

Analysis of obstetric hysterectomy – A lifesaving procedure in challenging obstetric hemorrhages to reduce severe acute morbidity and mortality in a tertiary referral center.

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How to citation this article: Dr. Saraswathi A K, Dr. Puneetha V S, Dr. Vaishnavi P K, “Analysis of obstetric hysterectomy – A lifesaving procedure in challenging obstetric hemorrhages to reduce severe acute morbidity and mortality in a tertiary referral center”, IJMACR- October - 2023, Volume – 6, Issue - 5, P. No. 139 – 147.

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Type of Publication: Original research article

Conflicts of Interest: Nil

Abstract

Background: Obstetric hysterectomy (OH) is a significant procedure carried out when a life-threatening hemorrhage occurs during pregnancy or just after an abdominal or vaginal delivery. However, paucity in Indian data shedding light on the risk-factors, indications, outcomes and complications associated with OH is scarce. Additionally, the study attempts to plan protocols for management to reduce maternal mortality and morbidity. The study also aims to compare the outcomes of emergency and elective OH.

Materials and methods: This ambispective study of 118 OH was carried over a span of 3 years between January 2020 and May 2023 in the department of obstetrics and gynecology, KIMS-Hubballi, Karnataka. Sociodemographic details, obstetric history and various intra and postoperative data was captured. Descriptive statistics were applied.

Results: A total of 118 women underwent obstetric hysterectomy during the study period. Above 60% of the patients were multigravida with 55.9% who underwent LSCS in their previous delivery with >37 weeks of gestation. 48.3% of the patients had an indication of atonic PPH. The study revealed majority women underwent LSCS as primary mode of delivery. Most noted complications of OH included anemia (76.3%), DIC (26.3%). Following emergency OH, there were 15 maternal fatalities, but not after elective OH. Maternal mortality rate was 12.7% and 26.3% were intrauterine deaths or fresh stillbirths.

Conclusion: Abnormal placentation disorders are one of the major indications for OH, however prenatal diagnosis, anticipation of the risk factors, involvement of an experienced obstetrician at an early stage of management and a timely decision for hysterectomy help reduce the mortality and morbidity.

Keywords: Caesarean Section, Postpartum Hemorrhage, Abnormal Placentation, Subtotal Hysterectomy.

Introduction

The second most frequent surgical operation for women is a hysterectomy, following caesarean sections. Hysterectomies may be performed in emergency or elective obstetric or gynecological circumstances [1]. Obstetric hysterectomy (OH) is the removal of the uterus after a caesarean section (CS) or after a vaginal delivery (VD) or during the puerperium and it is often carried out when an obstetric hemorrhage poses a life-threatening risk, employed as a last-resort option [2]. It is considered only when all other management approaches, such as uterotonics, surgical, or interventional radiology techniques, have failed. It is crucial to avoid OH as much as possible because one of its characteristics is the choice between saving a life and compromising fertility. The World Health Organization (WHO) has consequently classified it as a maternal near-miss incident [3]. Life-threatening hemorrhage that is not responding to medical intervention, uterine rupture, abnormal placentation (placenta accreta), and sepsis are the most frequent reasons for the utilization of emergency OH.

The frequency of OH conducted worldwide is variable. This frequency is influenced by advanced maternal age, abnormal placentation, increased parity, and caesarean birth in a prior or ongoing pregnancy all affect frequency [4]. According to recent statistics, more obstetric hysterectomies may occur as a result of the increasing popularity of technologies for assisted reproduction [5]. Obstetric hysterectomy frequently results in intra-operative and post-operative bleeding that can cause hemorrhagic shock, fever, bladder and urinary tract injuries, widespread vascular damage, and septicemia [6].

We carried out the current study to gain insights about the risk factors, indications, associated complications of OH, we conducted the present study. We also aimed to mitigate management protocols to reduce maternal morbidity and mortality and potentially preventable hysterectomies. Additionally, comparison of outcomes of emergency and electively planned OH was another goal of this study.

Materials and methods

This ambispective study was conducted in Department of Obstetrics and Gynecology, Karnataka Institute of Medical Sciences, Hubballi after obtaining approval from the Institutional Ethics committee. Following the receipt of written informed consent, all the women who underwent hysterectomy for any indication during pregnancy, labor, and puerperium during the study period between January 2020 and May 2023 were included in the study.

The study team compiled various parameters for analysis which included:

- Socio-demographic characteristics (age, body-mass index, socioeconomic and educational status, associated comorbidities, booking of the pregnancy, referral status, time of admission)
- Obstetric history (gravida, diagnosis made during the patient admission)
- Previous clinical indicators (curettage, previous mode of delivery)
- Intra-operative patient status (hemoglobin levels, primary mode of delivery, mode of induction if any, type of anesthesia used, operative details of hysterectomy, amount of blood lost, and intraoperative procedure carried out to ensure reduced blood loss)

- Post-operative findings and outcomes (details of ICU care given, duration of hospital stay, status at discharge and mortality status, if)
- Details of the newborn (birth weight, status of the newborn)

Statistical analysis

The data was compiled in Microsoft Excel version 16.7 and analyzed with and analyzed in statistical software GraphPad InStat v3.0. Categorical variables were expressed as frequency and percentages. We represented the continuous variables as mean (Standard deviation) or median (Inter-quartile ranges).

Results

Between January 2020 and May 2023, 118 women underwent obstetric hysterectomy, including those who gave birth at hospitals other than the research location but were referred for further care.

Demographic details of the patients

The study team meticulously gathered the sociodemographic data that are provided in **table 1** in order to identify patients at risk and analyses the demographic variability in the patients. Most of the women who underwent obstetric hysterectomy at our institute belonged to age group of 20-25 years and majority of them were multigravida. Our center being tertiary referral center for adjacent 8 districts have 96/118 (81.3%) of referral cases. Out of which 93/118 (78.8%) are antenatal cases and 25/118 (12.2%) cases which who delivered outside and were referred in view of atonic postpartum hemorrhage, rupture uterus, retained placenta, hemoperitoneum etc and most of these patients were hemodynamically unstable with severe anemia with full blown disseminated intravascular coagulation.

Demographic variable	Category	Frequency (%)
M Age n (%)	< 20 years	1 (0.85)
	20-25 years	60 (50.8)
	26-29 ears	31 (26.3)
	>30 years	26 (22.03)
Body mass index in kg/m ² (Mean ± SD)	23.86 ± 2.46	
Education n (%)	Primary	13 (11)
	Middle	42 (35.6)
	High	56 (47.5)
	Graduate	4 (3.4)
	Post-graduate	3 (2.5)
Socioeconomic status n (%)	Lower	74 (62.7)
	Upper lower	0 (0)
	Lower middle	39 (33.1)
	Upper middle	5 (4.2)
	Upper	0 (0)
Booking of the pregnancy	Booked at our institution	15 (12.7)
	Booked at institution elsewhere	103 (87.3)
Referral at our centre n (%)	Yes	96 (81.3%)
	No	22 (18.6%)
At admission	Antenatal	93 (78.8)
	Postnatal	25 (21.2)
Condition at admission	Hemodynamically stable	68 (57%)
	Unstable at admission and required immediate resuscitation	30 (25%)
	Gasping	11 (9%)

Table 1: Demographic details of women included in the study.

Diagnosis At Admission	
Pre -eclampsia and related Complications Like:	80
▪ Placental Abruption	40
▪ Eclampsia	11
▪ HELLP	14
Abnormal Placentation	31
Uterine Rupture	8
Atonic PPH And traumatic PPH	23
Covid positive	3
Obstructed labor	2
Uterine inversion	2

Table 2: Diagnosis of patients admitted at KIMS who underwent obstetric hysterectomy.

Our center being a tertiary referral center, majority of women were diagnosed with pre-eclampsia at admission and associated complications like HELLP, placental abruption etc. leading to uterine atony.

Obstetric parameters

Out of the 93 antenatal women, 52/93 (55.9%) had gestational ages greater than 37 weeks. While 22/93 (23.6%) were between 34 and 37 weeks; 11/93 (11.8%) were between 28 and 34 weeks; the remaining antenatal women who underwent hysterectomy belonged to gestational age < 28 weeks. Most of the women who underwent peripartum hysterectomy for placenta accreta spectrum belonged to 34- 37 weeks of gestation.

Atonic postpartum hemorrhage (PPH) in 57/118 (48.3%) cases and placenta accreta in 31/118 (26.3%) cases were the major reasons to carry out the obstetric hysterectomy. Around 4 patients had broad ligament hematoma extending up to retroperitoneum and another patient who was referred in view of retained placenta with atonic PPH was initially taken up for manual removal of placenta but eventually ended up in peripartum hysterectomy had bicornuate uterus with cornuo-fundal implantation of placenta in right rudimentary horn. Due to profuse vaginal

bleeding, 7 patients who were under 28 weeks' gestation underwent hysterectomy for placenta accreta spectrum. The other indications why women <24 weeks gestational age underwent hysterectomy included cervical ectopic pregnancy with severe anemia and broad ligament ruptured ectopic pregnancy with massive broad ligament hematoma and massive hemoperitoneum, necrosis and auto amputation of uterus with fundal rupture of uterus with pyo-peritoneum who was post abortal day13 and had come with sepsis. The 118 cases represented in Figure 1 reflect the indications for obstetric hysterectomy.

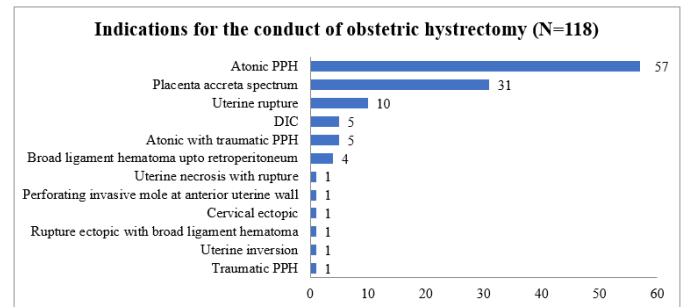


Figure 1: Indications for the conduct of Obstetric hysterectomy. [DIC: Disseminated intravascular coagulation; PPH: Postpartum hemorrhage]

Previous clinical indicators

According to the analysis of the obstetric history, 77/118 (65.25%) of the women were multigravida, 20/118 (16.95%) were gravida 2, and 21/118 (17.8%) were primigravida. One was gravida 10 with 9 abortions who had atonic PPH hence underwent peripartum hysterectomy.

Out of the 118 patients included 15 (12.7%) had a previous history of curettage. On analyzing the primary mode of delivery was by lower segment caesarean section (LSCS)- 64%, while 17% by under vaginal delivery, 7% by operative vaginal delivery and 6% underwent hysterotomy.

Mode of previous delivery	Number of prior deliveries	Frequency with percentage
Previous LSCS N= 66	Previous one LSCS	16 (24)
	Previous two LSCS	50 (76)
Previous vaginal delivery N= 31	Previous one vaginal delivery	8 (25)
	Previous 2 or more vaginal deliveries	23(74)

Table 3: Details of mode of previous delivery. [LSCS: Lower segment caesarean section]

Intraoperative findings

In the study, which highlighted the most common delivery methods among the 118 women who were surveyed, we discovered that the majority, or 75/118 (63%) of women, experienced LSCS. However, only 5/118 (4.2%) of the patients underwent a laparotomy. Other primary modes of delivery have been illustrated in figure 2. In 70 patients, no inducement of labor was used. The others, however, required oxytocin or misoprostol/dinoprostone induction.

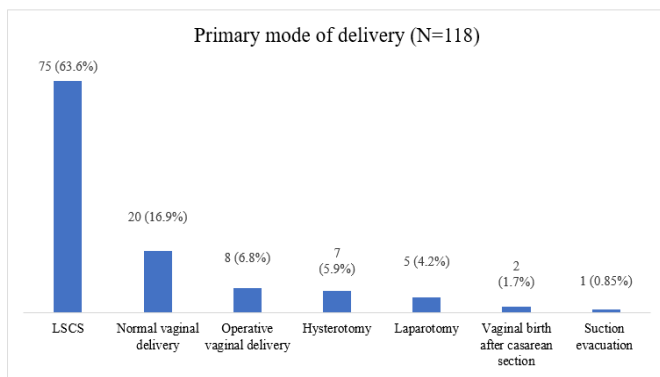


Figure 2: Primary mode of delivery in 118 patients. [LSCS: Lower segment caesarean section]

The objective of the study was to measure pre-operative hemoglobin levels. According to the study's findings, 6–8 mg% was present in around 48/118 (40.1%) of the study

participants. Only 37/118 (31.4%) people had hemoglobin levels more than 9 mg%. However, 33/118 (30%) had a level below 5 mg%. Four women were discovered to have hemoglobin levels 4 mg% after further investigation. This proved that most obstetric hysterectomy patients were hemodynamically unstable, necessitating a massive blood transfusion.

On approximately 106/118 (89%) patients, an emergency obstetric hysterectomy was carried out based on the patient's vitals, comorbidities, and clinical presentation. While the diagnosis of placenta accreta spectrum on prenatal ultrasound with doppler and MRI to look for invasion, led to the elective planning of the hysterectomy in 12/118(11%)of the patients. All patients who underwent elective hysterectomy procedures had adequate blood and blood products availed before the surgery. A classical cesarean was done, and the placenta was not separated and kept in situ followed by suturing of the incision site to reduce intra operative bleeding with bilateral internal iliac artery ligation and proceeding to hysterectomy in these cases with an aim to minimizing blood loss during or after surgery. 71/118 (60.2%) patients underwent obstetric hysterectomy immediately after the delivery i.e during the caesarean section or after vaginal delivery due to various causes like atonic PPH with failed medical management, persistent placental bed ooze in cases of placenta previa, massive broad ligament hematoma, placenta accreta spectrum invading the bladder or women who had frank DIC etc. Thirty, 30 of the 118 cases (25.4%) underwent hysterectomy within six hours of delivery either due to hemoperitoneum or atonic PPH not responding to conservative management or persistent hypotension etc. and some of these patients delivered outside and were referred for retained placenta, atonic PPH, hemorrhagic shock etc. and required

immediate resuscitation. However, 13 patients underwent hysterectomy between 6 and 12 hours after giving birth. After 12 hours following delivery, five hysterectomies were carried out.

In 23/75 (30.7%) of the 75 patients who delivered by caesarean section, a classical uterine incision was made away from the placental bed to avoid intra operative bleeding in cases of placenta previa- accreta spectrum group. Depending on the patient's condition, sub-arachnoid block and general anesthesia were utilized in approximately 62.7% (74/118) and 20.3% (24/118) of the patients, respectively. About 19 individuals who were first induced a subarachnoid block eventually switched to general anesthesia because of ongoing complications. With an aim to reduce the blood loss, several surgical measures were carried out prior to emergency hysterectomy.

Details of the surgical methods have been tabulated below in table 4.

Procedure done	Frequency (%) N=118
Bilateral uterine artery ligation	90 (76.3)
Internal iliac artery ligation	108 (91.5)
Global and funnel Compression sutures	69 (58.5)
Paracervical clamps	27 (22.9)
Hysterectomy alone	22 (18.6)
Bladder repair	8 (6.8)
Foley's tamponade	6 (5.08)
Vaginal exploration	3 (2.5)
Manual removal of placenta	2 (1.7)
Pelvic packing	2 (1.7)

Vaginal tamponade	2 (1.7)
Bowel repair	1 (0.8)
Utero-ovarian anastomosis	1 (0.8)
Right iliac vein repair	1 (0.8)

Table 4: Surgical management adopted to ensure reduced blood loss.

Depending on the surgeon's discretion and the clinical circumstances, total abdominal hysterectomy was performed in about 21/118 (17.8%) cases and the rest underwent subtotal hysterectomy. Most maternal deaths are due to limited availability of drugs and absent skills to manage PPH. Various techniques are practised in our institute like paracervical clamps, Foley's tamponade, prophylactic internal iliac artery ligation in cases of early DIC, funnel compression sutures for placental bed ooze in cases of placenta previa, pelvic pressure packing, global compression sutures, Hayman's and B lynch sutures, prophylactic vaginal packing etc have helped reduce blood loss.

Majority of 49/118 (41.5%) patients had a blood loss of 1000-1500mL. However, a massive blood loss >2000mL was noted in 12/118 (10.2%) patients and required massive blood transfusion.

Post-operative findings and outcomes

Most patients i.e., 82/118 (69.5%) were admitted in the hospital for a duration of less than 10 days. Mechanical ventilation was required 43/118 (36.4%) cases and inotropic support in 30/118 (25.4%) patients. Anemia (90/118), DIC (31/118), postoperative shock (20/118), and febrile morbidity (12/118) were the most prevalent post-operative maternal complications. A few complications, including as pulmonary oedema, acute kidney injury, sepsis, post-partum eclampsia, and peri partum cardiomyopathy, were noted in less than 10 cases. Serious complications included cardiac arrest (4/118);

intracranial bleed and posterior reversible encephalopathy syndrome (PRES) in 1 each.

Mortality was seen in 15/ 118 (12.7%) cases. The cause for death in 15 patients has been depicted in figure 4.

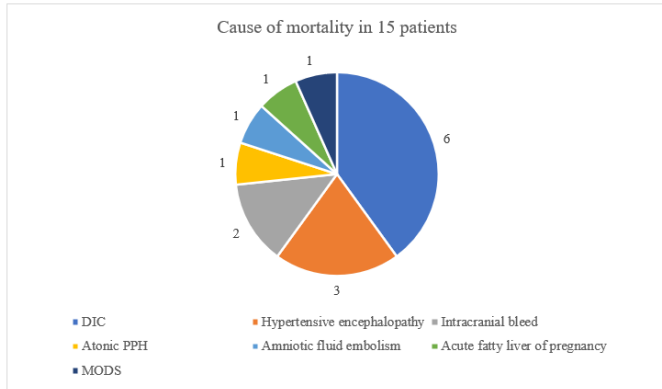


Figure 3: Cause of mortality in 15 patients. [DIC: Disseminated intravascular coagulation; MODS: Multiple organ dysfunction syndrome]

Our study clearly shows that planned, interdisciplinary approaches result in much lower perioperative morbidity and postoperative problems in elective patients than emergency hysterectomies. Comparison of elective and emergency obstetric hysterectomy is shown below in table 5.

	ELECTIVE	EMERGENCY
Most common indication of hysterectomy	Placenta accreta spectrum	Uterine atony
Blood loss	Reduced	Increased
Maternal outcome	No death	15 deaths
Duration of ICU stay	1 day	>10 days
Associated co morbidities	Reduced	Most commonly – preeclampsia
Post OP complications	Reduced	More

Table 5: Comparison of elective and emergency hysterectomy

Details of the new-born

Out of these 118 neonates delivered, 66/118 (55.9%) were alive and healthy. 4/118 (11.9%) of the neonates required critical care. 31/118 (26.3%) of the cases were intrauterine deaths or fresh stillbirths. 5.9%, or seven out of 118, were aborted. Nearly 48.3% (57/118) of the newborns were weighing between 2.5 and 3.5 kg, while 23.7% (28/118) were between 2 and 2.5 kg. Birthweight of >3.5kg was witnessed in just 4/118 (3.4%) babies.

Discussion

Obstetric hysterectomy is a life-saving emergency procedure for uncontrollable obstetric hemorrhage. In our study, majority of the patients belonged to the age-group between 20 and 25 years. More than half of the women who underwent hysterectomy had their gestational ages >37 weeks. The majority of the women involved in the study were multigravida. The findings were consistent with a number of earlier research that showed increasing parity as a risk factor for obstetric hysterectomy. This can be justified by the higher incidence of uterine atony that does not respond to medical therapy associated with the high parity [7]. It is crucial to educate women about the risks associated with increasing parity and encourage them to use suitable forms of contraception [8,9].

In the majority of cases, uterine surgery in the past in the form of LSCS had been identified, with two prior LSCS occurring in roughly 50 patients. The results were furthered by Bhat S et al study which highlighted a 33.33% risk of previous LSCS leading to obstetric hysterectomy [10]. The association between prior caesarean deliveries and abnormal placentation in subsequent pregnancies is amply demonstrated by this [11].

We identified that atonic PPH (48.3%) followed by placenta accreta (26.3%) as an important indication for obstetric hysterectomy. Worldwide, PPH continues to be an important factor contributing to maternal mortality and morbidity. Therefore, obstetric hysterectomy is carried out to manage the uncontrollable PPH [12]. In the past, uterine atony and rupture were the most frequent causes of hysterectomy. The increased occurrence of abnormal placentation caused by the paradigm shift in the caesarean section necessitated hysterectomy [13]. The results of the current study demonstrate the need of obstetricians paying close attention to women who are at a high risk of an abnormal placentation during their routine antenatal consultations.

The present study found that anemia, postoperative shock and DIC were the most prevalent outcomes of maternal morbidity related to obstetric hysterectomy. Postoperative shock, paralytic ileus, and fever were the most frequent complications in retrospective research conducted by Kanhere A and colleagues, which made similar conclusions [14].

Despite the availability of uterus-sparing surgical procedures and uterotonic medications, 89% of patients underwent an emergency hysterectomy. To avoid a hysterectomy in cases of severe PPH, additional time may be needed for performing conservative procedures like bilateral uterine artery ligation, which might lead to maternal morbidity, major blood loss, and the need for blood transfusions. So, in women who are hemodynamically unstable, obstetric hysterectomy is a life-saving procedure.

The maternal mortality rate was 12.7% attributed to the DIC, hypertensive encephalopathy. The study results were consistent with Kanhere A et al study and Siddiq et al [14,15].

The current study shed light on the comparison between elective versus emergency hysterectomy in a rapidly developing nation. The study reiterates the value of rapid decision-making, team management, and obstetricians receiving surgical skill training. Due to the design's ambispective nature, the team was able to collect data across a three-year period. The research has a limitation in that it only used data from one institution. For validation of our findings, prospective multi-centered cohort studies are recommended.

Conclusion

Obstetric hysterectomy is a lifesaving tool. Multiparity and increasing rate of caesarean sections has led to placenta accreta spectrum, which is the major indication for obstetric hysterectomies in recent times. Patients who underwent emergency obstetric hysterectomy for PPH had higher mortality rates when compared to those who underwent elective obstetric hysterectomy. However, with adequate care given to an antenatal woman, timely referral, early antenatal diagnosis of co-morbidities and abnormal placentation, multidisciplinary approach, surgical protocols and innovative techniques and ICU back can reduce the maternal and fetal morbidity and mortality enhancing the quality of life.

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