A 5-years cross-sectional study of Peripartum hysterectomy at a tertiary care hospital in South India

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Abstract

Background: Peripartum hysterectomy (PH) is an emergency obstetric procedure performed most commonly for intractable postpartum haemorrhage.

Objectives: Our aim was to study the patient demographics, incidence, indications of PH and compare emergency vs elective PH.

Patients and methods: This was a retrospective analysis of all cases of PH performed over 5 years at our tertiary care hospital. The association of variables was based on Chi-square test and Fisher's exact test. Mann-Whitney U- test was used to compare the distributions between groups.

Results: A total of 53 peripartum hysterectomies were done in a period between January 2016- to December 2020. Incidence of PH was 1.71/1000 deliveries. PPH was the commonest indication of PH followed by placenta previa. 12 were planned elective PH. Haemorrhage and bladder injury were commonly encountered intra-op complications. ICU admissions were mainly for management of shock, disseminated intravascular coagulation and renal failure. There were 7 maternal deaths noted. Emergency PH were associated with overall higher mortality and morbidity than elective PH.

Conclusion: Multidisciplinary approach involving an experienced obstetrician, anaesthetist, urologist & intensivist is needed for management of patients warranting PH. Haemorrhage continues to be leading indication for Emergency PH with higher risk of mortality. Antenatal anticipation of risk factors and early referral will help reduce maternal mortality.

Keywords: Placenta previa; Postpartum haemorrhage; Rupture uterus; Caesarean section.

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Introduction

Peripartum hysterectomy (PH) is an emergency life-saving procedure performed most commonly for haemorrhage after delivery. PH is defined as surgical removal of uterus any time after delivery up to 6 weeks post-partum. It is a maternal "near miss" and an unequivocal marker for severe maternal morbidity and mortality **(De La Cruz, 2015)**. PH is performed as a last resort when conservative medical and surgical interventions fail to control bleeding with consequent loss of fertility. The decision to perform PH in women of younger age and low parity is challenging. The survival of the mother is dependent on timely decision of performing PH. Patients needing PH also demand access to anaesthetic, surgical, blood-banking and intensive care facilities. Given the nature of unplanned surgery and need to perform it expeditiously pose challenges on the obstetrician. Availability of an experienced obstetric team is of utmost importance in managing patients needing PH **(Machado,2011;Zelop et al.,1993)**.

Incidence of PH varies in different parts of the world. In high-income countries, it is <1 per 1000 deliveries and in medium and low-income countries it varies from 4-11 per 1000 deliveries. There is also a change in the incidence of of PH following Caesarean delivery varying between 0.17 to 8.7% . Indications like postpartum haemorrhage (PPH) and uterine rupture have been replaced by abnormal placentation in most of the recent studies in developed countries **(Kittur and Swetha, 2016;Chibber et al.,2012)**. Conservative management of uterine atony with novel uterotonics and extensive use of CS have led to this change over last few decades. However placental abnormalities still necessitate PH. Abnormal placentation include, placenta previa and morbidly adherent placenta which are usually not amenable to conservative management. High rate of CS is associated with concomitant increase in the incidence of placenta previa with accreta/percreta warranting PH. Placenta previa accrete/percreta is associated with approximately 5% risk of PH. Other factors like advanced maternal age, maternal obesity, multiple gestation, multiparity, gestational diabetes mellitus, preeclampsia, antepartum haemorrhage also increase risk of PH. PPH still continues to be the leading indication for PH in developing countries. The most severe complication of haemorrhage is maternal death which accounts for 1 in 1000 deliveries in developing countries. Delayed diagnosis and referral are mostly accompanied by complications. Hypovolemic shock, disseminated intravascular coagulation, sepsis, transfusion related lung injury, acute respiratory distress syndrome, renal failure and febrile illness are commonly seen with severe haemorrhage necessitating PH **(Kwee et al., 2016; Gupta and Gupta, 2017)**.

These complications influence the post-operative recovery, maternal morbidity and mortality significantly more than the procedure itself. Many of the women have long-term physical, emotional and social morbidity following PH. Presently in modern obstetrics, vigilant antenatal and intranatal care, universal practice of active management of third stage of labour

(AMTSL), use of partograph to monitor labour and safe CS practices have reduced the overall maternal mortality. Screening of antenatal women for risk factors predisposing to PH is needed for early referral **(Kastner et al.,2002;Clark et al.,1984).**

The primary objective was to study the incidence, patient demographics, indications for PH, anaesthesia & surgical complications and outcome of patients who underwent peripartum hysterectomy.The secondary objective was to compare emergency vs. elective PH.

Patients and methods

Study Setting

This study was done in teaching hospital of KAHER'S Jawaharlal Nehru Medical College, Belagavi which is a major referral tertiary care centre in our part of the state. The hospital is a multi-speciality unit with 1200 beds of which 64 beds are allocated to Emergency Obstetrics. There are 20 beds in obstetric high dependency unit with provision of 24 hours availability of residents, nurses and consultants. The institutional evidence-based protocols are used for management of high-risk patients.

Study design

This was a retrospective analysis of all cases who underwent Peripartum Hysterectomy between 1st January 2016 to 31st December 2020. PH performed between the gestational age of 24 weeks and up to 6weeks postpartum were included. In this study, we analysed patient demographics, indications for PH, surgical complications, condition at the time of discharge in women who underwent hysterectomy.

Study Participants

All women who underwent PH between the gestational ages of 24 weeks upto 6 weeks post-delivery during the study period were included in the study. These women were either registered gravida at our hospital or who were referred for delivery and for post-delivery complications.

Data Collection

The data was collected from medical records section, Birth register and OT register using the pre-tested proforma. ICD-10 coding system was used to identify the cases and the identified cases were confirmed with the histopathology reports. Ethical clearance was obtained.

Operational definitions

(i) Peripartum Hysterectomy- the procedure of removal of uterus after delivery till 6 weeks post-partum.

(ii) Registered gravida- a woman who has had 4 or more antenatal visits.

(iii) Postpartum haemorrhage- bleeding of more than 500ml into the genital tract after delivery. (iv) Placenta Previa- implantation of placenta in the lower uterine segment within 5cms from the internal os after 28 weeks of gestation.

(v) Maternal death- death of a mother while pregnant or within 6 weeks of delivery due to factors resulting from or aggravated by pregnancy but not due to accidental or incidental causes.

Statistical analysis

Data was analysed using R software version 4.0.2 and Excel. Continuous variables are given in mean ± SD/median form. Categorical variables represented in frequency table. P-value less than or equal to 0.05 indicates significance. Fisher's exact

test/ chi-square test was used to check the dependency between categorical variable. Mann-Whitney U- test used to compare the distributions between groups.

Results

Peripartum Hysterectomy rate-Total deliveries during the study period were 30,835. Among them 53 women underwent PH. Incidence of PH at our hospital was 1.71 per 1000 deliveries. Demographic and clinical characteristics of study participants as described in (**Table 1**),the Mean age of women was 27.06±4.97 years. 85% (n=45) were delivered in our hospital and 15%(n=8) were referred for post-delivery complications. 24.5%(n=13) were registered in our hospital and 75.5%(n=40) were unregistered. 69.8% (n=37) were at term and 30.2% (n=16) were preterm deliveries. Among the 16 preterm deliveries, 2 were between gestational age of 24-28 weeks, 6 were between 29-33 weeks and 8 were between 34-36 weeks of pregnancy. All were singleton pregnancies, except one twin pregnancy. Mean birth weight of newborns was 2.26 ± 0.7 kg.

Table 1. Demographic and clinical characteristics

Variables	**Min-Max**	**Mean ± SD**	**Median**
Age	19-42	27.06 ± 4.97	26
Parity	1-4	2.51 ± 0.64	3
Previous LSCS	0-3	1.02 ± 0.8	1
Hb in gm%	4.7-14.6	10.08 ± 2.23	10.5
Clinical characteristics			
Parity	**Number of women (%) (n=53)**		
P1	3(5.66)		
P2	24(45.82)		
P3	26(49.05)		
Previous caesarean delivery			
None	15(28.3)		
One	23(43.39)		
Two	14(26.41)		
Three	1(1.88)		
Maturity at delivery			
Term	37(69.81)		
Preterm	16(30.18)		
Mode of delivery			
Normal	11(20.75)		
LSCS	40(75.47)		
Ventouse	1(1.88)		
D &C	1(1.88)		

Placental delivery was managed as per Active management of third stage of labour. The blood loss was measured objectively using the BRASS-V Drape in all women who delivered vaginally. Use of ergometrine, misoprostol and carboprost was noted commonly. Tranexamic acid was also noted in all patients for controlling haemorrhage. Modified Haymann's brace sutures were used in all cases of atonic PPH. Stepwise devascularisation of the uterus was done in 20 cases. Bilateral internal iliac artery ligation was done in 18 cases. 5 Patients underwent uterine artery embolization. Uterine packing was done in 2 patients.

Indications of PH- As described in (**Table .2**), Atonic PPH was the commonest indication for PH 47.1% (n=25). Placental abnormalities which included Placenta previa, with or without accreta or percreta and morbidly adherent placenta were found to be the second most common indication (28.3%, n=15) cases. Uterine rupture was the third most common indication 15% (n=8). Previous cesarean 7 had one previous cesarean section and 1 had obstructed labour. Other indications were traumatic PPH following ventouse delivery 2% (n=1), perforating mole hydatidiform mole (1.88%, n=1), Retained /morbidly adherent placenta (1.88%, n=1), acute Uterine inversion (1.88%, n=1) which was repositioned successfully but had atonic PPH, secondary PPH due to puerperal sepsis (1.88%, n=1) not responding to conservative line of management who underwent PH on day 25 of delivery.

Table 2. Indications for peripartum hysterectomy

Indication	**Number (%)**
Uterine atony	25(47.1%)
Placenta previa with incerta/percreta	15(28.3%)
Rupture uterus	8(15%)
Traumatic PPH	1(1.88%)
Morbidly adherent /retained placenta	1(1.88%)
Evacuation of molar pregnancy	1(1.88%)
Inversion of uterus	1(1.88%)
Secondary PPH	1(1.88%)
Total	53

Emergency PH was more commonly performed after cesarean section (75.4%, n=40) than after vaginal delivery (20.7%, n=11). Most of the patients undergoing emergency PH were due to atonic PPH, only 10 cases of placenta previa were done electively as described in Table 3. Majority of the emergency PH cases (n=25) 47.1% were done under General anaesthesia. In 35.8% (n=19) of patients conversion of spinal to GA was necessitated due to decision of Emergency PH following LSCS. In 6 pts the procedure was completed under spinal anaesthesia.

Mean operating time was 160.94±43.39 minutes. Emergency PH needed longer time but was not statistically significant compared to elective PH. The

mean operative time was 1.5hrs± 25min. We found that 60.3% (n=32) required massive transfusion of multiple units of packed cell volume, fresh frozen plasma and random donor platelets. Only 22.6% (n=21) needed single component. The need for multiple component transfusion was more in the emergency PH as the condition of patient was less stable as compared to the elective group, (**Table .3**).

Haemorrhage was the commonest intra-operative complication noted in both emergency and elective PH. Bladder injury was noted in 4 patients (7.5%) all of who were cases of previous LSCS which was significant in elective PH. ICU admission was required in 24.5% (n=13), remaining 75.4% (n=40) were managed in High Dependency Unit of labour room. Management of shock and disseminated intravascular coagulation were the commonest indications of ICU admission. Emergency PH patients needed prolonged mechanical ventilation. None of patients required re-exploration after PH. Postoperative complications noted were fever in 15%(n=8), transfusion reactions in 3.7%(n=2), acute renal failure needing dialysis in 2%(n=1) prolonged catheterization post bladder repair (n=3) 5.6%, surgical site infections (n=4) 7.5%. These complications were found to be associated with emergency PH than with elective PH. The mean duration of hospital stay was noted to be 12±3.7 days in the emergency PH. Though duration of hospital stay between elective and emergency PH is not statistically significant, the Post-operative recovery was much better in elective PH, (**Table .3**).

Table 3. Comparison of Emergency vs elective peripartum hysterctomy

Factors	**Emergency PH (n=43)**	**Elective PH (n=10)**	**P value**
Anaesthesia			
GA only	25	2	0.023
Regional only	1	6	
Combined spinal & GA	17	2	
Blood and blood products transfusion			
Single component	08	6	0.125
Multiple components	35	4	
Duration of surgery (in minutes)	160± 39	100±25	0.423
Blood loss (ml)	2890 ml	1650 ml	0.212
Surgical complications	1	3	0.013
Post -operative complications	10	1	0.01
ICU admission	13	0	0.065
Hospital stay(in days)	12± 3.7 days	7± 2.6 days	0.256
Maternal death	7	0	0.235

There were 7 maternal deaths in this study as described in Table 4. All were attributed directly or indirectly to haemorrhage. All deaths were in patients who underwent emergency PH. No deaths were seen in women who underwent elective PH, (**Table .4**).

Table 4. Causes of maternal death in women who underwent EPH

Cause of death	No. of cases (%)
DIC secondary to haemorrhagic shock	2(28.6)
AFLP with DIC with ARF	1 (14.3)
MODS secondary to sepsis	3(42.8)
Irreversible haemorrhagic shock	1(14.3)
Total	7

Discussion

The mean of women who underwent PH in our study was 27 yrs and mean parity was 2. There was no statistically significant association between age and parity India being a developing country still has a high burden of maternal mortality due to postpartum haemorrhage. Atonic PPH is seen in any parturient women without any other co-morbidities or risk factors for PPH. This shows that no delivering woman is immune to PPH. Women with risk factors such as anemia, preeclampsia, multiple gestation, polyhydramnios, disseminated intravascular coagulation etc,are prone to PPH , however the anticipation of PPH and use of prophylactic uterotonics reduces the incidence of PPH.

The incidence of PH at our centre was 1.7/1000 deliveries which was comparable with most of the studies done in India and other low-and -middle income countries. This procedure was pioneered successfully by EuardoParro at Pavia for PPH and prevention of peritonitis in 1876. Since then, there have been changing indications for PH. Despite the development of novel uterotonics, PPH is still the commonest indication for PH in developing countries **(Stanco et al.,1993; Chester et al.,2016)**. This was similar to the common indications in our study.

Though PPH has remained the leading indication worldwide, abnormal placentation has been on the rise. All cases of placenta previa with accrete in our study were seen in women with previous Cesarean Section scar **(Whiteman et al.,2006;Saxena et al.,2004)**. All cases of placenta previa with accrete or percreta were diagnosed antenatally in our study and underwent elective PH. The incidence of placenta previa with accreta and percreta were higher in women who had previous Caesarean section women **(Najam et al.,2010; Chanrachakul et al.,1996)** which is also reflected our study. Uterine rupture was seen mostly in women with atleast one previous caesarean all of which were referred to our hospital. Other indications had similar occurrence in most studies.

Decision for performing PH was influenced by the patient's condition after delivery, presence of DIC, multiparity Our study reflected Cesarean Section was more commonly associated with PH. Most of the cases were done after Cesarean Section because the uterus was more accessible for surgical removal **(Chanrachakul et al.,1996;Flood et al..2009).**

Antenatal diagnosis of placenta previa and increta/percreta helps in preparedness and early decision for Elective PH. Placental abnormalities are significantly associated with risk of PH. This emphasizes the need for early referral of cases requiring PH. Use of partograph has reduced obstructed labour leading to rupture (**Patra et al., 2019**). Other indications in our study were similar to other studies. One case of secondary PPH warranted PH due to failed medical management.

General anaesthesia is associated with higher complication rates especially related to aspiration, intubation and mechanical ventilation. Most cases of emergency PH were done under general anaesthesia because of haemodynamic instability and associated comorbidities. Conversion of regional anaesthesia to spinal anaesthesia was required when decision for emergency PH was taken during caesarean section when conservative management failed. Most of elective PH were done under regional anaesthesia. This shows that whenever risk factors for PH were anticipated the patient preparation and pre anaesthetic evaluation will reduce anaesthesia related complications **(Cintesun and Cintesun ,2018)**.

Emergency PH warrants blood and blood product transfusion, especially multiple units of blood and its components. Haemorrhage leading to shock and DIC are managed with massive transfusion protocol where blood, platelets and fresh frozen plasma are transfused. In our study too we observed that multiple component transfusion was necessary in emergency PH **(Maher et al.,2016)**. However, when elective PH was planned the need for massive transfusion and multiple component transfusion was lesser. Most cases were managed with packed cell transfusion.

Other intraoperative complications were injury to bladder and urinary tract. This is due to the adhesions in vesicouterine pouch due to previous scarring or trophoblastic invasion into the bladder wall in cases of placenta previa with percreta and morbidly adherent placenta. Bladder injuries and other urinary tract injuries need to be identified intraoperatively and repaired to prevent urinary fistulas. They need prolonged catheterization increasing post-operative morbidity and risk of urosepsis. All cases of bladder injury were in women with scarred uterus. Placenta previa with percreta was diagnosed in all these cases. This emphasises the need for pre-operative counselling and written consent with regards to these injuries **(Shellhaas et al.,2009).**

ICU admission was most commonly required for patients who underwent emergency PH. Management of shock, DIC, renal failure and need for mechanical ventilation warranted ICU care. Prolonged hospital stay was need in all cases of PH. The difference was not statistically significant in emergency and elective cases. There was no difference in neonatal outcome in emergency vs elective PH as the bleeding in most cases was post-partum period. There were 7 maternal deaths in our study and all were directly or indirectly caused by haemorrhage and its complications. PPH continues as a leading cause of maternal mortality despite the invention of novel uterotonics. Its prediction is poor leaving all delivering women

susceptible to bleeding and its complications unless timely managed. Emergency PH done for atonic PPH had higher mortality compared to elective PH which was similar to other studies.

Conclusion

In the era of uterine conservation, PH still has a major role in life-threatening bleeding after delivery. PH should be reserved for indications where maternal life is at stake. Despite universal use of AMSTL, uterotonics and conservative surgical methods, PH has to be performed in unresponsive cases. Involvement of team approach consisting of an experienced obstetrician, anaesthetist, onco-surgeon, urologist, intensivist and is needed especially for cases of placenta previa with accreta or percreta. Following protocol for managing obstetric haemorrhage and early referral will reduce mortality. Reducing the primary section rate will help reduce the incidence of abnormal placentation which pose life threatening risk to the mother. There is no risk assessment system which can predict all women at risk for PPH, however one can still identify a significant number of high-risk pregnancies in the course of antenatal care for referral to tertiary care centre. Antenatal anticipation of high-risk pregnancies and early referral will go a long way in reducing maternal morbidity and mortality.

Data availability

Data will be available on request to the corresponding author.

Conflict of interest

There is no conflict of interest among the authors.

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