DOI: 10.7860/JCDR/2015/12299.6782

Original Article

Obstetrics and Gynaecology Section

# Maternal and Perinatal Outcome of Life Threatening Obstetrical Complications Requiring Multiple Transfusions

RITU KHATUJA[1], GEETIKA JAIN[2], GITA RADHAKRISHNAN[3], AG RADHIKA[4], ATUL JUNEJA[5], BHARAT SINGH[6]

## ABSTRACT

**Introduction:** Obstetrical haemorrhage is the direct cause of maternal mortality, which can be prevented by timely recognition followed by quick and adequate treatment.

**Aim:** To evaluate maternal and perinatal outcome of life threatening obstetric complications requiring multiple transfusions.

**Materials and Methods:** It is an observational study conducted on 112 antenatal and postnatal women admitted in a tertiary level hospital, requiring blood and blood products transfusion of >1.5 liters in 24 hours, over a period of 15 months (Aug 2011 to Oct 2012). The demographic and obstetrical profile, amount transfused, mode of delivery, duration of hospital stay, maternal and neonatal morbidity and mortality was evaluated.

**Statistical Analysis:** Statistical analysis of the data was performed using chi-squared test.

**Results:** There were 95 women who presented in antepartum period and 17 in the postpartum. Multigravidas comprised of 70 women, 81 had unsupervised pregnancies and 33 women presented in shock. At admission, 76 peripartum women had severe anaemia and 62 had coagulopathy. Obstetrical hysterectomy was done for 33 women and total 17 women expired. Haemorrhage was the most common indication for transfusion. The mean blood transfusion and volume replacement in 24 hours was 4.2 units & 2.25 liters respectively. The mean hospital stay was 10-15 days. Intra-uterine death at the time of admission was present in 40 women and 72 had live births. After birth, 21 babies required neonatal intensive care, of which 6 expired.

**Conclusion:** Antenatal care is important to prevent complications though pregnancy is always unpredictable. Patients' condition at admission is single most important factor often influencing the maternal and perinatal outcome.

**Keywords:** Blood products, Obstetrical outcome, Transfusion

## INTRODUCTION

Severe obstetric haemorrhage is the major cause of maternal mortality worldwide [1]. The maternal mortality ratio in India for the year 2013 is 190/100,000 live-births [2]. Peripartum haemorrhage is the most important cause of maternal mortality and most of the patients require multiple transfusions in the form of blood and its components. While dealing with such patients, the obstetrical care providers have to make immediate decisions on transfusion management even before the laboratory reports are made available.

The various studies have been conducted, which have included the criteria of an ICU admission, hysterectomy, and blood loss more than 2500ml or acute transfusion of ≥ 4 unit of blood which indicates that there were no uniform criteria of inclusion in these studies [3-7]. Al-Zirqi et al., considered visually estimated blood loss of >1500 ml intrapartum and within 24 hours postpartum, or the need for blood transfusion postpartum regardless of the amount of blood loss. The visual blood loss may underestimate the actual blood loss that occurred in the patient [8].

In this study, the transfusion of 1500 ml or more of blood and/or its components over 24 hours during intra-partum and postpartum period was considered. Transfusion of >1500 ml indicates >25% of blood volume replacement, which would have been given to correct the Haemodynamic decompensation. Management of such cases poses great challenges to the obstetrical unit as well as the audit of these cases helps in evaluation of the quality of health care providers.

The aim of this study was to evaluate maternal and fetal outcome of life threatening obstetrical complications requiring multiple transfusions in our center.

## MATERIALS AND METHODS

An observational study enrolling 112 patients was conducted from August 2011 to October 2012. It is a tertiary care hospital and an obstetric center with more than 15,000 deliveries a year. The data was obtained from medical record sheet of the patients. The peri-partum women (with pregnancies more than 28 weeks to 6 weeks post-partum) who required more than 1.5 liters of blood or blood products in 24 hours after admission were recruited in the study. Some of these women presented with hypotension i.e. decrease in blood pressure by 20%, tachycardia of more than 110 beats per minute and in shock or with the clinical or the biochemical evidence of coagulopathy. The patients with severe chronic anaemia, not presenting in labour or with isolated thrombocytopenia at the time of admission were excluded from the study population. In this study, the blood product volume transfused was taken as the criteria and not the units, as some patients would have required only multiple units of fresh frozen plasma (FFP) and not red cell concentrate (RCC) or platelets. One unit of whole blood was taken as 350ml, one unit of RCC as 250 ml, one unit of FFP as 150ml and platelet concentrate as 75ml. The decision for transfusion was based upon the clinical assessment as well as laboratory investigations. The patients' demographical profile, antenatal care provided and associated medical or obstetrical complications which might have had developed at or after admission and acute cause called for transfusion were evaluated. The investigations done for the patient, blood products required for management, mode of termination of pregnancy as well as the maternal and perinatal outcome were taken into account.

## STATISTICAL ANALYSIS

Statistical analysis of the data was performed using chi-squared test. A p-value of <0.05 was considered as statistically significant.

## RESULTS

During these 15 months, there were 112 patients out of 2537 women with obstetrical complications who required ≥1.5 liters of

| Mean age (in years) = 26.4 | | | |
|---|---|---|---|
| Parameter | | Number of patients | Percentage (%) |
| Antepartum | | 95 | 84.8 |
| Status (n=112) | Booked | 31 | 27.7 |
| | Unbooked | 81 | 72.3 |
| Parity (n=95) | Primigravida | 25 | 26.3 |
| | Multigravida | 70 | 73.7 |
| Period Of Gestation (n=95) | 26-34 Weeks | 33 | 34.7 |
| | ≥35 Weeks | 62 | 65.3 |
| Mode of delivery (n=95) | Vaginal delivery | 34 | 35.7 |
| | Caesarean section | 36 | 37.8 |
| | Obstetrical hysterectomy | 25 | 26.3 |
| Postpartum | | 17 | 15.2 |

**[Table/Fig-1]:** Demographic and obstetric profile (n=112)

| Indication of Transfusion | Number of patients | Percentage (%) |
|---|---|---|
| Postpartum Haemorrhage | 28 | 25 |
| Antepartum Haemorrhage | 21 | 18.8 |
| Antepartum + postpartum Haemorrhage | 9 | 8 |
| Coagulopathy | 12 | 10.7 |
| HELLP | 12 | 10.7 |
| Rupture uterus + Scar rupture | 16(12+4) | 14.3 |
| Post-surgical complications | 6 | 5.4 |
| Others (severe anaemia in labour-5, thrombocytopenia with severe anaemia-2, thrombocytopenia with dengue-1) | 8 | 7.1 |

**[Table/Fig-2]:** Indication of transfusion (n=112)

| Comorbidity | Number of patients | Percentage (%) |
|---|---|---|
| Hysterectomy | 33 | 29.5 |
| Wound infection | 17 | 15.2 |
| ARF | 6 | 5.4 |
| LRTI | 6 | 5.4 |
| Pressure sore | 5 | 4.5 |
| Septicemia | 4 | 3.5 |

**[Table/Fig-3]:** Co-morbidities (n=112)

transfusion and fulfilled the inclusion criteria and thus constituted the study population. The demographic and the obstetrical data of the patients are shown in [Table/Fig-1]. In this study, women mostly presented in ante partum period and were multigravidas with period of gestation more than 35 weeks. The mean age of the women included was 26.4 years. Being a tertiary care and a referral center, the unit encounters more of unbooked cases (72.3%, n=81) with obstetrical complications like ante partum haemorrhage (APH), atonic or traumatic postpartum haemorrhage (PPH), pregnancy induced hypertension (PIH), rupture uterus, previous lower segment caesarean section (LSCS), obstructed labour, delivery by untrained personnel etc which require emergency care and transfusion therapy. At admission, 33 women (29.5%) presented to the emergency in a state of shock, 67.8% (n=76) peripartum women had severe anaemia (Haemoglobin < 7 gm/dl), 55.3% (n=62) had coagulopathy and 54 presented with thrombocytopenia (platelet count below one lac)

The mode of delivery is shown in [Table/Fig-1]. Amongst the 95 antepartum women, 34(35.7%) had vaginal deliveries, 36(37.8%) caesarean section and 25 (26.3%) underwent obstetrical hysterectomy. Obstetrical hysterectomy was done for six patients after vaginal delivery, 14 after caesarean section and five women had emergency laparotomy with hysterectomy for rupture uterus at the time of presentation. Emergency laparotomy with repair of the uterus was done for three patients. In the postpartum population, eight had undergone obstetrical hysterectomy for postpartum Haemorrhage.

All the patients received blood which was screened, cross-matched and released from the hospital blood-bank. As depicted in [Table/Fig-2], the most common indication for transfusion was postpartum haemorrhage (25%) followed by ante-partum haemorrhage (18.8%). Blood transfusion was given in the form of whole blood (WB) and red cell concentrate (RCC), fresh frozen plasma (FFP) and platelet concentrate. The mean blood transfusion given to these patients in 24 hours was 4.2 units and mean volume replacement in 24 hours was 2.25 litres.

The co-morbidities in the women receiving multiple transfusions are given in [Table/Fig-3]. Maternal mortality was higher in women who underwent obstetrical hysterectomy although it was not statistically significant (p=0.08). Women experienced overlapping co-morbidities varying from wound infection; lower respiratory tract infection, septicaemia, pressure sores due to prolonged immobility to acute renal failure.

The maximum duration of hospital stay of the mother was 65 days, the mean stay being 10.15 days. Close monitoring in intensive care units (ICU) was done for 44 patients with a mean stay of 2.6 days and there were 15.2% (n=17) maternal deaths. Most of the women who expired (13.4%) or presented in shock (27.7%) had severe anaemia (haemoglobin less than 7 gm/dl). None of the patients had multiple gestations. Intra-uterine death at the time of admission was present in 40 patients and 72 had live births. Out of the 72 live-born, 21 babies required transfer to neonatal intensive care units (NICU) soon after delivery, of which six expired. The parity of the women was not significantly associated with maternal mortality (p=0.54) or perinatal outcome (p=0.15). Though this study had greater number of unbooked cases, but it was not significantly associated with increased perinatal (p=0.38) or maternal (p=0.77) mortality. Thus rest of 95 patients (84.8%) were near miss women in this study group, who were managed and saved from the life threatening complications.

## DISCUSSION

A near miss case has been defined as “a woman who nearly died but survived a complication that occurred during pregnancy, child birth or within 42 days of termination of pregnancy” [9]. The present study evaluates the maternal and perinatal outcome in near miss cases requiring multiple transfusions. It is highlighted that if timely adequate management with blood transfusion is done, a life of a woman can be saved. Here, it is also emphasized that there is non-awareness and non-availability of adequate antenatal care at rural level. By the time the patient presents at tertiary care level their condition is critical as in present study 30% cases presented in shock.

In this study, the rate of multiple transfusions in 15 months in our institute was 0.62%, which is in accordance with the incidences reported previously, 0.3–1% [10-12]. The patients requiring transfusion of more than or equal to 1.5 litters in 24 hours in antepartum, intrapartum or postpartum period were included in our study, whereas Butwick et al., evaluated the estimated blood loss in the patients receiving multiple transfusions [13]. A retrospective analysis of transfusion management for obstetric haemorrhage in a Japanese obstetric centre considered haemoglobin concentration <7 g/dL a criteria for blood product transfusion [14]. The visual estimation of blood loss can vary subjectively and it is known to underestimate the actual loss by 30-50% [15]. In the present study, one-third of the patients presented in compromised state, so blood loss criteria were not considered.

The mean age of the patients receiving multiple transfusions was 26.4 years where as in studies by other authors showed that age more than 30 years had an increased risk of obstetrical haemorrhage

[8,13,14]. They also found that patients with prime parity were more prone, which is different from the present study. Multiparity in present study was found in 73.7%, which could be due to early marriage, early conception as well as repeated pregnancy without adequate inter pregnancy interval in our country.

As reported by Yadav K et al., this study also had unbooked and unsupervised pregnancies (72.3%) [16]. It also highlights the fact that concept of routine and regular antenatal checkups has still not available to every pregnant women. The most common presentation of patients in the present study was pregnancy induced hypertension and its complications which are consistent with the study by Butwick et al., [13]. The aetiological factors associated with multiple transfusions are postpartum haemorrhage and antepartum haemorrhage which are in accordance with results from the studies assessing the risk factors associated with postpartum haemorrhage [17-20].

Caesarean section and exploratory laparotomy was done in 51.8% patients, whereas 63% and 67% delivered by caesarean section in the studies by Butwick et al and Matsunaga S et al., respectively [13,14]. The most common indication for multiple transfusions in this study was postpartum Haemorrhage which is similar to the study by Matsunaga S et al., [14]. Al-Zirqi et al., and Butwick et al., could not identify the indication for transfusion in one-third of cases [8,13].

The mean volume replacement given to these patients in 24 hours was 2.25 litres and the transfusion was done on the clinical assessment of blood loss and patients' condition, as in obstetrical emergencies one cannot wait for blood investigation report, although laboratory investigations were sent for these patients [21]. In present study, 76.8% of the patients had haemoglobin less than 7 gm%. Butwick et al., had 23% ICU admissions and no maternal mortality whereas our study reported 39.3% of ICU admissions and 15.2% maternal mortality [13]. Al-Zirqi et al., in their study group had 245 ICU admissions; hysterectomy was done in six patients and two of them developed acute renal failure, whereas 33 patients of our study group had obstetrical hysterectomy and six developed acute renal failure [8].

Neonatal ICU (NICU) admissions in this study was in 21 babies and IUD was as high as 40 which is different from the study by Butwick et al., where 25 babies required NICU care [13]. Adequate antenatal care for every patient is important. Primary health care centres needs to be strengthened with proper and early identification of high risk patients. These women should be timely referred to higher centre which have appropriate facilities.

## LIMITATION

The limitation of this study is that it is an observational study with a small sample size as well as the obstetricians involved in managing such high risk patients had varying threshold for transfusion of blood and its components.

## CONCLUSION

The physiological changes occurring during pregnancy makes obstetrics a very high risk field of medicine, which alerts the obstetricians that even normal low risk pregnancy, can become high risk at any time and vigilant supervision is required. Prompt availability of blood and components in adequate quantity combined with management by a critical care team can help to avert mortality in considerable number of cases. Long term consequences of multiple transfusions are not of serious concern in managing these life threatening complications. Thus antenatal care, clean safe delivery, essential obstetric care and family planning can give us safe motherhood.

## REFERENCES


[1] Lolonde A, Davis B A, A Costa A : PPH Today; ICM/FIGO initiation 2004-2006, UGO;2006;94:243-253.
[2] WHO, UNICEF, UNFPA, The World bank and the united Nations Population Division. data.world bank.org.indicators.
[3] Murphy DJ, Charett P. Cohort study of near-miss maternal mortality and subsequent reproductive outcome. *Eur J Obstet Gynecol Reprod Biol.* 2002;102(2):173-78.
[4] Wen SW, Huang L, Liston R, Heaman M, Baskett T, Rusen ID. Severe maternal morbidity in Canada, 1991-2001. *Can Med Assoc J.* 2005;173:759-64.
[5] Brace V, Kernaghan D, Penney G. Learning from adverse clinical outcomes: major obstetric haemorrhage in Scotland, 2003-5. *BJOG*. 2007;114:1388-96.
[6] Zhang WH, Alexander S, Bouvier-Colle MH, Macfariane A, MOMS-B Group. Incidence of severe pre-eclampsia, postpartum Haemorrhage and sepsis as a surrogate marker for severe maternal morbidity in a European population-based study: the MOMS-B survey. *BJOG.* 2005;112:89-96.
[7] Waterstone M, Bewley S, Wolfe C. Incidence and predictor of severe obstetric morbidity: case-control study. *BMJ*. 2001;322:1089-93.
[8] Al-Zirqi I, Vangen S, Forsen L, Stray-Pedersen B. Prevalence and risk factors of severe obstetric Haemorrhage. *BJOG*. 2008;115:1265-72.
[9] Say L, Pattinson RC, Gulmezoglu AM. WHO systemic review of maternal morbidity and mortality:the prevalence of severe acute maternal morbidity (near miss). *Reprod Health*. 2004;1:3
[10] Balki M, Dhumne S, Kasodekar S, Seaward G, Carvalho JC. Blood transfusion for primary postpartum Haemorrhage: a tertiary care hospital review. *Journal of Obstetrics and Gynaecology Canada*. 2008;30(11):1002–07.
[11] Drife J. Management of primary postpartum Haemorrhage. *BJOG*. 1997;104(3):275-77.
[12] James AH, Paglia MJ, Gernsheimer T, Grotegut C, Thames B. Blood component therapy in postpartum Haemorrhage. *Transfusion*. 2009;49(11):2430–33.
[13] Butwick AJ, Aleshi P, Fontaine M, Riley ET, Goodnough LT. Retrospective analysis of transfusion outcomes in pregnant patients at a tertiary obstetric center. *Int J Obstet Anesth*. 2009;18:302-08.
[14] Matsunaga S, Seki H, Ono Y, Matsumura H, Murayama Y, Takai Y, et al. A retrospective analysis of transfusion management for obstetric Haemorrhage in a Japanese obstetric center. *ISRN Obstet Gynecol.* 2012;2012:854064.
[15] Glover P. Blood loss at delivery: how accurate is your estimation? *Aust J Midwifery.* 2003;16:21-24.
[16] Yadav K, Namdeo A, Bhargava M. A retrospective and prospective study of maternal mortality in a rural tertiary care hospital of central India. *Indian Journal of Community Health*. 2013;25(1):16-21.
[17] Rouse DJ, MacPherson C, Landon M, Varner MW, Leveno KJ, Moawad AH, et al. Blood transfusion and cesarean delivery. *Obstet Gynecol*. 2006;108:891-97.
[18] Reyal F, Sibony O, Oury JF, Luton D, Bang J, Blot P. Criteria for transfusion in severe postpartum Haemorrhage: analysis of practice and risk factors. *Eur J Obstet Gynecol Reprod Biol*. 2004;112:61-64.
[19] Combs CA, Murphy EL, Laros RK. Factors associated with Haemorrhage in caesarean deliveries. *Obstet Gynecol*. 1991;77:77-82.
[20] Sheiner E, Sarid L, Levy A, Seidman DS, Hallak M. Obstetric risk factors and outcome of pregnancies complicated with early postpartum Haemorrhage: a population-based study. *J Matern Fetal Neonatal Med*. 2005;18:149-54.
[21] Nuttall GA, Stehling LC, Beighley CM, Faust RJ. Current transfusion practices of members of the American Society of Anesthesiologists:a survey. *Anesthesiology.* 2003;99:1433-43.



**PARTICULARS OF CONTRIBUTORS:**
1. Assistant Professor, Department of Obstetrics and Gynaecology, Dr BSA Medical College & Hospital, Rohini, Delhi, India.
2. Consultant Infertility and High-Risk pregnancy, 89 North Speciality Clinic, Kamla Nagar, Delhi, India.
3. Director Head of Department, Department of Obstetrics and Gynaecology, UCMS and Guru Teg Bahadur Hospital, Delhi, India.
4. Specialist, Department of Obstetrics and Gynaecology, UCMS and Guru Teg Bahadur Hospital, Delhi, India.
5. Scientist C, National Institute of Medical Statistics (ICMR) Ansari Nagar, New Delhi, India.
6. Head of Blood Bank and Director of Regional Blood, Department of Transfusion Medicine, Centre, UCMS and Guru Teg Bahadur Hospital, Delhi, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**
Dr. Geetika Jain,
89 North Speciality Clinic, Kamla Nagar, Delhi-110007, India.
E-mail: drgeetikagoel@gmail.com



**FINANCIAL OR OTHER COMPETING INTERESTS:** None.

Date of Submission: **Nov 26, 2014**
Date of Peer Review: **Mar 18, 2015**
Date of Acceptance: **Aug 24, 2015**
Date of Publishing: **Nov 01, 2014**