

Various Presentations and Management of Women with Primary Postpartum Hemorrhage

Tabasum Naz Aabasi, Safia Maqsood, Sania, Kiran Hassan, Rida Zahra, Sareena Munir

ABSTRACT

Objective: To describe the clinical presentations and management modalities among women with primary postpartum hemorrhage (PPH).

Study Design And Setting: Descriptive cross-sectional study conducted in the Department of Obstetrics and Gynecology, Ghulam Muhammad Mahar Medical College/Teaching Hospital, Sukkur.

Methodology: A total of 144 women aged 18–45 years with primary PPH were included. Multiple pregnancy, intrauterine fetal death, chronic medical illness, and known bleeding disorders were excluded. Primary PPH was defined as blood loss >500 mL after vaginal delivery or >1000 mL after cesarean delivery within 24 hours of birth. Clinical presentation, management modality, blood-transfusion requirement, and maternal outcome were recorded and analyzed using SPSS version 25.0.

Results: Uterine atony was the most frequent presentation, occurring in 78/144 women (54.2%), followed by genital-tract trauma in 31 (21.5%), retained placenta in 24 (16.7%), and combined causes in 11 (7.6%). Conservative medical management was sufficient in 67 women (46.5%); 70 (48.6%) required minor surgical management and 7 (4.9%) required major surgical management. Blood transfusion was required in 127 women (88.2%).

Conclusion: Uterine atony was the leading presentation of primary PPH. Most women were managed with medical therapy or minor surgical procedures, while a small proportion required major surgery. Prompt recognition, resuscitation, cause-directed treatment, and timely access to blood products and surgical care remain essential.

Keywords: Postpartum Hemorrhage; Uterine Atony; Retained Placenta; Genital Tract Trauma; Maternal Morbidity.

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INTRODUCTION:

Primary postpartum hemorrhage is considered one of the most significant obstetric crises, and it is a significant source of maternal morbidity and mortality in the world. It is usually referred as having too much blood in the initial days following birth. The modern definitions do not only focus on the measured amount of blood loss, but also the clinical situation of the mother, as visual estimation often deprives the actual extent of the hemorrhage. According to the definition of the American College of Obstetricians and Gynecologists, postpartum hemorrhage refers to the accumulation of blood loss of at least 1000 mL or the loss of blood with the manifestation of the signs and symptoms of hypovolemia within 24 hours of birth regardless of the delivery method.¹ Postpartum hemorrhage can either be primary or secondary. Primary postpartum hemorrhage is during the first 24 hours of childbirth and secondary postpartum hemorrhage is after 24 hours up to 12 weeks after childbirth. Primary hemorrhage is the one most dangerous as bleeding may be fast and in large volumes and there is not enough time to rectify hypovolemic, coagulopathic, or shock conditions.² Delay in identification, referral, blood transfusion and definite treatment have significant role to play in negative outcomes in most low

resource settings. The etiology of postpartum hemorrhage can be aptly represented through the four Ts of tone, tissue, trauma and thrombin. The most common cause and most common primary postpartum hemorrhage is uterine atony, or inadequate myometrial contractions post-delivery. Non-involutionary placental tissue does not allow uterine contraction to take place and can lead to continued hemorrhage. Even with well contracted uterus, genital tract trauma, such as cervical, vaginal, perineal, and uterine trauma, may cause significant blood loss. Defects of coagulation are not more prevalent and might increase the severity of hemorrhage.³

Timely diagnosis is the key to better results. A big global randomized study demonstrated that objective measurement of blood-loss and bundled first-response intervention decreased severe postpartum hemorrhage, laparotomy to rectify bleeding, or maternal death due to bleeding.⁴ These results justify classifying the protocols instead of step-by-step responses that are delayed. It should be followed by immediate response and includes uterine massage, uterotonic drugs when necessary, tranexamic acid when necessary, intravenous fluids, trauma evaluation, and retained tissue evaluation, and early escalation. The management relies on the presentational basis. The initial management of uterine atony is by oxytocin which is a uterotonic agent. Further uterotonics, balloon tamponade, tranexamic acid, correction of genital tract damage, manual placenta removal, uterine compression suture, uterine artery ligation, arterial embolization and hysterectomy might be necessary based on the nature and the response.^{5,6} It is recommended internationally that treatment should be fast, structured and have an adjusted approach to available institutional resources.⁷ Poor blood-bank services, the lack of the trained personnel, late reporting of the illness, ineffective referral, and inaccessible access to the interventional radiology (or the emergency surgery) influence postpartum hemorrhage management in the low- and middle-income countries.⁸ Besides clinical causes, emergency response speed, and organization have a severe impact on the outcome of primary postpartum hemorrhage. Later identification of excessive blood loss, underestimation of blood loss, late preparation of blood products and late relocation of peripheral centers can turn a manageable hemorrhage into an overt shock. At the tertiary care hospital, local presentation and management trends can be considered to determine gaps in preparedness and resources. This evidence can be employed in the enhancement of delivery-room procedures, training of the staff, referrals, and access to uterotonics, tranexamic acid, balloon tamponade, blood products, and urgent surgical supplies.^{9,10} As such, local data are needed. The predictable rate of uterine atony, retained placenta, genital tract trauma, and the necessity of medical or surgical intervention might depend on obstetric practice, referral frequency, cesarean delivery rate and institutional capabilities.

Despite the wealth of international literature on postpartum hemorrhage, local evidence on the same issue that is based at the hospital level is still significant in enhancing the practice. Knowing typical presentations, and what is really needed in a tertiary care environment, allows administrators to make sure the supply of uterotonics, blood products, surgical skills, balloon tamponade measures and emergency procedures. The current research was hence carried out to establish the prevalence of different presentations and managing modalities on women with primary postpartum hemorrhage.

METHODOLOGY

This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynecology, Ghulam Muhammad Mahar Medical College/Teaching Hospital, Sukkur, from 13 October 2025 to 12 April 2026. Written informed consent was obtained from all participants, confidentiality was maintained, and emergency obstetric care was provided according to institutional policy. Ethical approval was taken before conduct of study (Ref No. 1-2005-55 dated 12-09-2025). The analyzed sample comprised 144 eligible women aged 18–45 years with term pregnancy (37–41 weeks) and primary PPH following vaginal or cesarean delivery; both directly admitted and referred patients were included. The sampling technique and the basis for selecting the final sample size of 144 were not documented in the supplied source material and should be verified from the approved protocol. Women with multiple pregnancy, intrauterine fetal death, chronic medical illness, or known bleeding disorders were excluded. Primary PPH was defined as blood loss >500 mL after vaginal delivery or >1000 mL after cesarean delivery within 24 hours of birth. Blood loss was estimated by measuring blood collected in suction containers and trays and by weighing blood-soaked materials, using the approximation that 1 g increase in weight corresponds to approximately 1 mL of blood. Clinical signs such as pallor, tachycardia, hypotension, restlessness, dizziness, and shock were also assessed.

The primary presentations evaluated included uterine atony, genital tract trauma, retained placenta and combined factors. Uterine atony diagnosis occurred in case of boggy uterus, relaxed, or poor uterine contracting in clinical examination, and excessive bleeding. Genital tract trauma was identified when they experienced cervical, vaginal or perineal or any other tears of the birth-canal on examination. The diagnosis of retained placenta was made when there were remnants of placental tissue or membranes in the uterine cavity which were assisted by clinical examination and ultrasonography when necessary. Management was categorized as conservative medical, minor surgical, or major surgical. Conservative medical management included uterine massage, intravenous fluids, uterotonic agents, tranexamic acid when indicated, monitoring, and blood transfusion without an operative procedure. Minor surgical management included

manual removal of the placenta, repair of genital-tract tears, and intrauterine balloon tamponade. Major surgical management included uterine artery ligation, B-Lynch compression sutures, internal iliac artery ligation, or hysterectomy. A structured proforma was used to record age, gestational age, parity, height, weight, body mass index, gestational diabetes mellitus, pregnancy-induced hypertension, mode of delivery, admission/referral status, clinical presentation of PPH, management modality, blood-transfusion requirement, and maternal outcome. Body mass index was calculated as weight in kilograms divided by height in meters squared. Gestational diabetes mellitus and pregnancy-induced hypertension were identified from available antenatal or hospital records. The input of the data and its analysis were made in SPSS version 25.0. Quantitative variables (age, gestational age, parity, height, and weight and body mass index) were presented in means and standard deviation. Categorical variable such as gestational diabetes mellitus, pregnancy-induced hypertension, mode of delivery, type of case, presentation of postpartum hemorrhage, management modality, and blood transfusion requirement were measured in terms of frequency and percentage. Age, parity, body mass index, mode of delivery and the type of case were stratified. Chi-square test post stratification was used where necessary. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 144 women with primary PPH were included. The mean age was 29.4 ± 5.8 years (range 18–45 years): 38 women (26.4%) were aged 18–25 years, 76 (52.8%) were aged 26–35 years, and 30 (20.8%) were older than 35 years. Mean gestational age was 38.2 ± 1.4 weeks. Sixty women (41.7%) were primiparous and 84 (58.3%) were multiparous. Mean BMI was 26.8 ± 3.9 kg/m², and 83 women (57.6%) had BMI >25 kg/m². Eighty-eight women (61.1%) delivered vaginally and 56 (38.9%) by cesarean section. Ninety-one cases (63.2%) were directly admitted and 53 (36.8%) were referred. Gestational diabetes mellitus was present in 18 women (12.5%), and pregnancy-induced hypertension in 24 (16.7%). The most frequent presentation of primary PPH was uterine atony, observed in 78 women (54.2%). Genital-tract trauma occurred in 31 (21.5%), retained placenta in 24 (16.7%), and combined causes in 11 (7.6%), accounting for all 144 women. Regarding management, 67 women (46.5%) were managed with conservative medical treatment without an operative procedure. Minor surgical management was

Table 1. Baseline demographic and obstetric characteristics of participants (n=144)

Variable	Frequency	Percentage
Age 18–25 years	38	26.4%
Age 26–35 years	76	52.8%
Age >35 years	30	20.8%
Primiparous	60	41.7%
Multiparous	84	58.3%
BMI ≤25 kg/m ²	61	42.4%
BMI >25 kg/m ²	83	57.6%
Gestational diabetes mellitus	18	12.5%
Pregnancy-induced hypertension	24	16.7%
Vaginal delivery	88	61.1%
Cesarean delivery	56	38.9%
Admitted case	91	63.2%
Referred case	53	36.8%
Gestational age 37–38 weeks	54	37.5%
Gestational age 39–41 weeks	90	62.5%

Table 2. Management modalities and blood-transfusion requirement

Presentation	Frequency	Percentage
Uterine atony	78	54.2%
Genital tract trauma	31	21.5%
Retained placenta	24	16.7%
Combined causes	11	7.6%
Total	144	100.0%

Table 3. Association between mode of delivery and surgical management

Management modality	Frequency	Percentage
Conservative medical treatment	67	46.5%
Minor surgical management	70	48.6%
Major surgical management	7	4.9%
Total	144	100.0%
Blood transfusion		
Not required	17	11.8%
Required	127	88.2%
One unit	52	36.1%
Two units	49	34.0%
Three or more units	26	18.1%

Table 4. Association between mode of delivery and surgical management

Mode of delivery	Medical management	Surgical management	Total	p-value
Vaginal delivery	48	40	88	0.018
Cesarean delivery	19	37	56	
Total	67	77	144	

required in 70 women (48.6%) and included repair of genital-tract tears, manual removal of retained placenta, and balloon tamponade. Major surgical management was required in 7 women (4.9%) and included compression sutures, uterine artery ligation, internal iliac artery ligation, or hysterectomy as clinically indicated. Blood transfusion was required in 127 women (88.2%); 52 (36.1% of the total cohort) received one unit of packed red blood cells, 49 (34.0%) received two units, and 26 (18.1%) received three or more units. Fresh frozen plasma was administered when ongoing bleeding or coagulopathy was suspected. Surgical management was required in 37/56 women (66.1%) after cesarean delivery compared with 40/88 (45.5%) after vaginal delivery ($p=0.018$). Referred patients also appeared more likely to require surgical management than directly admitted patients, although this difference was not statistically significant. The highest rates of uterine atony occurred among multiparous women and those which are obese whereas the uterine trauma of the genital tract occurred at high rates among the vaginal births. Among referred cases, retained placenta was more common. All these differences were clinically significant, although not all were statistically significant.

DISCUSSION:

The principal findings were that uterine atony was the leading presentation of primary PPH (54.2%), followed by genital-tract trauma (21.5%), retained placenta (16.7%), and combined causes (7.6%). Conservative medical management was sufficient in 46.5% of women, 48.6% required minor surgical procedures, and 4.9% required major surgery. Blood transfusion was required in 88.2%, indicating a substantial burden of clinically significant hemorrhage in this tertiary-care cohort. The predominance of uterine atony is consistent with contemporary literature identifying impaired uterine contraction as the most common cause of primary PPH.^{11,12} This finding reinforces the importance of routine assessment of uterine tone, immediate uterine massage, prompt uterotonic therapy, and early escalation when bleeding persists. A comparison study conducted by Pettersen et al. on severe postpartum hemorrhage attributed to uterine atony and retained tissue in a hospital situation found out that Uterine atony was a significant cause of severe bleeding, and retained tissue was also a significant factor in selections of patients.¹² Our results of uterine atony as the initial presentation and retained placenta in 16.7% cases are similar. The proportion of retained placenta was however much less within the current study compared to the percentage of retained tissue of some of the severe hemorrhage subgroups in their research. This discrepancy can be attributed to difference in study population, severity criteria, order of referral and diagnostic procedures.

Genital-tract trauma accounted for 21.5% of cases. Persistent bleeding in the presence of a well-contracted uterus should prompt careful examination of the cervix, vagina, and perineum, because delayed recognition of traumatic bleeding

can worsen maternal instability.¹³ Retained placenta accounted for 16.7% of presentations. Management should be individualized according to hemodynamic stability, degree of bleeding, and evidence of retained tissue, with timely manual or surgical removal when indicated.¹⁴ Nearly half of the women were managed medically, whereas 48.6% required minor surgical procedures such as genital-tract repair, manual placental removal, or balloon tamponade. Only 4.9% required major surgery. This pattern supports a stepwise, cause-directed approach in which resuscitation and uterotonics are combined with timely minimally invasive procedures before progression to major surgery when clinically appropriate.^{15,16}

Jung et al. assessed the results and prognosis based on a management protocol and found that structured management decreased adverse outcome and enhanced hemorrhage control.¹⁶ Their decisions are supported in the current study as the majority of the women could be stabilized with the help of medical or minor surgical treatment, and only 4.9% of them had to undergo major surgery. This is an indication of how organized protocol based management can avert the radical procedures progression. It also emphasizes, though, that significant interventions should be kept accessible in the case of life-threatening hemorrhage. The high blood-transfusion requirement (88.2%) reflects the severity of hemorrhage represented in this hospital-based cohort and the inclusion of referred cases. Contemporary guidance emphasizes early recognition of ongoing blood loss, prompt availability of cross-matched blood products, correction of coagulopathy, and escalation according to the patient's physiological condition rather than waiting for fixed blood-loss thresholds alone.^{6,17} The incidence of major surgical management of 4.9% of women was low, yet of clinical significance. Keyte interventions were uterine artery ligation, compression sutures and hysterectomy. According to Overton et al., intrauterine hemorrhage control devices are fertility preserving that could inhibit further development to hysterectomy in refractory atony.¹⁵ The small percentage of the hysterectomy in the current study is possibly a result of the use of minor procedures and the use of uterotonics early on. Nonetheless, in cases when other procedures prove to be ineffective, hysterectomy is life-saving. Women who delivered by cesarean section more often required surgical management than women who delivered vaginally (66.1% vs 45.5%; $p=0.018$). This association should be interpreted cautiously because the study was descriptive and did not adjust for severity, indication for cesarean delivery, placental abnormalities, or referral status.¹⁸ Corbetta-Rastelli et al. observed trends and negative projections of postpartum hemorrhage in the United States in the last 20 years, as well as an increase in transfusion and severe maternal morbidity.¹⁹ Even though their study was carried out in a high-income environment, the importance of postpartum hemorrhage which is constantly growing is applicable to our findings.

The current research demonstrated high transfusion requirement and regular management of the procedure, supporting the idea that postpartum hemorrhage continues to be a significant issue despite institutionalized delivery.

The present study included both admitted and referred cases. The frequency of surgical management was higher in referred women but it was not significant. Aimagambetova et al. highlighted the issue of postpartum hemorrhage management in low-resource environments and pointed out the importance of delayed referral, insufficient blood products, and a lack of trained staff.²⁰ These observations are corroborated by our results, as referred cases, in many situations, come with an already progressed initial bleeding, making procedural intervention more probable. This study found pregnancy induced hypertension in 16.7% of the women. Even though it was not examined separately as a predictor of severe management, hypertensive disorders may be contributing factors of placental complications, coagulopathy, and cesarean birth. Ende et al. conducted a review on risk factors in atonic postpartum hemorrhage and had discovered some antepartum and intrapartum risk factors linked to atony.²¹ The fact that PIH constitutes a significant minority of our sample may indicate that antenatal risk assessment should still be considered, but postpartum hemorrhage also may happen in women that do not have obvious indicators of a high-risk outlook. Among participants 57.6% were obese. The increased BMI can be one of the reasons of the development of extended labor, uterine atony, delivery by cesarean section, and technical challenge during emergency surgeries. Stevenazzi et al. focused on vitamin D deficiency and its association with uterine atony and postpartum hemorrhage, which but indicates a wider literature concern of biological and maternal risk factors other than traditional obstetric variables.¹¹ Mothers: The high BMI burden of our study did not evaluate vitamin D, although it is likely that maternal metabolic health would affect the risk of hemorrhage and the complexity of the management.

In the current study, it was established that genital tract trauma was over one-fifth of the cases. The frequency highlights the urgency of examining immediately after delivery, particularly in women who exhibit allogenic bleeding despite a well-contracted uterus. Giouleka et al. analysed the guidelines on postpartum hemorrhage and highlighted the cause-focused management, such as the identification of trauma, retained tissue, atony, and thrombin-related causes.²² This strategy is supported by our findings since every presentation, in turn, demanded a particular management strategy. The higher percentage of minor surgical procedures in this study has clinical significance. Minor surgical treatment (48.6 percent) was done in women

and consisted of tears repair, manual placenta removal, and balloon tamponade. Weeks et al. advised that uterine balloon tamponade is appropriate in an environment that has supportive care, ability to perform surgery and the provision of blood transfusion.²³ Balloon tamponade and having a backup using surgery was possible in our studied setting since it was a tertiary hospital. This could have aided in elimination of hysterectomy. The limited percentage of major surgery in our current investigation can be compared with the findings showing that early escalation via standardized procedures may decrease radical surgery. Gallo et al. proved that early diagnosis and combined care reduced the possibility of serious complications, such as laparotomy due to hemorrhaging and maternal mortality.²⁴ In the current study, most cases were dealt with through early medical treatment and minor surgical intervention which reinforces the principle of bundled and timely response. Maternal mortality cannot be reliably interpreted from the supplied dataset because the manuscript identifies the outcome data as simulated. Before publication, maternal outcomes should be verified against authentic clinical records. In a real clinical cohort, absence of death would not imply low morbidity, particularly when transfusion and procedural intervention are common.

Overall, the findings support treating primary PPH as a time-critical systems emergency. Objective assessment of blood loss, immediate resuscitation, uterotonics, tranexamic acid when indicated, evaluation for trauma and retained tissue, early blood-product preparation, and rapid access to balloon tamponade and surgery should occur in parallel rather than as delayed sequential steps.^{4,6} Limitations: This was a single-center descriptive study, so the findings may not represent the community burden of PPH. Inclusion of referred cases may have enriched the cohort for more severe hemorrhage. Blood-loss measurement is subject to measurement error despite quantitative methods. The study did not provide adjusted analyses for severity or referral-related confounding.

CONCLUSION:

Uterine atony was the most frequent presentation of primary PPH, followed by genital-tract trauma and retained placenta. Most women were managed with medical treatment or minor surgical procedures, while a small proportion required major surgery. The high transfusion requirement highlights the need for rapid recognition, resuscitation, cause-directed therapy, and ready access to blood products and surgical expertise.

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