Section: OBG

Original Research Article

A STUDY OF QUANTIFICATION OF BLOOD LOSS FOLLOWING VAGINAL DELIVERIES

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Abstract

Background: Peripartum haemorrhage is a significant cause of maternal death. Severe bleeding during delivery or within 24 hours following delivery can lead to devastating complications as hypovolemic shock, multi- organ dysfunction, and maternal death. These deaths are preventable with early identification and prompt interventions, but delay in diagnosis poses a challenge. Quantification of blood loss by an accurate objective technique can be beneficial in the management of adverse outcome of blood loss. The aim objective is to study an objective and accurate method to assess blood loss following vaginal deliveries and to correlate it with the maternal outcome. **Materials and Methods:** This Prospective observational study, carried out in the department of Obstetrics & Gynaecology, Netaji Subhash Chandra Bose Medical College & Hospital, Jabalpur (M.P.) from 1st March 2021 to 31st August 2022. Full term women with, vertex, singletone pregnancy, who delivered vaginally, with blood loss either during labour or within 24 hours following delivery were included in the study. Blood loss was assessed using caliberated plastic bag and gravimetric method and was correlated with maternal outcome. **Result:** Out of 682 vaginal deliveries 80 women formed the study group. Majority of women 50(62.5%) were in the age group 20-24 years, unbooked 57(71.3%), from rural area 55 (68.8 %) and low socioeconomic status 56 (70.%). Majority were primigravida 41 (51.3%). 9 (11.25%) women had genital tract trauma. Atonicity was the major cause of blood loss. 61(76.3%). 76(95%) had blood loss less than 500ml with drop in haemoglobin less than 1 gm/dl. Medical and mechanical were the main mode of management. **Conclusion:** Underestimation and overestimation of blood loss following vaginal deliveries, have their own hazards, leading to many unforeseen complications. Quantification of blood loss using an objective method like customized caliberated plastic sheet bag and gravimetric method is easy and cost effective for accurate measurement of blood loss and helps in timely and appropriate management thereby, reducing maternal death due to peripartum haemorrhage.

INTRODUCTION

Complications of pregnancy and childbirth remain a leading cause of death and disability among women of reproductive age. More than half of all maternal deaths occur in 24 hours of giving birth. Peripartum hemorrhage is the single most important cause of maternal death. Severe bleeding during delivery or within 24 hours following delivery can lead to devastating complications as hypovolemic shock, multi- organ dysfunction, and maternal death. These deaths are preventable with early identification and prompt interventions.[1]

Delay in diagnosis poses a challenge. Before the clinical signs appear consequent to blood loss, there already occurs a 30% blood loss, which itself is a detrimental factor, especially in developing countries where anemia is rampantly prevalent. Hence accurate measurements of blood loss becomes essential to institute for prompt and appropriate therapeutic measures, thereby reducing

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maternal mortality and improving maternal health outcome with regards to peripartum haemorrhage.[2]
There are many ways for the assessment of blood loss following delivery including visual estimation, objective techniques, direct measurements, obstetric shock index clinical signs of hypovolemia and hemoglobin (Hb)and hematocrit (Hct) drop. Quantification of blood loss by an accurate objective technique can be beneficial in the management of adverse outcome of blood loss following vaginal deliveries.[3]
We, therefore undertook this study to find out an objective method of assessing blood loss.
Aims and objectives: To study an objective and accurate method to assess blood loss following vaginal deliveries and to correlate it with maternal outcome.

MATERIALS AND METHODS

This Prospective observational study was carried out in the department of Obstetrics & Gynecology at Netaji Subhash Chandra Bose Medical College & Hospital, Jabalpur (M.P.). from 1st March 2021 to 31st August 2022
Inclusion Criteria
Women with antenatal mild to moderate anemia (8-10gm/dl), full term vaginal delivery, blood loss in third stage labour or within 24 hours following delivery.
Exclusion Criteria
Preterm vaginal delivery, caesarean section, first and second trimester blood loss, abortions, ectopic pregnancy, and women with history of bleeding disorders or on Heparin therapy.
Methodology
After approval from institutional ethical committee, subjects qualifying inclusion criteria were enrolled in this study. Informed consent was taken. Demographic characteristics, detail history, risk factors, a thorough general and obstetrical examination findings were noted. Blood loss during the third stage or 24 hours following delivery was assessed by an objective method, which included direct measurement and gravimetric method, the sum of which was used to assess actual blood loss. In direct measurement method blood was collected in a specially designed customized funnel shaped calibrated plastic drape placed under the woman's buttocks with its two belts at the upper end, tied around the woman's abdomen. The collected blood was then quantified to assess the actual blood loss. The calibrations were done on the plastic drape with the help of standard calibrated normal saline bottle supplied in our setup. Liquor amni following rupture of bag of water was collected in a separate plastic bag. Due care was taken so as to prevent it from spillage in the customized calibrated plastic bag.
The gravimetric method included standardized size gauge pieces/mops/perineal pads. Which were weighed before and after, being used (soaked ones which had been used in episiotomy or other genital tract tears). The dry weights of the materials were subtracted from the total weight. Difference of each gram was taken as 1ml. Blood loss was measured till the bleeding stopped or for atleast one hour.
Active management of third stage of labor (AMTSL)was subjected to each and every case as per WHO guidelines including partograph. Time of delivery, baby notes were taken. Vital signs in terms of systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), pulse pressure (PP), heart rate (HR) was noted within first hour following blood loss.
Hemoglobin and Hematocrit values were recorded before the onset of labor and on first postnatal day. A drop in their values were noted. Maternal outcome was correlated. All women and their babies were followed up till their discharge. Data was collected, compiled and analysed at the end of study period.

RESULTS

Out of 682 vaginal deliveries 80 women formed the study group. Majority of women 50(62.5%) were in the age group 20-24 years, unbooked 57(71.3%), belonging to rural area 55 (68.8 %), low socioeconomic status 56 (70.%), primigravida 41 (51.3%)and singleton pregnancy76 (95%). Atonicity was the major cause of blood loss. 76(95%) had blood loss less than 500ml and with drop in haemoglobin less than 1 gm/dl. Medical and mechanical methods were the main mode of management.4 (5%) women required blood transfusion. We observed 7 women with morbidity as moderate anemia and no maternal mortality.

Table 1: Demographic profile

Characteristics	Frequency	%
Age - 20-25	53	66.25
26-30	21	26.25
31-35	5	6.3
36-40	1	1.25
Booking status-Booked	23	28.8
Unbooked	57	71.3
Locality – Rural	55	68.8
Urban	25	31.3
SES – Upper	2	2.5
Middle	22	27.5
Lower	56	70.0
BMI - <18	2	2.5

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18-23.9	55	68.8
24-29.9	23	28.8

Table 2: Obstetric profile

Characteristics	Frequency	%
Obstetric score -		
primigravida	41	51.3
multigravida	39	48.7
Type of pregnancy -		
singleton	76	95
multiple	4	5
Obstetrics disorders in index pregnancy- Placenta Previa		
Abruptio	1	1.25
	2	2.5
Medical disorders in index pregnancy – Anemia	9	11.25
Hypertension	6	7.5
Gestational Diabetes Mellitus	2	2.5

Table 3: Peripartum profile

Characteristics	Frequency	%
Aetiology of blood loss-		
Tone	70	87.5
Trauma	9	11.25
Tissue	1	1.25
Blood loss estimate –		
<500 ml	76	95
500-999 ml	4	5
Drop in Hb -		
<1gm/dl	76	95
>1gm/dl	1	1.25
Blood transfusion/component	4	5
Management –		
Medical	2	2.5
mechanical	2	2.5

9 (11.25%) women had genital tract trauma.

Figure 1a - calibrated drape used in our study

Figure 1b - calibrated drape used in our study

DISCUSSION

Peripartum haemorrhage is one of the major contributor of maternal mortality and morbidity in developing countries and is preventable.[4] Delayed diagnosis as a result of inaccurate estimation of blood loss leads to catastrophic event at the time of delivery. Visual estimates of blood loss are inaccurate as many times they are underestimated and sometimes overestimated.[5] Accurate and rapid assessment of blood loss is important in the management of PPH. Hence, it is crucial to have an objective tool for the assessment of exact blood loss during delivery.

In the present study majority of women (62.5%) were in the age group 20-24 years, (71.3%) unbooked, (68.8 %) from rural area, (70.%) from low socioeconomic status. (51.3%) were primigravida and singleton pregnancy were 76(95%). We found 55(68.8%) women with BMI in the range of 18- 23.9kg/mm2 and 23(28.8%) in 24-29.9kg/mm2 range. Individual blood volumes vary in relation to an individual's body mass index. Higher BMI is a risk factor for the post-partum hemorrhage4. We did not find any significant result regarding BMI association with increase of hemorrhage.

In our study (95%) women were in gestational age between 37 and 42 weeks and (2.5%) were gestation week more than 42 weeks. Many studies have reported no significant association of gestational age

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with increase blood loss. We found similar results. However in two cases who had blood loss more than 500ml, were subjected to induction of labour for prolonged pregnancy. Induction of labor is a risk factor for increase blood loss during delivery even in a low risk cases.[5]

We found 76(95%) women with singleton pregnancy and 4 as twin pregnancy. We did not find any significant association of blood loss with multiple pregnancy, though it is an established risk factor. Hyperexpansion damages the myometrial contractility resulting in uterine fatigue and uterine atony.[6]

In this study, 39(48.7%) had previous vaginal delivery. Only 1(1.25%) woman had a history of previous section. One (1.25%) cases had history of antepartum hemorrhage due to placenta previa and two case of abruptio placentae. In our study one case of placenta previa, the blood loss was more than 500ml.

Prior cesarean section is one of the major independent risk factor blood loss during delivery. Placenta previa is the main reason for peripartum haemorrhage although it does not always cause it. Abnormal placentation can unexpectedly lead to catastrophic blood loss, multiple complications and even death. Placental abruption may lead to increase blood loss.[7]

In our study 9(11.3%) cases had antenatal complications like Infections, myomas, inversion and prolapse. All these may complicate pregnancy and may lead to haemorrhage during delivery. Majority were urinary tract infection, as confirmed by microscopic and culture sensitivity test.[8]

We found 17(21.3%) with medical disorders in index pregnancy.[9] women with moderate degree anaemia, 6 with preeclampsia, and 2 were gestational diabetes mellitus. Anemia greatly increases the risk of bleeding during child birth. It reduces the oxygen-carrying capacity of the blood which makes them intolerant to even small amount of blood loss9. Uterine tone is compromised in preclampsia and diabetes in pregnancy.[10,11]

Atonicity was the major cause of blood loss 70(87.5%) followed by trauma in 9(11.25%), out of which 5(6.25%) were cervical tears, others being perineal tears majorly. Medical and mechanical methods were the main mode of management. Four (5%) women required blood transfusion. We observed 7 women with morbidity as moderate anemia and no maternal mortality.

Atony, genital tract trauma, retained products of conception and Coagulopathy are the most common aetiolgies for peripartum blood loss. 28(35%) women underwent episiotomy for the reasons like malpresentation cephalopelvic disproportion, vaginal birth after section and big size baby. As such routine episiotomy is not practiced in our set up. Excessive bleeding from an episiotomy, and tears lacerations in the genital tract can lead to increase blood loss.[12]

76(95%) had blood loss less than 500ml and with drop in haemoglobin less than 1 gm/dl. On an average the blood loss was between 200-250 ml. 4(%) women found to have blood loss between 500-999/ml. Precise estimation of blood loss is crucial because underestimation may lead to significant complications, and overestimation and unnecessary transfusion may increase complications and mortality.

We found 4(5%) women with drop of haemoglobin more than 1gm/dl from the recruitment to the first post-partum day. The changes in haematological parameters, during pre and post-delivery state helps to assess the incidence of primary PPH.[13]

In the present study 4(5%) women, required tranexamic acid and balloon tamponade apart AMTSL. AMTSL is a critical intervention for PPH prevention. It has become a central component of the PPH reduction strategies of governments around the world. Antifirinolytics reduce bleeding by inhibiting the enzymatic breakdown of fibrin blood clots. As per WHO the use of intrauterine balloon tamponade is recommended in bleeding due to uterine.

4 (5%) women required blood transfusion/ component therapy. They had blood loss more than 500ml, 2 were prolonged pregnancy and were subjected to induction of labour, one was twin pregnancy and another one was marginal placenta previa. Early plasma transfusion is believed to improve maternal outcome because it could prevent or treat coagulopathy in case of prolonged bleeding.[14]

In our study 38(47.5%) women were in the range of fetal birth weight 2.5 -2.9kg while one woman had above 3kg. Higher birth weight is both, a strong and a generally increasingly common risk factor.[15]

We observed 7 women with morbidity as moderate and severe anemia and no mortality.

Limitation of the Study

Present study is based on small sample size, therefore it needs a extensive research further for the concise interpretation. The accidental spillage of amniotic fluid may have affected the blood loss estimation

CONCLUSION

Accurate measurement of blood loss and its timely and appropriate management has a crucial role in reducing maternal death due to peripartum haemorrhage. Quantification of blood loss using an objective method like customized caliberated plastic sheet bag and gravimetric method is easy and cost effective. Laboratory analysis of haematological parameters, particularly Hb and haematocrit, being simple and accurate method, aids in assessment of peripartum haemorrhage. All the health care professionals working in labour unit should undergo training for using customised calibrated drapes and visual assessment of blood loss. Training module should be designed by showing pictures of blood-

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soaked drapes, sponges, containers, kidney trays and floor spills, etc.

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