keeping the burden of maternal morbidity and mortality in control.

REFERENCES

1. Loudon I. Maternal mortality in the past and its relevance to developing countries today. Am J Clin Nutr 2000;72:241S-6S.
2. GBD 2015 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: A systematic analysis for the global burden of disease study 2015. Lancet. 2016;388:1545–602.
3. World Health Organization (WHO). WHO recommendations for the prevention and treatment of postpartum hemorrhage. Geneva, WHO, 2012.
4. Escobar MF, Nassar AH, Theron G, Barnea ER, Nicholson W, Ramasauskaite D, Lloyd I, Chandraharan E, Miller S, Burke T, Ossanan G, Andres Carvajal J, Ramos I, Hincapie MA, Loaiza S, Nasner D; FIGO Safe Motherhood and Newborn Health Committee. FIGO recommendations on the management of postpartum hemorrhage 2022. Int J Gynaecol Obstet. 2022 Mar;157 Suppl 1(Suppl 1):3-50.
5. Trikha A, Singh PM. Management of major obstetric hemorrhage. Indian J Anaesth. 2018 Sep;62(9):698-703.
6. Chawla S, Bal MHK, Vardhan BS, Jose CT, Sahoo I. Blood Transfusion Practices in Obstetrics: Our Experience. J Obstet Gynaecol India. 2018 Jun;68(3):204-207.
7. Fazal S, Poornima A P. A study on transfusion practice in obstetric hemorrhage in a tertiary care centre. Glob J Transfus Med 2018;3:41-5.
8. Singh S, Sinha P, Yadav G, Gupta U, Tyagi P. Transfusion practices in obstetrics and gynecology in a tertiary care center. Int J Reprod Contracept Obstet Gynecol 2016;5:831-4.
9. Matsunaga S, Seki H, Ono Y, Matsumura H, Murayama Y, Takai Y, Saito M, Takeda S, Maeda H. A retrospective analysis of transfusion management for obstetric hemorrhage in a Japanese obstetric center. ISRN Obstet Gynecol. 2012;2012:854064.
10. Abdoul-Samadou A, Baguilane D, Akila B, Dédé R, Kossi-Edem L, Kokou D, Tchin D, Koffi A. Blood Transfusion Practices at the Gynecology-Obstetrics Department of the Sylvanus Olympio University Hospital in Lomé: A Study of 254 Cases. Open Journal of Obstetrics and Gynecology, 2019; 9: 494-501.
11. Pancholi N. Study of blood component therapy in obstetrics. Int J Reprod Contracept Obstet Gynecol 2019;8:2155-8.
12. Gillissen A, van den Akker T, Caram-Deelder C, et al. Association between fluid management and dilutional coagulopathy in severe postpartum hemorrhage: a nationwide retrospective cohort study. BMC Pregnancy Childbirth. 2018;18:398.
13. Bhattacharjee R, Raithatha N, Sapre S, Vaishnav SB, Sheth V. An Analysis of Large Volume Blood and Blood Product Transfusion in Critically Ill Obstetric Patients: A Retrospective Study. J South Asian Feder Obs Gynae 2019; 11 (3):148-152.