Original Research

Visual Estimation Of Blood Loss Veruses Quantification Of Blood Loss After Vaginal Birth Using Brass V Drape: A Prospective Study

Dr Sonali Mahto¹, Dr. Shipra Saxena², Dr. Divyani Chaudhary³, Dr. Sapna Rajput⁴

¹Postgraduate Resident, Department of Gynaecology and obstetrics, Krishna Mohan medical College, Mathura, Sonalibholi04@gmail.com

²Associate Professor, Department Of Gynaecology And Obstetrics, Krishna Mohan Medical College, Mathura ³Assistant Professor, Department Of Gynaecology And Obstetrics, Krishna Mohan Medical College, Mathura ⁴Assistant Professor, Department Of Gynaecology And Obstetrics, Krishna Mohan Medical College, Mathura

Corresponding author

Dr. Sonali Mahto

Postgraduate Resident, Department of Gynaecology and obstetrics, Krishna Mohan medical College, Mathura, Sonalibholi04@gmail.com

Received Date: 28 February, 2025

Acceptance Date: 31 March, 2025

Published: 13 April, 2025

Abstract

Background: This study was conducted for visual estimation of blood loss versus quantification of blood loss after vaginal birth using brass v drape.

Material and methods: Ethical Approval was taken from the concern institutional ethical committee from the commencement of the study. It was a Prospective Observational Study conducted at Krishna Mohan Medical College Mathura UP from Nov 2022 to May 2025. They included 100 patients coming to OBG labor room who ever fulfilled the criteria in the given period of time.

Brass V Drape: Immediately after delivery and cord clamping, blood measurement began. The calibrated delivery drape was placed under the buttocks of the woman and tied around the woman's waist with the funnel portion hanging down between her legs. Blood loss was measured for at least one hour or, if bleeding continued after one hour, until active bleeding had stopped."

Indirect Weight Method: Just after delivery and cord clamping, a sheet with plastic backing was placed under the buttocks of the woman. A basin was placed directly under her on a small shelf on the delivery table. Blood loss was measured for at least one hour or, if bleeding continued after one hour, until active bleeding had stopped." "After bleeding had stopped, all gauze pieces and mops were counted and then placed in the collection basin. The basin was placed on the scale and weighed. The weight of the blood was assessed by subtracting the weight of the basin, gauzes and mops from the total weight of the soaked materials assuming that one gram is equivalent to 1 ml. We used a Brass-V Drape with a graduated pouch under the buttocks for blood loss estimation. To avoid contamination of amniotic fluid, the Brass-V Drape was used immediately after delivery of the baby and before delivery of the placenta. It consists of a funneled and calibrated collecting pouch attached to a plastic sheet that is placed under the woman's buttocks immediately after delivery of baby. The gauges and pads (soaked in blood) were used for cleaning and repairing of the episiotomy, which were put in the Brass-V Drape for accurate measurement of blood loss. Blood spilled on the sheet under the buttocks was also included in the Brass-V Drape estimation. Results: 64 percent of the patients belonged to the age group of 18 to 25 years respectively. 29 percent of the patients belonged to the age group of 26 to 30 years. Mean age of the patients was 25.9 years. 61 percent of the patients were of rural residence while the remaining were of 39 percent of the urban residence. 62 percent of the patients were of multigravida while the remaining 38 percent of the patients were of primigravida. While evaluating the socio-economic status, 27 percent of the patients were of lower class while 73 percent of the patients were of middle class. In 63 percent of the patients, BMI was between 20 to 24.9 Kg/m2 while it was between 25 to 29.9 Kg/m2 in 20 percent of the patients. Mean BMI was 26.9 Kg/m2. Episiotomy was done in 21 percent of the patients. Out of 100 newborns, 45 percent were boys while the remaining 55 percent were girls. Mean predelivery haemoglobin was 9.2 gm% while mean postdelivery haemoglobin was 8.7 gm%. Mean visual blood loss was 173.2 ml while mean blood loss by brass V shaped estimate was 173.2 ml and 223.9 ml respectively. Significant results were obtained were obtained while comparing the blood loss by visual method and by brass V shaped estimate.

Conclusion: Postpartum haemorrhage is the most common cause of serious blood loss in obstetrics. If blood loss is not assessed correctly and managed swiftly, it may result in a fatality and can have a high chance of a healthy women becoming.

Visual estimation of postpartum blood loss is inaccurate, resulting in underestimation and misdiagnosis of immediate PPH. Hence; a brass v drape method should be preferred. However; further studies are recommended for better exploration of results.

Keywords: Blood Loss, Vaginal Birth

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Introduction

Postpartum hemorrhage (PPH) represents а considerable threat maternal well-being, to characterized by significant blood loss following childbirth. The regulation of blood loss is primarily managed by uterine contractions and the coagulation cascade; however, untreated PPH can result in serious complications. The conventional definition of PPH has adapted over time to include broader criteria that account for indicators of hypovolemia, based on specific blood loss thresholds. Traditionally, PPH is identified as exceeding 500 mL of estimated blood loss in vaginal deliveries or surpassing 1000 mL in Cesarean sections. In 2017, the American College of Obstetrics and Gynecology revised these parameters to define PPH as a cumulative blood loss exceeding 1000 mL accompanied by signs and symptoms of hypovolemia within 24 hours post-delivery, irrespective of the delivery method. This revision acknowledges that blood loss during delivery is often underestimated; thus, a blood loss greater than 500 mL during vaginal delivery should be regarded as abnormal and may necessitate intervention.¹

Postpartum hemorrhage (PPH) is classified into two types: primary and secondary. Primary PPH occurs within the first 24 hours following delivery (referred to as early PPH), while secondary PPH takes place between 24 hours and 12 weeks after delivery (known as late or delayed PPH). A systematic review of the global burden of disease from 1990 to 2013 revealed that maternal mortality rates (MMR) showed a decline, with 292,982 maternal deaths recorded in 2013 compared to 376,034 in 1990. Notably, the most significant decrease in mortality was linked to maternal hemorrhage, which fell from 71,295 deaths in 1990 to 44,190 in 2013. In Turkey, PPH was the leading cause of maternal mortality, with a rate of 13.1 per 100,000 live births in 2019. Consequently, it is crucial to maintain vigilance and awareness regarding risk factors prior to delivery.^{2, 3}

PPH is the major cause of maternal mortality and morbidity across the world, responsible for more than 25% of deaths annually. WHO statistics suggested that 60% of maternal deaths in developing countries were due to PPH, accounting for more than 100,000 maternal deaths per year worldwide.⁴

We proposed a randomized prospective study to compare the measurement of blood loss during the third stage of labor with two different methods: the modified WHO blood measurement protocol and the Excellent BRASSS-V DrapeTM. Upon admission in the labor ward, study staff will approach all delivering women about participation in the study and seek informed consent. Blood loss will be measured for all consenting women with vaginal deliveries.

Material and methods

Ethical Approval was taken from the concern institutional ethical committee from the commencement of the study. It was a Prospective Observational Study conducted at Krishna Mohan Medical College Mathura UP from Nov 2022 to May 2025. They included 100 patients coming to OBG labor room who ever fulfilled the criteria in the given period of time.

Brass v drape

Immediately after delivery and cord clamping, blood measurement began. The calibrated delivery drape was placed under the buttocks of the woman and tied around the woman's waist with the funnel portion hanging down between her legs. Blood loss was measured for at least one hour or, if bleeding continued after one hour, until active bleeding had stopped."

Indirect weight method

Just after delivery and cord clamping, a sheet with plastic backing was placed under the buttocks of the woman. A basin was placed directly under her on a small shelf on the delivery table. Blood loss was measured for at least one hour or, if bleeding continued after one hour, until active bleeding had stopped." "After bleeding had stopped, all gauze pieces and mops were counted and then placed in the collection basin. The basin was placed on the scale and weighed. The weight of the blood was assessed by subtracting the weight of the basin, gauzes and mops from the total weight of the soaked materials assuming that one gram is equivalent to 1 ml. We used a Brass-V Drape with a graduated pouch under the buttocks for blood loss estimation. To avoid contamination of amniotic fluid, the Brass-V Drape was used immediately after delivery of the baby and before delivery of the placenta. It consists of a funneled and calibrated collecting pouch attached to a plastic sheet that is placed under the woman's buttocks immediately after delivery of baby. The gauges and pads (soaked in blood) were used for cleaning and repairing of the episiotomy, which were put in the Brass-V Drape for accurate measurement of blood loss. Blood spilled on the sheet under the buttocks was also included in the Brass-V Drape estimation.

Results

Table 1: Age wise distribution of patients

Age (Years)	Number	Percentage
18-25	64	64
26-30	29	29
>30	7	7
Total	100	100
Mean	2	25.9
Sd		4.9

64 percent of the patients belonged to the age group of 18 to 25 years respectively. 29 percent of the patients belonged to the age group of 26 to 30 years. Mean age of the patients was 25.9 years.

Table 2: Distribution of patients according to Residence

Residence	Number	Percentage
Rural	61	61
Urban	39	39
Total	100	100

61% of the patients were of rural residence while the remaining were of 39 percent of the urban residence.

Table 3: Distribution of patients according to Gravida

		0
Gravida	Number	Percentage
Primigravida	38	38
Multigravida	62	62
Total	100	100

62 percent of the patients were of multigravida while the remaining 38 percent of the patients were of primigravida.

Table 4: Distribution of patients according to socio-Economic status

Socio-Economic status	Number	Percentage
Upper class	5	5
Middle class	73	73
Lower class	27	27
Total	100	100

While evaluating the socio-economic status, 27 percent of the patients were of lower class while 73 percent of the patients were of middle class.

BMI (Kg/m ²)	Number	Percentage	
<20	13	13	
20-24.9	63	63	
25-29.9	20	20	
≥30	4	4	
Total	100	100	
Mean	26.9		
SD	3.7		

Table 5: Distribution of patients according to BMI

In 63 percent of the patients, BMI was between 20 to 24.9 Kg/m² while it was between 25 to 29.9 Kg/m² in 20 percent of the patients. Mean BMI was 26.9 Kg/m².

Table 6: Haemoglobin					
Haemoglobin	Mean	SD	p-value		
Pre-delivery	9.2	1.02	0.228		
Post-delivery	8.7	1.01			

Mean predelivery haemoglobin was 9.2 gm% while mean postdelivery haemoglobin was 8.7 gm%.

Table 7: Range / Blood loss

Variable	Visual blood loss(ml)	Brass V-shaped estimate
Mean	173.2	223.9
SD	41.6	63.8

ſ	Range	100-360	120-500
	p-value	0.0001 ((Significant)

Mean visual blood loss was 173.2 ml while mean blood loss by brass V shaped estimate was 173.2 ml and 223.9 ml respectively. Significant results were obtained were obtained while comparing the blood loss by visual method and by brass V shaped estimate.

Table 8: Comparison of vaginal blood loss estimation by both methods using various variables

Variables		Visual bl	ood loss	Brass-V Drape estimate		Difference of	р-
		Mean	SD	Mean	SD	mean blood loss	value
						(ml)	
Age group	18-25	156.3	32.3	218.4	50.3	62.1	0.21
(years)	26-30	182.8	42.7	232.7	62.1	49.9	
	>30	208.9	52.9	243.9	66.9	35	
Residence	Rural	182.2	45.2	231.7	43.7	49.5	0.81
	Urban	165.7	41.9	215.9	45.3	50.2	
Gravida	Primigravid	169.2	39.5	219.1	35.1	49.9	0.66
	Multigravida	179.8	48.7	228.4	39.2	48.6	
Socio-	Upper class	168.2	33.1	211.8	31.2	43.6	0.27
Economic	Middle class	172.6	35.6	220.3	32.8	47.7	
status	Lower class	175.9	32.9	229.7	31.9	53.8	
BMI	<20	165.9	39.2	212.8	32.8	46.9	0.61
(Kg/m^2)	20-24.9	172.9	31.5	223.9	33.7	51	
	25-29.9	183.9	35.6	238.7	29.5	54.8	
	≥30	202.9	34.7	253.9	31.9	51	
Episiotomy	Yes	196.5	31.8	243.9	39.6	47.4	0.85
	No	168.2	32.9	213.4	37.2	45.2	
New Born	Boys	182.6	38.4	225.5	35.7	42.9	0.55
	Girls	175.6	36.3	220.3	35.1	44.7]



Discussion

The period between the birth of the baby and expulsion of the placenta and membranes is the third stage of labour. Blood loss during this period and immediately thereafter depends on how well the placenta separates from the uterine wall and how well the uterus contracts to close the vascular channels in the placenta bed. Blood loss during delivery is physiological and does not lead to later problems except for women who are already anaemic. The major complication associated with this stage is postpartum haemorrhage. Gyte in 1992 suggested that blood loss at birth is physiologically normal and is a part of the mechanism that brings the mother's blood volume back to its nonpregnant level.^{5,6,7}

According to the World Health Organisation (WHO), postpartum haemorrhage (PPH) is defined as bleeding from the genital tract in excess of 500 ml after vaginal delivery of the baby: postpartum haemorrhage (PPH) minor: 500-1000 ml, PPH major: over 1000 ml (moderate 1000-2000 ml and severe > 2000 ml). The American College of Obstetricians and Gynaecologists (ACOG) define postpartum haemorrhage as excessive bleeding from the genital tract causing a haematocrit drop of more than 10% requiring immediate transfusion. Postpartum haemorrhage is sufficient to affect the general condition of the mother, which can be shown clinically by tachycardia and hypotension. Morbidity following PPH varies from simple to severe, such as the patient being vulnerable to anaemia, prolonged hospital stay, difficulties in establishing breast feeding, DIC, shock, acute renal failure, multiple organ dysfunction, sepsis, or death. According to the World Health Organisation, 60% of maternal deaths in developing countries are due to PPH, accounting for more than 100,000 maternal deaths per year.⁸

In the United States the pregnancy-related mortality ratio was 17.3 deaths per 100,000 live births in 2013, and approximately 11.4% of these deaths were due to PP. In India, the incidence of maternal death due to PPH is 25.6%. In rural India, maternal mortality rates due to PPH are 350 to 650 per 100,000 live births, accounting for the world's highest number of maternal deaths per year. In November 2003, FIGO and ICM issued a joint statement declaring the reduction of PPH an integral component of the Safe Motherhood global initiative. Assessment of postpartum blood loss is difficult, particularly after vaginal birth, due to physiological adaptation to pregnancy including an increase in plasma volume and haemodilution providing a reserve of circulatory volume, and signs of haemorrhage may be delayed.⁶

We proposed a randomized prospective study to compare the measurement of blood loss during the third stage of labor with two different methods: the modified WHO blood measurement protocol and the Excellent BRASSS-V DrapeTM. Upon admission in the labor ward, study staff will approach all delivering women about participation in the study and seek informed consent. Blood loss will be measured for all consenting women with vaginal deliveries.

AGE

64 percent of the patients belonged to the age group of 18 to 25 years respectively. 29 percent of the patients belonged to the age group of 26 to 30 years. Mean age of the patients was 25.9 years. Sada SI et al, in a previous study reported that the mean age of all parturient was 28.64 years.⁹ In another study conducted by Singh G et al, 75.2 percent of the patients belonged to the age group of 18 to 25 years.⁶ Lertbunnaphong T et al, in another previous study, reported that mean age of the patients was 27.1 years.¹⁰ In a similar study conducted by Mishra N et al, mean age of the patients was 25 years.¹¹

BMI

In 63 percent of the patients, BMI was between 20 to 24.9 Kg/m² while it was between 25 to 29.9 Kg/m² in 20 percent of the patients. Mean BMI was 26.9 Kg/m². Mean BMI was 26.9 Kg/m². In a study conducted by Singh G et al, BMI was between 20 to 24.9 Kg/m² in 83.8 percent of the patients. Mishra et al, in another previous study reported the mean BMI of the patients to be 25.41 Kg/m^{2.6, 11}

Range / blood loss

Mean visual blood loss was 173.2 ml while mean blood loss by brass V shaped estimate was 223.9 ml. Significant results were obtained were obtained while comparing the blood loss by visual method and by brass V shaped estimate. Mishra et al, in a previous study reported that mean blood among patients of visual examination group and brass B shaped estimate was 197.2 ml and 297.2 ml respectively. In another study conducted by Singh G et al, mean visual blood loss was 155.36 ml while mean blood loss by brass V shaped estimate was 213.57 ml.^{6,11}

Lerbunnaphong T et al, in another study reported that there was a significant difference (80.4 \pm 41.8 mL; p < 0.0001) in the overall volume of blood loss between visual estimation (mean 178.6 \pm 133.1 mL) and objective measurement with the sterile under-buttock drape (mean 259.0 \pm 174.9 mL).¹⁰

Conclusion

Postpartum haemorrhage is the most common cause of serious blood loss in obstetrics. If blood loss is not assessed correctly and managed swiftly, it may result in a fatality and can have a high chance of a healthy women becoming. Visual estimation of postpartum blood loss is inaccurate, resulting in underestimation and misdiagnosis of immediate PPH. Hence; a brass v drape method should be preferred. However; further studies are recommended for better exploration of results.

References

- Wormer KC, Jamil RT, Bryant SB. Postpartum Hemorrhage. [Updated 2024 Jul 19]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-.
- 2. Bienstock JL, Eke AC, Hueppchen NA. Postpartum hemorrhage. N Engl J Med. 2021;384(17):1635 1645.
- Kassebaum NJ, Bertozzi-Villa A, Coggeshall MS.et al. Global, regional and national levels of maternal mortality during 1990-2013. Systematic analysis for the global burden of disease study. Lancet. 2014. ;384(9947):980 1004.
- 4. Ford JB, Patterson JA, Seeho SK, Roberts CL. Trends and outcomes of postpartum hemorrhage, 2003-2011. BMC Pregnancy Childbirth. 2015;15(1):334.
- Singh G, Singh V, Sasidharan S, Singh S, Naseer A, Babitha M, Dhillon HS. A comparative study of Brass-V Drape and standardised visual estimation of blood loss during vaginal delivery–a single-observer study. Journal of Obstetrics and Gynecological Investigations. 2020;3(1):26-34.
- Esau J, Morris T, Muller C, Els C, de Waard L. Two Postpartum Blood Collection Devices: The Brass-V Drape and MaternaWell Tray—As Experienced by

Birth Attendants and Birthing Women—A Questionnaire-Based Randomised Study. Obstetrics and Gynecology International. 2024;2024(1):6605833.

- Gyte, G. (1992). The significance of blood loss at delivery. MIDIRS Midwifery Digest, 2, 88-92.
- 8. WHO Guidelines for the Management of Postpartum Haemorrhage and Retained Placenta. Geneva: World Health Organization; 2009. PMID: 23844453.
- Sada S, Aliyu R, Umar H, Randawa A, Onwuhafua P. A Comparative Study of Postpartum Blood Loss Using Visual Method and Blood Collection Drape in a Northwestern Hospital. Tropical Journal of Obstetrics and Gynaecology. 2021;38(1):20-7.
- Lertbunnaphong T, Lapthanapat N, Leetheeragul J, Hakularb P, Ownon A. Postpartum blood loss: visual estimation versus objective quantification with a novel birthing drape. Singapore medical journal. 2016 Jun;57(6):325.
- 11. Mishra N, Dhruw S, Mishra I, Daharwal A. Visual estimation of blood loss versus quantification of blood loss after vaginal birth using an innovative drape: a prospective study. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2021 Jan 1;10(1):268-75.