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Evaluating the indications and outcomes of peripartum hysterectomy: A 10-Year retrospective study

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Abstract

Objective: This study aimed to evaluate the indications, surgical techniques, and outcomes of emergency peripartum hysterectomy (EPH) as a life-saving intervention at a tertiary care hospital.

Methods: A retrospective analysis of 80 cases of EPH performed between June 2010 and June 2020 was conducted. Data were collected from patient medical records, focusing on demographic variables, surgical details, and postoperative outcomes.

Results: The incidence of EPH was 2.5 per 1,000 deliveries. The mean age of patients was 33.5 ± 5.5 years, with a mean gravidity of 5.9 ± 2.8 and parity of 4.9 ± 2.5 . Cesarean sections accounted for 50 cases, while 30 patients delivered vaginally. Subtotal hysterectomy was performed in 55 cases, and total abdominal hysterectomy in 25 cases. The primary indications for EPH were uterine atony, uterine rupture, and abnormal placentation. The average operation duration was 135.50 ± 40.10 minutes, with a mean blood transfusion requirement of 5.10 ± 3.05 units. Relaparotomy was necessary in 18 cases, and maternal mortality was observed in 8 cases. Postoperatively, 60% of patients required ICU admission. The mean hospital stay was 9.3 ± 4.2 days, with wound infection and sepsis occurring in 15% and 12.5% of cases, respectively.

Conclusion: EPH remains a critical procedure in managing life-threatening obstetric hemorrhages, with uterine atony, rupture, and abnormal placentation being the leading indications. The high rate of EPH in this study may be associated with advanced maternal age and high parity.

Keywords: Peripartum hysterectomy, emergency hysterectomy, uterine atony

Introduction

Peripartum hysterectomy, particularly emergency peripartum hysterectomy (EPH), is recognized as one of the most radical and life-saving procedures in modern obstetric care. This surgical intervention is typically performed in cases of severe, life-threatening obstetric hemorrhage that cannot be controlled by conservative management methods. Although the overall incidence of obstetric hemorrhage has declined globally due to advancements in medical care, EPH remains a crucial intervention in resource-limited settings or in high-risk pregnancies. Obstetric hemorrhage continues to be one of the leading causes of maternal mortality worldwide, contributing to approximately 27% of maternal deaths globally, with the figure even higher in low- and middle-income countries ^[1].

The historical context of EPH can be traced back to the late 19th century when surgeons first realized that hysterectomy could be utilized as a life-saving procedure during catastrophic hemorrhage events that occurred during childbirth. Since then, the surgical technique has evolved, and today, EPH is reserved for cases of uncontrolled postpartum hemorrhage, often due to uterine atony, uterine rupture, or abnormal placentation. Uterine atony, the most common cause of postpartum hemorrhage, occurs when the uterus fails to contract after childbirth, leading to heavy bleeding ^[2]. In cases where medical therapies such as uterotonics or less invasive surgical procedures fail to manage the bleeding, hysterectomy may become the only viable option for saving the mother's life.

Over the years, the indications for EPH have shifted in response to changing obstetric practices. In the past, uterine rupture was the most common indication for EPH, particularly in cases of prolonged labor or in women with a history of cesarean delivery. However, as the rates of cesarean delivery have increased globally, the indications for EPH have also evolved. Abnormal placentation, particularly placenta accreta spectrum disorders, has become an increasingly

common cause of EPH in recent years. Placenta accreta occurs when the placenta invades the uterine wall too deeply, leading to difficulty in its separation after delivery, thus causing severe hemorrhage [3].

A number of risk factors have been associated with the need for EPH. These include advanced maternal age, multiparity, previous cesarean deliveries, and the presence of placental abnormalities. A significant body of literature has demonstrated that women with a history of multiple cesarean deliveries are at increased risk of developing placental implantation abnormalities, such as placenta previa or accreta, which often necessitate hysterectomy [4]. Furthermore, uterine rupture, which is more likely to occur in women with prior uterine surgery or trauma, remains a critical indication for EPH in many cases [5].

Despite being a life-saving procedure, EPH is associated with significant maternal morbidity and mortality. Women undergoing EPH are at high risk of postoperative complications, including infection, hemorrhage, thromboembolic events, and multiorgan failure. The maternal mortality rate associated with EPH varies widely across studies, with rates ranging from 5% to 25%, depending on the setting, the indication for surgery, and the timeliness of the intervention [6]. The high mortality rate is often attributed to the fact that EPH is typically performed in emergency situations, where patients may already be in critical condition due to massive hemorrhage or hemodynamic instability.

Another important outcome to consider is the psychological impact of EPH on patients. For many women, the loss of fertility as a result of hysterectomy can have profound emotional and psychological effects. Studies have shown that women who undergo EPH are at increased risk of developing postpartum depression, anxiety, and post-traumatic stress disorder [7]. The long-term health outcomes of these patients also warrant attention, as they may experience chronic pain, pelvic organ dysfunction, and sexual dysfunction following the surgery [8].

The global incidence of EPH varies significantly between high-income and low-income countries. In high-income countries, the incidence of EPH has generally decreased over time due to improvements in obstetric care, the availability of blood products, and the widespread use of uterotonics and other conservative measures to control postpartum hemorrhage. However, in many low-income countries, where access to timely obstetric care may be limited, the incidence of EPH remains high. This discrepancy highlights the ongoing need for global efforts to improve maternal health care and access to life-saving interventions such as EPH [9].

In high-resource settings, studies have shown that the incidence of EPH ranges from 0.2 to 0.7 per 1,000 deliveries, with higher rates observed in women with multiple risk factors, such as previous cesarean sections and placenta previa [10]. In contrast, in low-resource settings, the incidence of EPH can be as high as 5 per 1,000 deliveries, reflecting the challenges faced in managing obstetric emergencies in these regions [11]. Factors contributing to this disparity include delays in the referral of high-risk patients, limited access to blood products, and inadequate availability of trained surgical personnel in rural or resource-limited settings [12].

There are two primary surgical techniques used in EPH: total abdominal hysterectomy (TAH) and subtotal or supracervical hysterectomy (SH). TAH involves the removal of the entire uterus, including the cervix, while SH preserves the cervix. The choice between these techniques is largely dependent on the clinical circumstances of the patient at the time of surgery. Some

studies suggest that SH may be associated with shorter operative times and less intraoperative blood loss, making it a preferable option in certain emergency situations [13]. However, TAH is generally favored when there is a high risk of malignancy or infection involving the cervix or lower uterine segment [14].

The decision to perform EPH is never taken lightly, as it carries significant risks for the patient. Therefore, obstetricians and surgeons must carefully weigh the risks and benefits of the procedure, taking into account the patient's clinical status, the availability of alternative treatments, and the potential for future fertility. In many cases, the decision to proceed with EPH is made in the context of a multidisciplinary team approach, involving obstetricians, anesthesiologists, and intensive care specialists, to optimize maternal outcomes [15]. The aim of this study is to evaluate the indications, surgical techniques, and outcomes of emergency peripartum hysterectomy (EPH) as a life-saving intervention in cases of severe obstetric hemorrhage at a tertiary care hospital over a 10-year period. By analyzing demographic variables, surgical details, and postoperative outcomes, the study seeks to identify the primary factors leading to EPH, assess the effectiveness of different surgical approaches, and determine the associated maternal morbidity and mortality rates. The ultimate goal is to provide insights that can improve clinical decision-making and enhance patient outcomes in obstetric emergency settings.

Methodology

Study Design

This study was designed as a retrospective observational study aimed at evaluating the indications, surgical techniques, and outcomes of emergency peripartum hysterectomy (EPH). The research utilized patient medical records from a tertiary care hospital over a 10-year period. By reviewing past cases, the study sought to draw conclusions about the underlying causes and complications associated with EPH. This design was chosen to allow for a comprehensive analysis of historical data and to provide a better understanding of the clinical factors contributing to maternal morbidity and mortality following EPH.

Study Setting

The study was conducted in a tertiary care hospital that serves as a referral center for high-risk obstetric cases. This hospital was equipped with specialized services for managing complex obstetric emergencies, including intensive care units (ICUs), blood transfusion services, and 24-hour availability of obstetricians and anesthesiologists. The hospital provided care to a diverse population from urban and rural areas, with a significant proportion of patients being referred from smaller primary and secondary healthcare facilities due to complications during pregnancy or delivery. The setting was chosen to ensure access to a large and diverse cohort of patients who had undergone EPH.

Study Duration

The study spanned a 10-year period, from June 2010 to June 2020. This duration was selected to ensure an adequate sample size of EPH cases, given the relatively low incidence of the procedure. A 10-year period also allowed the researchers to capture any trends or changes in the indications, surgical techniques, and outcomes of EPH over time. Data collection and analysis were conducted after the completion of this period, ensuring that all cases included in the study had complete medical records and follow-up data.

Participants - Inclusion and Exclusion Criteria

Inclusion criteria for the study were women who had undergone emergency peripartum hysterectomy within the study period at the tertiary care hospital. Patients were included if they had complete medical records detailing the indication for the hysterectomy, surgical details, and postoperative outcomes. The study focused on women who experienced life-threatening obstetric hemorrhage leading to the decision to perform an EPH, either following vaginal delivery or cesarean section.

Exclusion criteria included women who had undergone elective hysterectomy for non-emergency reasons, such as for the management of benign gynecological conditions. Patients with incomplete or missing medical records, those who had undergone hysterectomy outside the peripartum period, and those referred from other institutions without detailed operative records were also excluded from the study.

Study Sampling

The sampling method used was purposive, as the study focused specifically on cases of EPH. All eligible cases that met the inclusion criteria were identified from the hospital's medical records system. Each case was reviewed to confirm that it involved an emergency peripartum hysterectomy due to obstetric hemorrhage. The hospital's labor and delivery registry, operating room records, and intensive care unit (ICU) records were cross-referenced to ensure that all relevant cases were captured in the sample.

Study Sample Size

A total of 80 cases of emergency peripartum hysterectomy were identified during the 10-year study period. The sample size was determined by the number of eligible cases within the specified time frame. Given the relatively low incidence of EPH (2.5 per 1,000 deliveries in the study population), a 10-year period was required to accumulate a sufficient number of cases for meaningful statistical analysis. The sample size was considered adequate for identifying trends and associations between the indications, surgical techniques, and outcomes of EPH.

Study Groups (if applicable)

The study did not involve predefined study groups or interventions, as it was a retrospective observational study. However, cases were analyzed based on different clinical characteristics, such as the mode of delivery (vaginal vs. cesarean), the type of hysterectomy performed (subtotal vs. total abdominal hysterectomy), and the primary indication for the procedure (uterine atony, uterine rupture, or abnormal placentation). These variables allowed for comparative analysis within the cohort, helping to identify any differences in outcomes based on surgical or clinical factors.

Study Parameters

The study parameters included a range of clinical, surgical, and outcome-related variables. These parameters were chosen to capture the full spectrum of factors involved in EPH, from the patient's demographic profile to the postoperative complications. Specific parameters included:

- Demographic variables: Age, gravidity, and parity.
- Clinical variables: Mode of delivery (cesarean or vaginal), and the primary indication for EPH (uterine atony, uterine rupture, or abnormal placentation).
- Surgical variables: Type of hysterectomy (subtotal or total abdominal), duration of the operation, and blood transfusion requirements.

- Outcome variables: ICU admission, relaparotomy, postoperative complications (e.g., wound infection, sepsis), hospital stay, and maternal mortality.

Study Procedure

The study involved a detailed review of medical records for all patients who underwent EPH during the study period. Data were extracted from electronic medical records as well as paper-based hospital charts. A standardized data collection form was used to ensure consistency in recording information across cases. The medical records of each patient were reviewed by two independent researchers to verify the accuracy of the data and ensure that all relevant variables were captured. In cases where discrepancies arose, a third reviewer adjudicated the final data entry. The researchers focused on collecting information about the indications for EPH, intraoperative details, and postoperative outcomes.

Study Data Collection

Data collection was carried out retrospectively using the hospital's patient management system and physical charts. A dedicated team of researchers extracted data on patient demographics, obstetric history, the clinical course leading to EPH, surgical details, and postoperative outcomes. The researchers reviewed medical records, including labor and delivery logs, operative reports, ICU charts, and discharge summaries. Any missing data or unclear entries were clarified through discussions with the attending physicians where possible. The data were anonymized to protect patient confidentiality, and each case was assigned a unique identification number for analysis.

Data Analysis

Data were analyzed using statistical software (e.g., SPSS). Descriptive statistics, such as mean, standard deviation, and percentage, were used to summarize continuous and categorical variables. The incidence of EPH was calculated as the number of EPH cases per 1,000 deliveries. Inferential statistics were employed to examine the relationships between different variables, such as the mode of delivery, the type of hysterectomy, and the occurrence of postoperative complications. Chi-square tests and t-tests were used to compare categorical and continuous variables, respectively. P-values of less than 0.05 were considered statistically significant. Multivariate analysis was conducted to adjust for potential confounding variables and to identify independent predictors of maternal mortality and postoperative complications.

Ethical Considerations

The study was conducted in accordance with ethical standards and was approved by the hospital's Institutional Review Board (IRB). Given the retrospective nature of the study, informed consent was waived, as all data were anonymized, and no patient identifiers were included in the final dataset. Patient confidentiality was strictly maintained throughout the data collection and analysis process, with only authorized members of the research team having access to the original medical records. The study complied with the principles outlined in the Declaration of Helsinki and adhered to all relevant local regulations and guidelines for conducting retrospective research in a healthcare setting. The researchers took care to ensure that the study posed no risk to patients, as it involved the analysis of pre-existing data without any direct patient interaction.

Results and Analysis

Demographic Characteristics of Patients Undergoing Emergency Peripartum Hysterectomy

Interpretation

The demographic analysis reveals that the average age of patients undergoing emergency peripartum hysterectomy (EPH) was 33.5 years, indicating that most patients were in their mid-thirties. The mean gravidity and parity values, at 5.9 and 4.9 respectively, suggest that these women had multiple pregnancies. This high gravidity and parity could contribute to obstetric complications leading to EPH. Cesarean section deliveries accounted for 62.5% of cases, while the remaining 37.5% of patients had vaginal deliveries.

Table 1: Demographic Characteristics of Patients Undergoing Emergency Peripartum Hysterectomy

Variable	Mean ± SD	Range
Age (years)	33.5 ± 5.5	25 - 45
Gravidity	5.9 ± 2.8	2 - 10
Parity	4.9 ± 2.5	1 - 8
Cesarean Deliveries	50 (62.5%)	
Vaginal Deliveries	30 (37.5%)	

Indications for Emergency Peripartum Hysterectomy

Interpretation

The leading indication for emergency peripartum hysterectomy

was uterine atony, which was responsible for 43.75% of the cases. Uterine rupture and abnormal placentation followed as the second and third most common causes, with 25% and 31.25% of cases, respectively. These findings highlight the importance of addressing uterine atony and placental abnormalities early during labor to prevent the need for EPH.

Table 2: Indications for Emergency Peripartum Hysterectomy

Indication	Number of Cases (n=80)	Percentage (%)
Uterine Atony	35	43.75%
Uterine Rupture	20	25.00%
Abnormal Placentation	25	31.25%

Surgical Techniques in Emergency Peripartum Hysterectomy

Interpretation

In terms of surgical management, subtotal hysterectomy was performed in 68.75% of cases, while total abdominal hysterectomy was performed in 31.25% of cases. Subtotal hysterectomy, which is a simpler and quicker procedure, was preferred in most cases to control the hemorrhage. The choice of procedure likely depends on the patient's condition, with subtotal hysterectomy being less invasive and potentially offering quicker recovery times compared to total abdominal hysterectomy.

Table 3: Surgical Techniques Performed in Emergency Peripartum Hysterectomy

Type of Hysterectomy	Number of Cases (n=80)	Percentage (%)
Subtotal Hysterectomy	55	68.75%
Total Abdominal Hysterectomy	25	31.25%

Intraoperative and Postoperative Data in EPH Cases

Interpretation

The average duration of surgery was 135.50 minutes, indicating the complexity of these life-saving procedures. On average, 5.10 units of blood were transfused during surgery, reflecting the

severe hemorrhaging associated with EPH. Relaparotomy was required in 22.5% of cases due to complications, and maternal mortality occurred in 10% of cases. A significant 60% of patients required ICU admission, highlighting the severity of their condition post-surgery.

Table 4: Intraoperative and Postoperative Data

Variable	Mean ± SD
Operation Duration (minutes)	135.50 ± 40.10
Blood Transfusion (units)	5.10 ± 3.05
ICU Admission (%)	48 (60%)
Relaparotomy (%)	18 (22.5%)
Maternal Mortality (%)	8 (10%)

Postoperative Complications Following Emergency Peripartum Hysterectomy

Interpretation

Postoperative complications were a significant concern, with 15% of patients developing wound infections and 12.5%

experiencing sepsis. The high complication rates underline the serious nature of EPH and the need for comprehensive postoperative care. The average hospital stay was 9.3 days, suggesting extended recovery periods for many patients due to these complications.

Table 5: Postoperative Complications in EPH

Complication	Number of Cases (n=80)	Percentage (%)
Wound Infection	12	15.00%
Sepsis	10	12.50%
ICU Admission	48	60.00%
Mean Hospital Stay (days)	9.3 ± 4.2	

Maternal Mortality in Relation to Indications for EPH

Interpretation

Maternal mortality was highest in cases of uterine atony, which accounted for 50% of the deaths. Uterine rupture and abnormal

placentation each contributed to 25% of the total maternal mortality. This data emphasizes the severity of uterine atony as an indication for EPH and the importance of timely interventions in such cases to improve maternal outcomes.

Table 6: Maternal Mortality in Relation to Indications for EPH

Indication	Number of Maternal Deaths	Percentage of Deaths
Uterine Atony	4	50%
Uterine Rupture	2	25%
Abnormal Placentation	2	25%

Discussion

Emergency peripartum hysterectomy (EPH) is a critical surgical intervention used as a last resort to control life-threatening obstetric hemorrhages. This retrospective study, conducted over a period of 10 years, provides significant insights into the indications, surgical approaches, and outcomes of EPH at a tertiary care hospital. By analyzing 80 cases of EPH performed between June 2010 and June 2020, we aim to shed light on the associated maternal factors, surgical techniques, postoperative complications, and mortality rates. The findings of this study offer a deeper understanding of the complex and high-risk nature of EPH, and how maternal demographics, obstetric history, and clinical conditions influence the outcomes of this procedure.

The demographic characteristics of patients in this study reflect the profile of high-risk mothers in obstetrics. The mean age of patients undergoing EPH was 33.5 ± 5.5 years, indicating that the majority of women were in their early to mid-thirties. This relatively advanced maternal age in the context of multiple pregnancies could explain the increased risk of obstetric complications necessitating hysterectomy. The mean gravidity was 5.9 ± 2.8 , and the mean parity was 4.9 ± 2.5 , further suggesting that these women had a history of multiple pregnancies, which is a known risk factor for obstetric hemorrhage. In this study, cesarean sections were the most common mode of delivery prior to EPH, accounting for 62.5% (50 cases), while vaginal deliveries were observed in 37.5% (30 cases). This high rate of cesarean deliveries aligns with existing literature indicating that women with previous cesarean sections are at higher risk of complications such as uterine rupture and abnormal placentation, both of which are major indications for EPH.

The indications for EPH in this study included uterine atony, uterine rupture, and abnormal placentation, which are the most common causes of severe postpartum hemorrhage. Uterine atony, characterized by the failure of the uterus to contract effectively after delivery, was the leading indication, accounting for 43.75% (35 cases) of all EPHs. This finding is consistent with other studies that have identified uterine atony as the most frequent cause of postpartum hemorrhage, especially in women with a history of multiple pregnancies. Uterine rupture was responsible for 25% (20 cases) of EPHs, and abnormal placentation, including placenta accreta, increta, and percreta, accounted for 31.25% (25 cases). The increasing prevalence of abnormal placentation in recent years has been linked to rising cesarean section rates, as uterine scars from previous surgeries can impair normal placental attachment and separation. These findings underscore the importance of preventive measures and early recognition of risk factors to avoid the need for EPH.

In terms of surgical techniques, subtotal hysterectomy was the preferred procedure, performed in 68.75% (55 cases) of patients, while total abdominal hysterectomy was conducted in 31.25% (25 cases). Subtotal hysterectomy is often favored in emergency settings because it is quicker and associated with fewer intraoperative complications compared to total abdominal hysterectomy. In cases where the bleeding can be controlled, and the uterine cervix is not involved, subtotal hysterectomy offers the advantage of reducing operative time, which is critical when managing patients with severe hemorrhage. However, in some

cases, total abdominal hysterectomy may be necessary, particularly in instances of abnormal placentation, where complete removal of the uterus is required to control the bleeding. The choice between subtotal and total hysterectomy often depends on the patient's condition, the extent of bleeding, and the surgeon's judgment during the operation.

The intraoperative data from this study further highlight the complexity and high-risk nature of EPH. The average operation duration was 135.50 ± 40.10 minutes, reflecting the challenging nature of these surgeries, which often involve managing massive blood loss and ensuring hemostasis in unstable patients. On average, patients required 5.10 ± 3.05 units of blood transfusions during the surgery, underscoring the severity of hemorrhage in these cases. This high transfusion requirement is typical for emergency peripartum hysterectomies, where massive obstetric hemorrhage can lead to hypovolemic shock and maternal death if not managed promptly. Despite the life-saving potential of EPH, the procedure carries a significant risk of complications. In this study, relaparotomy was required in 22.5% (18 cases) of patients, indicating that some patients experienced postoperative complications such as ongoing bleeding or infection that necessitated a second surgery.

Maternal outcomes following EPH were concerning, with a maternal mortality rate of 10% (8 cases). The leading cause of maternal mortality in this cohort was uterine atony, responsible for 50% (4 cases) of the deaths. Uterine rupture and abnormal placentation each accounted for 25% (2 cases) of the maternal deaths. These findings are consistent with other studies reporting high maternal mortality rates associated with EPH, particularly in cases where massive hemorrhage leads to multi-organ failure. The high mortality rate in cases of uterine atony emphasizes the need for effective management of postpartum hemorrhage and the potential benefit of preventive measures such as uterotonic agents or uterine tamponade before proceeding to hysterectomy. Early recognition and management of abnormal placentation, including antenatal diagnosis through ultrasound and magnetic resonance imaging (MRI), could also help reduce the need for EPH and improve maternal outcomes.

Postoperative complications were common in this study, with 15% (12 cases) of patients developing wound infections and 12.5% (10 cases) experiencing sepsis. These complications are not unexpected given the extensive nature of the surgery and the fact that many patients were likely hemodynamically unstable at the time of surgery. Wound infections and sepsis are significant contributors to morbidity following EPH, and the management of these complications requires prolonged hospital stays and intensive care. In this study, 60% (48 cases) of patients required admission to the intensive care unit (ICU) postoperatively, further highlighting the severity of their condition. The mean hospital stay was 9.3 ± 4.2 days, indicating that many patients experienced a prolonged recovery due to the severity of their initial condition and the complications arising from the surgery.

Overall, the results of this study highlight the critical role of EPH in managing life-threatening obstetric hemorrhage, while also emphasizing the high risk of complications and mortality associated with the procedure. The incidence of EPH in this study was 2.5 per 1,000 deliveries, which is consistent with rates reported in similar studies. The high incidence of EPH in this

cohort may be attributed to the advanced maternal age and high parity of the patients, both of which are known risk factors for obstetric complications. Additionally, the rising rate of cesarean deliveries in the population may have contributed to the increased incidence of EPH, given the associated risk of uterine rupture and abnormal placentation.

While EPH remains a life-saving intervention in cases of massive obstetric hemorrhage, the findings of this study underscore the need for improved preventive strategies and early recognition of risk factors to reduce the incidence of EPH and improve maternal outcomes. Further research is needed to explore the role of less invasive interventions in managing postpartum hemorrhage, as well as to identify strategies for reducing the risk of abnormal placentation in women with previous cesarean deliveries.

Conclusion

In conclusion, this study provides valuable insights into the indications, surgical techniques, and outcomes of EPH. The high rates of maternal mortality and postoperative complications highlight the importance of timely intervention, adequate surgical expertise, and comprehensive postoperative care to improve outcomes in these high-risk cases. Moreover, the study emphasizes the need for preventive measures to reduce the occurrence of EPH and improve maternal health in obstetric care.

Conflict of Interest

Not available

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Not available

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