

Maternal Outcome Among Women Undergoing Obstetric Massive Blood Transfusions

Fehmida Parveen Memon, Zakia Zaheen, Farhana Anjum, Hira Saeed Khan, Nasreen Rebecca Wilson

ABSTRACT

Objective: To determine the maternal mortality and morbidity among women undergoing massive blood transfusion due to obstetric hemorrhage at tertiary care Hospital. **Study Design:** Cross-sectional study. **Settings:** Department of Gynaecology and Obstetrics Liaquat University Hospital, Hyderabad-Pakistan. **Duration:** 6 months from August 2016 to January 2017. **Methodology:** All the women undergoing massive blood transfusion due to obstetric hemorrhage were enrolled in current study. Women were followed during Hospital stay to measure the maternal morbidity and mortality. The data was documented in self-made pro-forma. **Results:** Total 115 women were studied, and mostly 69.6% were found in 20-30 years of age group and 30.4% in 31-40 years of age group. Majority of women 76.5% were un-booked. Multigravidas were most common 67.8%. Most of the patients 33.0% were noted with estimated blood loss more than 3000ml. Dilutional coagulopathy and thrombocytopenia were the most common complications among 26.1% patients respectively, followed by Hypocalcaemia, Citrate toxicity, Metabolic acidosis, Hypernatremia, Hypomagnesaemia, Renal failure, Blood reaction, Hyperkalemia and ICU admission with percentage of 18.3%, 6.1%, 13.0%, 11.3%, 8.7%, 6.1%, 9.6%, 7.0% and 13.9% respectively, while mortality rate was 7.0%. **Conclusion:** It was concluded that massive blood transfusion is very necessary for obstetric hemorrhage, but also correlated with greater rates of mortality and morbidity. The best massive blood transfusion protocols should be developed to decrease the complications.

Keywords: Obstetric haemorrhage, Massive blood transfusion, Maternal outcome.

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INTRODUCTION

Substantial blood loss takes place in a number of situations such as obstetric haemorrhage, gastrointestinal bleeds, major surgical procedures, polytrauma, etc.¹ Obstetric bleeding, is a key factor for maternal deaths in the underdeveloped countries in addition to among high resource nations.^{2,3} Transfusion of erythrocytes and any other blood product are important for acute administration of major obstetric bleeding. Though, the transfusion therapy carried out for maternal resuscitation can possibly be impeded by transfusion delays, and by the absence of early accessibility and adequate amounts of blood products.^{2,3} In the underdeveloped world postpartum bleeding is a key factor for maternal deaths and effects 1.00% of pregnant females, whereas in developed nations maternal death is hundred-times lesser however Postpartum bleeding represents maternal mortality for around 10 females per 100 thousand births.^{4,5}

The factors of Postpartum bleeding involve 27% Retained placenta, 33% Genital tract trauma, uterine atony (highly frequent 65%), Uterine rupture and coagulation disorders.^{5,6} In time detection and effective administration are essential for successful results following massive bleeding.¹ The database of over 3 years collected by American College of Surgeons National Surgical Quality Improvement Program exhibited very low prevalence of major transfusion; though, it was correlated with higher mortality than the patients with transfusion. Nonfatal

complications for example renal and respiratory, were noted in >50.00% of cases when transfusion of >5 units was carried out.⁷ Obstetric blood loss is a key factor for maternal mortality.⁸ Besides clinical approaches intended to accomplish haemostasis, transfusions remain a vital component in the administration of severe blood loss events.⁵

Rapid transfusion of massive amounts of blood products is needed in subjects with haemorrhagic shock that can possibly result in a distinctive array of complications.¹ The fatal triad of hypothermia, acidosis, and coagulopathy correlated with MT associates with a high rate of mortality. Further complications include acid/base imbalances, citrate toxicity, electrolyte malfunctions (hypokalemia, hypomagnesemia, hyperkalemia, and hypocalcemia), hypothermia, and transfusion-related acute lung damage.⁹

If fatal Postpartum bleeding occurs, access to and utilization of adequate amount of transfusion of blood products to correct clotting condition and to manage severe anemia are vital and clinical benefits of blood transfusions in obstetric blood loss was revealed in a hypothetical experimental study exhibiting a 6.5-times rise in the risk of maternal mortality.^{10,11} Not much is known regarding the administration and outcomes of females who sustain PPH requiring massive transfusion.¹¹ Specifically at local levels no such studies have been conducted, there for this has been planned to assess the maternal outcome undergoing massive blood transfusion.

METHODOLOGY

Study Design: Cross-sectional study.

Settings: Department of Gynaecology and Obstetrics Liaquat University Hospital, Hyderabad-Pakistan.

Duration: 6 months from August 2016 to January 2017.

Inclusion Criteria: All the women who underwent massive blood transfusion due to obstetric hemorrhage were enrolled in current study.

Exclusion Criteria: All the women with chronic liver disease, history of deranged PT and APTT, renal impairment, diabetes and any other known severe comorbidity.

Methods: Massive blood transfusion was defined as >3 transfusion within one hour and >10 blood transfusion during 24 hours. All the women were followed during Hospital stay to measure the maternal morbidity and mortality. The data was documented in self-made pro-forma. SPSS version 16 was used for data analysis.

RESULTS

Total 115 women were studied, and mostly 69.6% were found with age group of 20-30 years and 30.4% had age group of 31-40 years. Most of the women 44.3% were referred, 35.7% admitted in emergency and 20.0% admitted from OPD. Most of the women 67.8% were uneducated, 26.1% were primary passed and only 6.1% had secondary education. Majority of women 76.5% were un-booked and 23.5% were booked. Multigravidas were most common 67.8%, followed by 18.3% were primipara and 13.9% were grand-multipara. 47.0% women underwent normal vaginal delivery and 46.1% underwent caesarean section, while only 7.0% underwent episiotomy, results are shown in Table 1

Table 1: Distribution of patient according to demographic characteristics (n=115)

Demographic characteristics		Frequency	Percentage
Age groups	20-30 years	80	69.6%
	31-40 years	35	30.4%
	Total	115	100.0%
Mode of admission	Referred	51	44.3%
	OPD	23	20.0%
	Emergency	41	35.7%
	Total	115	100.0%
Educational Status	Un -educated	78	67.8%
	Primary	30	26.1%
	Secondary school	7	6.1%
	Total	115	100.0%
Booking status	Booked	27	23.5%
	Un-booked	88	76.5%
	Total	115	100.0%
Parity	Primi	21	18.3%
	Multigravida	78	67.8%
	Grand multi	16	13.9%
	Total	115	100.0%
Mode of Delivery	NVD	54	47.0%
	Episiotomy	8	7.0%
	Caesarean section	53	46.1%
	Total	115	100.0%

Most of the patients 33.05 were noted with estimated blood loss more than 3000ml, followed by 1100-2000ml blood loss was among 29.6%, 500-100ml loss among 25.25 and 2100-3000ml blood loss was noted among 12.2% patients. Figure 1

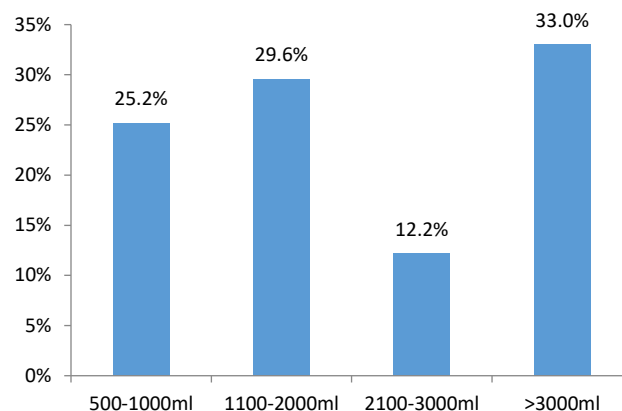


Figure 1: Patients distribution according to estimated blood loss n=115

According to maternal morbidity and mortality, dilutional coagulopathy and thrombocytopenia were found among 26.1% patients respectively, followed by Hypocalcaemia, Citrate toxicity, Metabolic acidosis, Hyponatremia, Hypomagnesaemia, Renal failure, Blood reaction, Hyperkalemia and ICU admission with percentage of 18.3%, 6.1%, 13.0%, 11.3%, 8.7%, 6.1%, 9.6%, 7.0% and 13.9% respectively, while mortality rate was 7.0%. Table 2

Table 2: Patient according to maternal morbidity and mortality (n=115)

Morbidity and mortality	Frequency	Percentage
Normal	42	36.5%
Dilutional coagulopathy	30	26.1%
Thrombocytopenia	30	26.1%
Hypocalcaemia	21	18.3%
Citrate toxicity	16	13.9%
Metabolic acidosis	15	13.0%
Hyponatremia	13	11.3%
Hypomagnesaemia	10	8.7%
Renal failure	7	6.1%
Blood reaction	11	9.6%
Hyperkalemia	8	7.0%
ICU admission	7	6.1%
Mortality	8	7.0%

DISCUSSION

In Gynae and Obs, significant reasons of the blood loss and massive transfusion become very significant for patient's appropriate management. In addition to the risk of transfusion-associated reactions that take place with transfusions of a single unit, subjects with MT are at risk of further adverse events because of large volumes of transfusion, for example acidosis and hypocalcaemia because of citrate and hypothermia because of cold storage.^{12,13} In this study according to maternal

morbidity and mortality, dilutional coagulopathy and thrombocytopenia were found among 26.1% patients respectively, followed by Hypocalcaemia, Citrate toxicity, Metabolic acidosis, Hyponatremia, Hypomagnesaemia, Renal failure, Blood reaction, Hyperkalemia and ICU admission with percentage of 18.3%, 6.1%, 13.0%, 11.3%, 8.7%, 6.1%, 9.6%, 7.0% and 13.9% respectively, while mortality rate was 7.0%. Similarly, in the study of Sihler KC et al⁹ massive blood transfusion was associated with significant complications as hypothermia, electrolyte imbalance, acid/base derangements, hypocalcaemia, citrate toxicity and hypokalemia and hyperkalemia. In this study 7.0% patients of massive blood transfusion were found with Hyperkalemia. In another previous study of Carmichael D et al¹⁴ massive blood transfusion was associated with hypokalemia and hyperkalemia. Following transfusion, the RBCs membrane Na⁺/K⁺-ATPase pumping process is reformed and cellular K⁺ reuptake takes place rapidly. Hyperkalaemia infrequently takes place during substantial transfusions if the subject is also acidotic and hypothermic.¹⁵ Erythrocytes are kept at 4°C. Quick transfusions at this temperature will rapidly drop the core temperature of recipient and further will damage haemostasis. Hypothermia diminishes the metabolic process of lactate and citrate and raises the probability of hypocalcaemia, cardiac arrhythmias and metabolic acidosis.¹⁵

In this study acute renal failure rate was 7.05 and Metabolic acidosis was 13.0%. While in the study of Raza S et al¹⁶ metabolic acidosis was in 50% patients and 60% had acute renal failure. This ratio of metabolic acidosis and acute renal failure was very higher than in our study, this difference can possibly be because our study contained small sample size and only obstetric related. Cotton BA et al¹⁷ reported that massive transfusion was associated with high rate of complications and organ failure. No particular studies have been conducted on massive blood transfusion related obstetric outcome.

In this series mostly 69.6% women were found with age group of 20-30 years. Similarly, Ramler PI et al¹¹ reported that most of women 63.0%, requiring massive blood transfusion were between age group of 20–34 years. Similarly, Gutierrez MC et al² reported that mean of patients was 36.5 years. On the other hand, Matsunaga S et al²⁰ reported mean age of women as 32.1 ± 4.7 years for those who underwent for transfusion management for obstetric haemorrhage. In this study multigravidas were most common 67.8%, followed by 18.3% were primipara and 13.9% were grand-multipara, these findings were similar to Ramler PI et al¹¹ as primipara and multipara in their study were commonest. Bindal J et al¹⁹ also reported similar findings regarding parity. In this series 47.0% women underwent normal vaginal delivery and 46.1% underwent caesarean section, while only 7.0% underwent episiotomy. On other hand, Green L et al¹⁸ reported mode of delivery as spontaneous 20%, Instrumental 12% and Caesarean 69% out of all the women who underwent massive blood transfusion due to postpartum haemorrhage. Ramler PI et al¹¹ reported similar findings regarding mode of delivery. Matsunaga S et al²⁰

reported that 67% were delivered by C- section and 33% vaginally delivered.

CONCLUSION

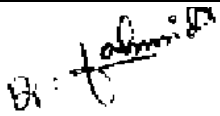
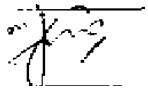
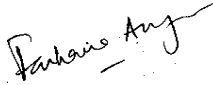

It was concluded that massive blood transfusion is very necessary for obstetric hemorrhage, but also associated with greater rates of mortality and morbidity. Serum electrolytes should be screened continuously during blood transfusion and further best protocols should be developed to decrease the related complications. More studies are required on maternal outcome related to obstetric massive transfusion.

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