Original Article

Primary Postpartum Hemorrhage: Risk Factors, Causes and Maternal Outcome

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Abstract

Objectives: To determine the prevalence of primary postpartum haemorrhage, its associated risk factors, causes and maternal outcome in patients with primary postpartum haemorrhage.

Methodology: This descriptive study was conducted at Sir Ganga Ram Hospital, Lahore, from 1st Jan 2013 to 30th Dec 2017. All patients with the primary postpartum haemorrhage who fulfilled inclusion criteria were included in the study after informed consent. Data was collected on a structured proforma. Data was entered and analyzed in SPSS version 23. For quantitative data like age, parity, gestational age, and Hb, the mean and standard deviation was calculated. For qualitative variables like the severity of Primary PPH, its associated risk factors were calculated in percent and frequency.

Results: Total number of births during the study period was 27,000 and those who developed primary postpartum haemorrhage were 202; thus, the prevalence of primary PPH was 0.74%. The mean age of the study participants was 26.97±4.6 years. Severity of primary postpartum haemorrhage was mild in 154(76.2%), moderate in 44(21.8%), and severe in 4(2%) cases. The most common cause of PPH was uterine atony in 168 (83.2%) patients. Maternal mortality was 8 (3.9%).

Conclusion: The most significant risk factor for primary PPH is placenta previa and morbidly adherent placenta. The most common cause of PPH is uterine atony. Maternal mortality can be markedly reduced by active management of 3rd stage of labour with uterotonics.

Keywords: Haemorrhage, Maternal Outcome, Postpartum, Risk factors

Cite this article as: Sultana R, Manzoor S, Humayan S. Primary Postpartum Hemorrhage: Risk Factors, Causes and Maternal Outcome.J Soc Obstet Gynaecol Pak.2020; Vol 10(1):40-46.

Introduction

Polyhydramnios World Health Organization defines post-partum haemorrhage as the estimated blood loss of ≥ 500ml after vaginal delivery and ≥ 1000ml after caesarean section.[1] Post-partum haemorrhage (PPH) within 24 hours of delivery is termed as early or primary postpartum haemorrhage; whereas haemorrhage24 hours after delivery is called secondary or late postpartum haemorrhage.[2] According to WHO, PPH complicates 2% of deliveries.[1]The most common causes for severe PPH are uterine atony (60%) and placental complications (36%).[3] Other associated risk factors are maternal age ≥35 years, multiple pregnancies, fibroids, pre-eclampsia, amnionitis, placenta praevia and placental abruption, cervical lacerations, uterine rupture, instrumental vaginal delivery and caesarean section.[3,4]

The active management of 3rd stage of labour significantly decreases the incidence of PPH. The

Authorship Contribution: [1]Conceived and planned the idea of the study, data collection and manuscript writing, Data Analysis & interpretation. [4]Supervised the study, [5]

Funding Source: none
Conflict of Interest: none

Received: Jan 05, 2020
Accepted: April 11, 2020

prevalence of PPH of > 1000ml is approximately 1% with active management versus 3% when expectant management of 3rd stage of labour is done.[5, 6] However, the risk of PPH with morbidly adherent placenta remains markedly high.[6]

In industrialized countries, PPH ranks in top 3 causes of maternal mortality along with embolism and hypertension.[5] An estimated 303,000 maternal deaths due to postpartum haemorrhage occurred in 2015.[7] Reducing maternal mortality and morbidity from postpartum haemorrhage is a global challange[8].PPH is a life-threatening obstetric emergency requiring immediate response and a multidisciplinary approach.[9] So, this study aimed to determine the prevalence of PPH in a tertiary care hospital where active management is a routine practice. Associated risk factors and causes of primary postpartum haemorrhage were investigated. PPH is one of the leading direct causes of maternal mortality so the rationale of the study is to find out causative factors of this condition along with maternal morbidity and mortality in a tertiary care hospital.

Methodology

It was a descriptive study conducted in Gynae Unit 1of Sir Ganga Ram Hospital, Lahore from 1st Jan 2013 to 30th Dec 2017, after taking informed consent. Ethical approval was obtained from the Institutional Ethical Review Board no. 29/ IERB. The patients who developed post-partum haemorrhage within 24 hours of vaginal or abdominal delivery at or above 28 weeks of gestation whether delivered at home or hospital will be included in the study. Patients at less than 28 weeks of gestation, those having bleeding disorders or using heparin or other anticoagulants, and patients who developed postpartum haemorrhage after 24hours were excluded from -the study. The required sample size was equal to 135 with 95% Confidence Interval, an acceptable difference equal to 0.08, and assumed portion equal to 0.34.[6] Non-probability convenience sampling was used.

Data was collected on a structured proforma that included demographic data like age, parity, and gestational age of patients. Associated risk factors for primary postpartum haemmorrhage like multiparity, placenta-previa, and anemia were inquired. The causes of postpartum haemorrhage and its management were recorded. All study participants were followed for six weeks postpartum. Maternal mortality was noted and its causes were explored. The prevalence of postpartum haemorrhage would be calculated from the total number of deliveries conducted in the study period.

Data was analyzed in SPSS Version 23. For quantitative data like age, parity, gestational age, and Hb, the mean and standard deviation was calculated. For qualitative variables like the severity of Primary PPH, its associated risk factors were calculated in percent and frequency. P-value of 0.05 was taken as significant.

Results

The total number of births during the study period was 27,000 and those who developed primary postpartum haemorrhage were 202. The prevalence of primary PPH was %0.74. Out of 125 deliveries, 178(86.6%) were delivered at the hospital while 27(13.4%) were delivered at home. Mode of delivery was vaginal delivery in135 (66.8%) of the women and 67 (33.2%) were delivered via cesarean section. The third stage of labour was managed actively in 176(86.6%) patients, 2(1%) patients did not receive uterotonics and 25(12.4%) did not know the status.

The mean age of the study participants was 26.97± 4.6 year ranging from 18 to 45 year. Multipara patients were 110(54.5%), grand multipara were 51(25.2%) and 41(20.3%) were para 1 and 2. One hundred and seventy-five (86.6%) women were at term pregnancy, 22(11.9%) were preterm, and 5(2.5%) were post term. The severity of primary postpartum haemorrhage was mild in 154(76.2%), moderate in 44(21.8%), and severe in 4(2%) cases. Causes of Primary postpartum haemorrrhge are in Figure 1.

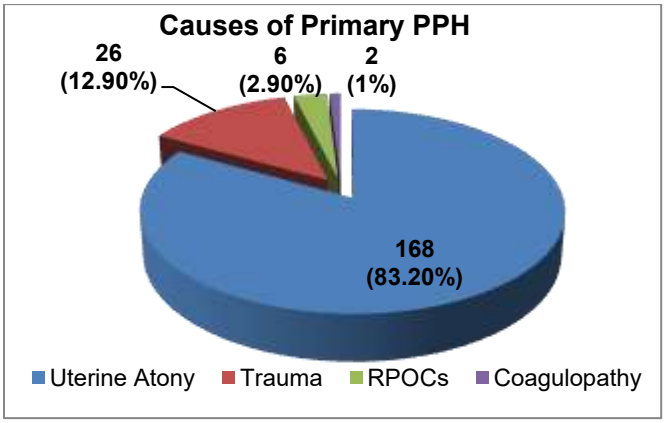

Figure 1. Causes of Primary Postpartum Haemorrhage

Associated risk factors are shown in table I. The analysis of risk factors in mild PPH versus moderate to severe PPH revealed that placenta praevia and morbidly adherent placenta were significant associated risk factors with p value of 0.008 and 0.000 respectively as shown in table I.

The mean antenatal haemoglobin of study participants was 9.6±1.6 gram/dl with a range from 4.6 to 13.8 g/dl. Blood transfusion was given to 121(60%) patients. One to three blood transfusions were given in 103(5%), four to six in 14(6.9%), and seven to nine transfusions in 4(2%) patients to replace blood loss.

Table I: Risk Factors in Mild PPH versus Moderate to Severe PPH.

Risk Factors for PPH		Mild PPH N(%)	Moderate to severe PPH N(%)	P value
Multiparity	Yes	102(66.2)	28(58.3)	0.319
	No	052(33.8)	20(41.7)	
Multiple pregnancy	Yes	006(03.9)	02(04.2)	0.933
	No	148(96.1)	46(95.8)	
Polyhydramnios	Yes	002(1.3)	01(02.1)	0.698
	No	152(98.7)	47(97.9)	
Placenta Previa	Yes	006(03.9)	07(14.6)	0.008
	No	148(96.1)	41(85.4)	
Morbidly Adherent placenta	Yes	001(0.65)	05(10.4)	0.000
	No	153(99.3)	43(89.6)	
Placental Abruption	Yes	003(01.9)	03(06.3)	0.126
	No	151(98.1)	45(93.7)	
Antenatal Anemia	Yes	104(67.5)	35(72.9)	0.483
	No	050(32.5)	13(27.1)	
Previous Uterine Scar	Yes	036(23.4)	14(29.2)	0.470
	No	118(76.6)	34(70.8)	

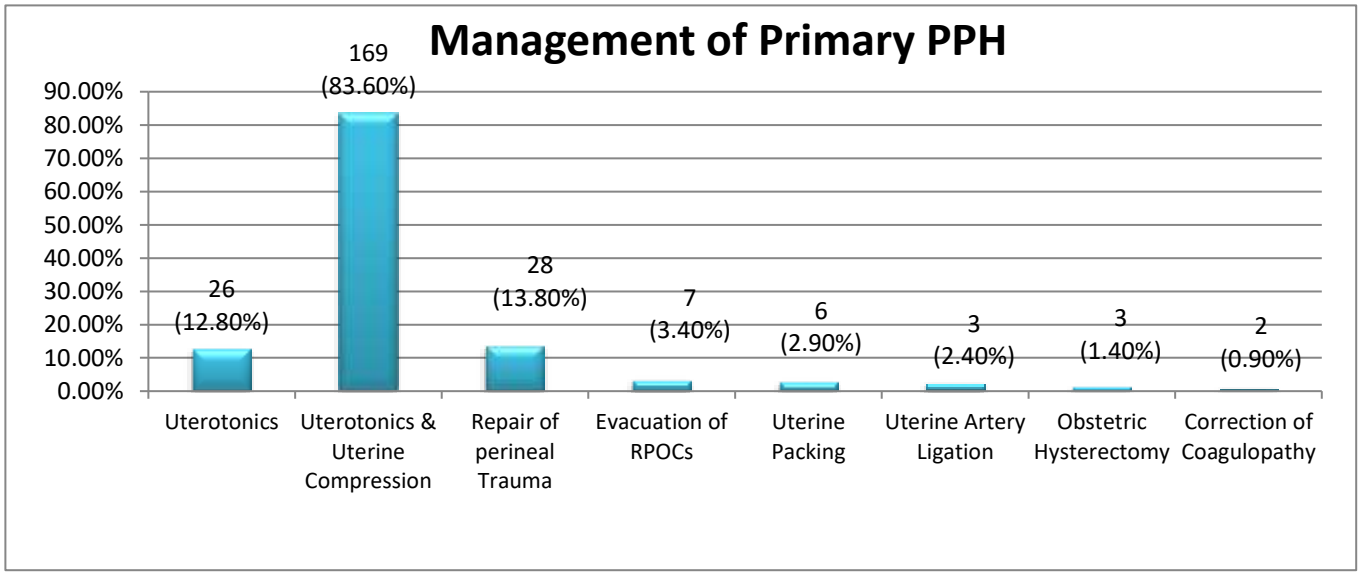

Figure 2. Management of Primary Postpartum Haemorrhage
*Percentage is higher than 100 because of multiple management strategies

All patients were followed to six weeks postpartum. Most of the mothers; 194(96.1%) were discharged home and maternal mortality was 8(3.9 %). All the mortalities were in cases of moderate and severe PPH. Those who expired, 4(50%) were having uterine atony as a cause of PPH, 1(12.5%) ruptured uterus, 1(12.5%) placental abruption, another 1(12.5%) morbidly adherent placenta Previa with severe anaemia, 1(12.5%) had perineal and cervical tears after SVD at home followed by DIC.

Discussion

Post-partum haemorrhage is one of the leading cause of maternal mortality worldwide and responsible for one quarter of maternal deaths.[10] Post-partum haemorrhage is not only obstetrician's nightmare but also a very life threatening condition.[11] Early anticipation of risk factors and active management of third stage of labour with prophylactic use of uterotonics are considered to be key preventive methods of PPH.[5] Even in tertiary care centres as us with the availability of excellent uterotonics and active management of third stage of labour still PPH dominates as the cause of maternal mortality.

The prevalence of primary PPH in our study was 0.74%. WHO reports that PPH complicates 2-4% of deliveries.[1] The incidence of PPH in a study done in Behrain was found to be 0.85%[12] and 2.2% in Nigeria.[13] It varies between 0.5-9.5 percent in different studies done in Pakistan.[14] which approximates to result of our study.

The mean age of the study participants was 26.8± 4.7 years ranging from 18 to 45 years. The mean age of patients was 27.7±6.9 years in the study by Ngwenya.[15] Out of 202 deliveries, 175 (86.6%) were delivered at the hospital while 27(13.4%) were delivered at home in our study. About 12% of cases presented with PPH after delivery in the home or the private setup in the study conducted at Ayub Teaching Hospital in Pakistan.[16].

Mode of delivery was vaginal in 135(66.8%) patients developing PPH and 67(33.2%) delivered through the abdominal route. This is also observed in the study by Holm C et al that planned abdominal deliveries had less chances of PPH as compared to intended vaginal deliveries.[17] The incidence of PPH was found to be higher in vaginal deliveries i.e. 2.4% Vs 1.6% in abdominal deliveries in a study in Colombia but this study included only the cases with low characteristics for PPH.[18] Three-quarters (75.7%) of the cases developing PPH had vaginal deliveries in the study by Ngwenya.[15]

PPH was observed as mild in 154(76.2%), moderate in 44(321.8%), and severe in 4(2%) of cases. The frequency of severe PPH was 2.5% in a study by Nyflot LT et al.[3] The incidence of severe PPH observed in a study conducted in Japanese population was 2.1% again augmenting the result of our study.[19]

The multivariate analysis of risk factors mild PPH versus moderate to severe PPH revealed that placenta praevia and morbidly adherent placenta were significant associated risk factors with p value of 0.008 and 0.000 respectively. A study conducted in New York reported abnormal placentation as the most common cause of PPH (26.6%).[20] Nyflot LT also identified placental problems (retained placenta, retained placental tissue and abnormal placentation) as the cause of severe PPH in about 36% of cases.[3]

The prevalence of anemia was 67.5% in patients with mild PPH and 72.9% in those with moderate to severe PPH in our study. The prevalence of anemia at term pregnancy was found to be 43% in a study conducted by Bhavana G et al.[21] Another study showed that 29.1% of anemic women developed PPH during cesarean delivery due to uterine atony.[22] These results are demonstrating less prevalence of anemia as risk factor for PPH as compared to our study because they recruited only those patients undergoing abdominal delivery. In our study, patients delivered by either vaginal or abdominal route were included in the study. The prevalence of anemia was found to be 70% in a study conducted in Bucharest.[23]

The mean antenatal haemoglobin of study participants was 9.6±1.6 gram/dl with a range from 4.6 to 13.8 g/dl in our study. Haemoglobin of patients ranged from 4–12 gm/dl with mean haemoglobin of 8.90±1.71 gm/dl in the study by H Naz et al; a study was done in Pakistan showing similar results.[16]

Multiple pregnancies was were observed in 3.9% of patients with mild PPH and 4.2% of those with moderate to severe PPH with p-value of 0.94 in our study which was non-significant. This is contrary to study by Nyloft LT et al which showed multiple pregnancies as one of the strongest risk factors for severe PPH with OR 2.11, CI1.39 – 3.22 and p-value of<0.001.[3] The reason for increased significance can be due to inclusion of patients conceived by IVF and ICSI leading to more multiple pregnancies in this study.

Other risk factors like placental abruption, multiparity, polyhydramnios were also observed in other studies.[10,24]

Regarding the causes of PPH, uterine atony was the most common cause observed in 83.2% of cases. Remaining causes were trauma in 12.9%, retained products of conception in 2.9% and coagulopathy in 1% of cases. A study conducted for 3 years in Indian women showed that 86% of cases of PPHwere due to atony, 9.9% due to trauma, and 0.97% were due to both atonic and traumatic PPH. 2.7% of cases were due to retained placental tissue and 0.07% were due to bleeding diathesis.[25] This order of prevalence of different causes of PPH corresponds to those in our population probably due to the same biogeographical factors.

The most common cause of post cesarean bleeding was primary uterine atony observed in 60.35% of PPH cases in a study by DP Pana et al.[23] Retained placenta is seen in 0.5-3% of deliveries in a study done at London; almost equal to that observed in the present study.[26] The most common etiologies found by Nyloft were uterine atony (60%) and placental complications (36%), but these were for severe PPH.[3] Uterine atony was the most common cause of postpartum hemorrhage (82.4%) observed by Ngwenya comparable to that noticed in our study.[15]

The third stage of labour was managed actively in 176(86.6%) patients in our study. The active management of the third stage of labor with uterotonics reduces the risk of postpartum hemorrhage.[27] Oxytocin and ergometrine are the drugs widely used for the prevention of PPH.[15] At our maternity hospital, the third stage of labor is actively managed with oxytocin as the main uterotonic agent. All the cases of primary PPH diagnosed during the study period received additional uterotonic doses as a treatment for PPH.

For the management of PPH, 12.8% of cases were dealt with only uterotonics and 83.6% cases were managed with uterotonics along with uterine compression. Oxytocin injection within 10 minutes after the diagnosis of PPH was significantly associated with a decreased risk of severe PPH (adjusted OR=0.3; 95% CI, 0.14-0.77), concluded in a study by Tort JI in Mali.[24] Repair of tears and removal of placenta was done in 6.7% each in a study conducted in a military hospital in Peshawer.[28] But in our study repair of tears was done in 13.8% of cases and POCs were removed only in 3.4% of cases. This difference may be due to retrospective data collection of all the maternal deaths in a military hospital with both primary and secondary PPH.

In our study, uterine packing was done in 2.9% of cases, obstetrical hysterectomy in 1.4% of cases, and correction of coagulopathy in 0.9% of cases. Subtotal abdominal hysterectomy was performed in 51.35%, Subtotal abdominal hysterectomy with internal iliac ligation was performed in 5.4%, which is quite high from that observed in our study. The incidence of obstetric hysterectomy was 0.030% following vaginal delivery, and 0.27% following cesarean section. The overall incidence was 0.083% in a study by J Chawla in Oman.[29] This incidence is lower from that of our study as this study was done for seven years and enrolled more patients than i.e 67,572 deliveries vs 27000. The incidence of 0.08% is also reported from Columbia (0.08%).[30] This can be attributed to the fact that although our study looked at a centrally located urban center, which caters to a higher proportion of booked cases with institutional deliveries but many un-booked and referred cases are also treated here. Also, the rate of cesarean section is increasing leading to more cases of the morbidly adherent placenta:it can also be a reason for the increased incidence of hysterectomy.

Blood transfusion was given to 60% of patients. One to three blood transfusions were given in 103(51%), four to six in 14(6.9%), and seven to nine in 4(2%) patients to replace blood loss in our study. 1–3 units blood was given in 48% cases, 4– 6 units blood was given in 18% cases and more than 6 unit of blood was given in 2% cases in the study by H Naz et al.[16]The comparison of both studies shows that majority of patients presenting with PPH need one to three blood transfusions.

Primary PPH is reported to occur in 2 to 20 % of cases of maternal deaths though some studies report it to be nearly 5%for the developing world.[31] Uterine atony was the cause of death in 45.9%, rupture uterus in 32%, genital tract tears in 14.86% and retained placenta in 6.75% cases of Postpartum Haemorrhage in the study by S Fayyaz demonstrating uterine atony as the, most common cause of death.[28]

Conclusion

The most significant risk factor for PPH is placenta previa and morbidly adherent placenta. The most common cause of PPH is uterine atony. Maternal

mortality can be markedly reduced by active management of 3rd stage of labour with uterotonics.

STRENGTHS OF STUDY: It was conducted over 5 years of the period on a large sample size in a tertiary care hospital that caters patients ranging from low risk to high risk.

LIMITATIONS OF STUDY: It was only carried out in women with primary postpartum haemorrhage.

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