

ORIGINAL RESEARCH**Study of Emergency Obstetric Hysterectomy for Life-Threatening Post-partum Haemorrhage in Shyam Shah Medical College, Rewa, Madhya Pradesh**

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Abstract

Background: Post-partum hemorrhage (PPH) is a leading cause of maternal mortality worldwide. Emergency obstetric hysterectomy (EOH) is a life-saving procedure performed in cases of severe PPH unresponsive to conservative management.

Aim and Objectives: The goals of this study were (1) to analyze the outcomes of EOH for life-threatening PPH performed over 12 months, (2) to investigate the causes of EOH, and (3) to assess the efficacy and safety of subtotal hysterectomy for PPH.

Materials and Methods: Information on all hysterectomies conducted in the name of emergency obstetrics at Shyam Shah Medical College in Rewa, Madhya Pradesh, from January 2020 to December 2020. Coagulation function parameters, perinatal problems, and hysterectomy incidence and outcomes were studied.

Results: Twenty-five women underwent an emergency hysterectomy. Twenty-five patients had a total hysterectomy, while the remaining 10 had a subtotal hysterectomy. When comparing the rates of total hysterectomy (TH) and subtotal hysterectomy (STH), women who had a cesarean section (CS) in the past had a statistically significant increase in the former ($P = 0.004$). There were no discernible differences in the surgical measures taken to avoid hysterectomy between the TH and STH groups. Reduced prothrombin activity (50%), placenta accreta, prior uterine curettage, uterine atony, grand multiparity (>6 pregnancies), and uterine rupture were identified as risk factors for the need for EOH in the treatment of PPH. In addition, the TH group experienced a more significant average blood loss than the STH group (6832 ± 787 mL vs. 6329 ± 893 mL, respectively; $P = 0.003$). The overall rate of illness was 43.75 percent. Disseminated intravascular coagulation (DIC; $n = 6$, 32.5%) was the most prevalent complication. There were no statistically significant differences between the STH and TH procedures in terms of the occurrence of maternal problems.

Conclusion: Most women with a hysterectomy did so because their post-partum prothrombin activity was below 50%, also associated with cesarean delivery. When an emergency hysterectomy was needed, STH was the method of choice.

Keywords:

Introduction

Post-partum hemorrhage (PPH) remains a significant cause of maternal morbidity and mortality worldwide, posing a substantial challenge to healthcare systems. It is defined as excessive bleeding following childbirth, typically within the first 24 hours but can occur up to six weeks post-partum. PPH is responsible for approximately one-quarter of all maternal deaths globally, with the majority occurring in low- and middle-income countries where access to comprehensive obstetric care may be limited.¹

Despite advances in obstetric care and improved management strategies, some cases of PPH are refractory to conservative measures such as uterotonics, uterine tamponade, and arterial embolization. In these critical situations, emergency obstetric hysterectomy (EOH) is a life-saving procedure involving removing the uterus to control and prevent further life-threatening bleeding. EOH is considered a last-resort intervention and is generally performed when all other conservative measures fail to control the hemorrhage.²

The decision to perform EOH carries significant implications for the woman's future reproductive health and emotional well-being. It represents a major surgical procedure with potential short-term and long-term consequences, including the loss of fertility and psychosocial impact. Therefore, understanding the clinical characteristics, outcomes, and factors associated with EOH in cases of life-threatening PPH is crucial for optimizing maternal care and informing evidence-based clinical decision-making.

The aim of this study is to analyze a cohort of women who underwent EOH for life-threatening PPH at a tertiary care hospital over a five-year period. By examining demographic characteristics, obstetric history, indications for EOH, surgical details, perioperative complications, blood transfusion requirements, and maternal outcomes, we aim to gain insights into the profile of these cases and identify potential areas for improvement in managing severe PPH.

The findings of this study may contribute to the existing body of knowledge surrounding EOH for life-threatening PPH, helping healthcare providers better understand the clinical context, associated risks, and outcomes. Ultimately, this research may guide the development of strategies to prevent severe PPH, optimize surgical interventions, and improve overall maternal outcomes in cases where EOH is required.

By addressing this critical aspect of obstetric care, we can strive to reduce maternal mortality and morbidity associated with life-threatening PPH, ultimately improving the quality of care for women during childbirth.

Materials and methods

This retrospective descriptive analysis included all women who had a hysterectomy at Shyam Shah Medical College Rewa in the Obstetrics and Gynaecology Department for PPH between January 2020 and December 2020. Our Institutional Ethics Committee approved the study, guaranteeing everyone's privacy and safety.

Surgery performed at the time of or within 24 hours after a vaginal or abdominal delivery for the treatment of bleeding that did not respond to conservative techniques was considered an emergency hysterectomy in cases when PPH could not be controlled by medicinal or less invasive surgical methods (such as bimanual uterine compression, oxytocin or prostaglandin administration, uterine packing, or compression sutures such as the B-Lynch brace suture), an emergency hysterectomy was performed. We didn't include women with elective cesarean

hysterectomy for obstetrics or an emergency hysterectomy for gynecological reasons (such as sterilization or malignancy).

The following data was collected from the medical records of women who had undergone emergency hysterectomy during the study period: maternal and delivery characteristics, including patient age (years), gravidity (number of pregnancies), parity (number of children born), abortion history (if any), previous cesarean section (CS), gestational age (weeks), fetal position, mode of delivery, and cesarean section indications. Complications such as damage to the urinary system, a hematoma in the pelvis, an infection of the wound, disseminated intravascular coagulopathy (DIC), acute renal insufficiency, abdominal re-exploration after bleeding, pneumonia, cardiac ischemia, the death of the newborn, and the death of the mother. Patients treated with either total hysterectomy (TH) or subtotal hysterectomy (STH) throughout the trial had their medical records analyzed to see what criteria led surgeons to make those decisions.

Results

Around 18000 deliveries in the Department of Obstetrics and Gynaecology between January 2020 and December 2020, 25 women underwent emergency hysterectomy. Fifteen of these women had a hysterectomy after giving birth naturally, while two had one after giving birth surgically (P< 0.001).

Table 1: The incidence of hysterectomy according to mode of delivery

| Parameters | Deliveries | Emergency hysterectomies |
|--------------------------------------|------------|--------------------------|
| Total | 18000 | 25 |
| Vaginal delivery | 10800 | 15 |
| Vaginal birth after CS | 800 | 2 |
| Vaginal delivery with no CS | 4000 | 1 |
| Cesarean deliveries | 7200 | 2 |
| Cesarean deliveries with prior no CS | 4800 | 3 |
| Cesarean deliveries with prior CS | 2400 | 2 |

When comparing the rates of TH and STH, women who had a CS in the past had a statistically significant increase in the former (P = 0.004). In contrast, there were no distinguishing changes in maternal or birth features between the TH and STH groups. Median gravidity was 3.29, mean gestational age was 35.47 weeks, and average maternal age was 31.47 4.80 years. There were no discernible differences in the surgical measures taken to avoid hysterectomy between the TH and STH groups. Table 2 provides a detailed review of the maternal and delivery characteristics and the preventative surgical procedures used by the TH and STH groups.

Table 2: EOH: maternal, delivery, and hysterectomy prevention factors

| | Parameters | TH | STH |
|------------------------|------------|-----------|-----------|
| Age; years | Mean | 31.7±4.6 | 31.0±4.8 |
| | 18-25 | 4 | 4 |
| | 25-35 | 15 | 16 |
| | >35 | 06 | 10 |
| Gravidity | | 3±1.54 | 3.29±0.63 |
| Parity | | 1.22±0.79 | 0.95±0.80 |
| Prior abortion | | 1.51±1.45 | 1.39±1.30 |
| Gestational age (week) | | 34±5 | 35±3 |
| Fetal position Vertex | | 28 | 40 |
| Breach | | 9 | 8 |
| Transfers | | 4 | 7 |

| | | | |
|----------------|-------------------------------------|----|----|
| CS indications | Placenta previa with previous CS | 23 | 14 |
| | Placenta previa with no previous CS | 2 | 7 |
| | Previous CS alone | 2 | 2 |
| | Placental abruption with no CS | 0 | 1 |
| | Placental abruption with CS | 1 | 4 |
| | Fetal distress | 3 | 1 |

Reduced prothrombin activity (50%), placenta accreta, prior uterine curettage, uterine atony, grand multiparity (>6 pregnancies), and uterine rupture were identified as risk factors for the need for emergency obstetric hysterectomy in the treatment of PPH. Post-partum prothrombin activity below 50% (n = 59, 61.5%), placenta accreta (53%), prior uterine curettage (40%), uterine atony (37.5%), grand multiparity >6 (31.3%), and uterine rupture (17.5%) were found to be the most common risk factors for EOH. Five cases (12.2%) of placental bladder invasion were seen in women who had a TH, but none were seen in women who had a STH. Table 3 provides more information on the causes that call for an emergency hysterectomy.

Table 3: Risk factors for EOH

| Prothrombin activity | Frequency |
|-------------------------|-----------|
| <50% | 59 |
| >50% | 37 |
| Placenta accreta | 51 |
| Uterine atony | 32 |
| Multiparity >6 | 18 |
| Prior uterine curettage | 22 |

Twenty-five patients had a total hysterectomy, while the remaining 10 had a subtotal hysterectomy. When comparing STH with TH, the average duration of the former was much shorter. In addition, the TH group experienced a greater average blood loss than the STH group (6832 787 mL vs. 6329 893 mL, respectively; P =.003). All patients needed blood transfusions, although those receiving TH needed more red cell units (16.24 9.48) than those receiving STH (12.43 7.2). Neither the STH nor the TH groups had significantly different hemoglobin levels before and after surgery. Similarly, there were no statistically significant differences in prothrombin activity between the TH and STH groups; however, in both groups, post-operative prothrombin activity was significantly higher than preoperative levels (TH: 56.84 14.74 vs. 44.39 15.69, P .001; STH: 57.63 15.68 vs. 47.87 12.86, P .001). Post-operative hospital stay duration and ICU admission rate were not significantly different between the STH and TH groups.

Table 5 shows the rates of maternal death and morbidity. The overall rate of illness was 43.75 percent. DIC (n = 6, 32.5%) was the most prevalent complication. Wound infections accounted for 10.38% of all complications, followed by injuries to the urinary system (7.3%), pelvic hematomas (5.21%), acute renal insufficiency (5.21%), re-explorations for intra-abdominal bleeding (3.13%), pneumonia (2.1%), cardiac ischemia (2.1%), and neonatal deaths (2.1%). However, there were no statistically significant differences between the STH and TH procedures in terms of the occurrence of maternal problems.

Discussion

PPH hysterectomy rates vary widely between nations and medical centers.³⁻⁶ The overall rate of hysterectomy performed due to PPH at our institution was 0.63 per 1,000 births (1.28 per 1,000 C-section births and 0.207 per 1,000 vaginal births). Previous studies have shown that women who have had CS in the past are more likely to need a hysterectomy for PPH than women who have only given birth vaginally.^{3, 4, 7, 8}

Our research shows that women who have had a cesarean section and have placenta previa are more likely to undergo a hysterectomy for PPH. Women with a previous CS and a vaginal

delivery had a 15-fold higher rate of PPH-related hysterectomy than those with only vaginal deliveries and no previous CS. Similarly, the risk of having a hysterectomy because of placenta previa was 28 times greater for women with an earlier CS and 3.87 times higher for those with a history of CS. Women who had a cesarean section the first time around were no more likely to have a hysterectomy than other women. Increases in aberrant placentation, placenta previa, and uterine scarring have been linked to the rising prevalence of CS.^{5, 6, 9, 10}

It required extra intervention to control bleeding after the hysterectomy was linked to a post-partum prothrombin activity level of less than 50%. Most of the women who underwent a hysterectomy in our study had a post-partum prothrombin activity level of less than 50%, which was the most decisive risk factor for hysterectomy in patients with potentially fatal PPH. Placenta accreta, prior uterine curettage, uterine atony, grand multiparity (more than six pregnancies), and uterine rupture were also risk factors for hysterectomy in individuals with life-threatening PPH. These results agree with recent case series that have been reported.³⁻⁶ Intriguingly, we discovered that TH patients had a higher incidence of placenta percreta and bladder invasion than STH patients. Therefore, TH could be an effective treatment for severe PPH due to bladder invasion.

Consistent with previous research³⁻⁶, we found that STH was the most often performed surgical technique in our study sample. When comparing STH and TH in women in severe need of emergency operations, we discovered that STH was related to faster operating times and lower blood loss. More RBCs had to be transfused into women undergoing TH. The rates of bladder injury, pelvic hematoma, wound infection, DIC, acute renal insufficiency, intra-abdominal bleeding, pneumonia, cardiac ischemia, neonatal death, or maternal death were not significantly different between TH and STH.

Injuries to the ureter are more common during TH than STH, according to the literature. The overall complication rate in our study was 7.3%, which is consistent with the range of 4% to 15% found in the literature.^{4, 11-13} We hypothesize that the increased risk of bladder injury in women undergoing hysterectomy for placenta accreta compared to those receiving hysterectomy for uterine atony is due to vesicouterine scarring generated by previous CS procedures. Despite earlier studies revealing increased rates of bladder injury after TH and placenta accreta¹⁴, there was no significant difference in the rate of bladder injury between STH and TH for women with these disorders.

A total of 37.9% of the women in our research had DIC. The prevalence of DIC was similar in TH and STH (39.0% and 36.4%, respectively) despite advancements in maternity care and ICU facilities over the study period. The more conservative strategy adopted by our institution to avert EOH may account for the greater frequency of DIC identified in our study compared to that reported in previous studies.^{14, 15}

Our study found a significantly lower rate of re-exploration following hysterectomy for PPH (3.125%) than the reported range of 4% to 25%.^{4, 12, 13} The rate of re-exploration was higher following STH than TH (2.44 percent vs. 3.64 percent), but the difference was not statistically significant. Compared to the published range of 11.8-31.0 percentage points¹⁶⁻¹⁸, our study's reported maternal death rate (2.1%) was lower. Successful hysterectomy for PPH relies heavily on coagulopathy management^{19, 20}. Except for three women who needed re-exploration due to intra-abdominal bleeding and two who died, our examination of pre-and post-operative coagulation function indices showed that post-operative prothrombin activity significantly increased compared to the levels during the operation. After failing to avert hysterectomy using more conservative treatments, prothrombin activity was decreased in 69 women until blood loss was under control. When prothrombin activity steadily decreases despite treatment, it's time to start thinking about having a hysterectomy for PPH. If prothrombin activity drops following a hysterectomy, bleeding isn't effectively managed.

The study's retroactive nature and reliance on data from a single institution are significant caveats. It's also possible that the outcomes were affected by the efforts made to prevent hysterectomy for PPH. Treatments for coagulopathy, such as fibrinogen concentrate, cryoprecipitates, and tranexamic acid, may affect the frequency of bleeding, potentially fatal PPH, and the need for an emergency hysterectomy. Efforts to lessen the need for emergency hysterectomy should be directed at better understanding and treating coagulopathy.

Conclusion

Compared to vaginal births, cesarean sections increase the likelihood of a hysterectomy being necessary due to PPH. Most women with a hysterectomy also had post-partum prothrombin activity below 50%, making this the most decisive risk factor for the procedure. Our analysis of the outcomes of women who underwent TH and STH for PPH provides a foundation for future decisions regarding the type of hysterectomy to be performed. Hysterectomy for PPH was most commonly performed using STH in this research.

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