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Emergency Obstetric Hysterectomy: A Retrospective Study from a Teaching Hospital in North India over Eight Years

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ABSTRACT

Objectives: We sought to determine the frequency, demographic characteristics, indications, and feto-maternal outcomes associated with emergency peripartum hysterectomy in an easily accessible urban center. ***Methods:*** We conducted a retrospective, observational, and analytical study over a period of eight years, from August 2006 to July 2014. A total of 56 cases of emergency obstetric hysterectomy (EOH) were studied in the Department of Obstetrics and Gynecology, Kasturba Hospital, New Delhi. ***Results:*** The incidence of EOH in our study was 30 per 100,000 following vaginal delivery and 270 per 100,000 following cesarean section. The overall incidence was 83 per 100,000 deliveries. Atonic postpartum hemorrhage (25%) was the most common indication followed by placenta accreta (21%) and uterine rupture (17.5%). The most frequent sequelae were febrile morbidity (19.2%) and disseminated intravascular coagulation (13.5%). Maternal mortality was 17.7% whereas perinatal mortality was 37.5%. ***Conclusions:*** A balanced approach to EOH can prove to be lifesaving at times when conservative surgical modalities fail and interventional radiology is not immediately available. Our study highlights the place of extirpative surgery in modern obstetrics in the face of rising rates of cesarean section and multiple pregnancies particularly in urban settings in developing countries.

Emergency obstetric hysterectomy (EOH) is defined as extirpation of the uterus either at the time of cesarean section or following vaginal delivery, or within the puerperium period. It is usually performed in the face of unrelenting and life-threatening obstetric hemorrhage. A near miss event is defined as a woman who nearly died but survived a complication that occurred during pregnancy, childbirth, or within 42 days of termination of pregnancy.[1] EOH can be rightly classified as a near miss event. It is important to study such events since they provide an insight into the standard of care provided and help to reduce maternal morbidity and mortality.

Conservative methods such as community-based use of misoprostol, oxytocin in the prefilled auto-disable drug delivery systems, condom catheter balloon, and non-inflatable anti-shock garments for the management of hypovolemic shock have all been advocated to effectively manage obstetric hemorrhage in low resource settings.[2] Advances in interventional radiology have also provided the option of uterine artery embolization.[3,4]

While this does seem encouraging, with regard to clinical implications, hemorrhage continues to be the leading individual cause of maternal death worldwide accounting for 27.1% of deaths as recently as 2014.[5] In this analysis, India and Nigeria together accounted for a third of global maternal deaths.[5] More alarming is the fact that some studies from developed nations are pointing towards an increase in the rate of postpartum hemorrhage.[6] One meta-analysis reported an annual increase of 8% in the incidence of EOH around the world.[7]

We aimed to evaluate the incidence, indications, and feto-maternal complications associated with EOH in the setting of an equipped 450-bed postgraduate teaching hospital in New Delhi.

METHODS

This was a retrospective, observational, analytical study of parturient women requiring EOH/emergency peripartum hysterectomy (EPH). We looked at data over an eight-year period, from August 2006 to July 2014 from the Department of

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EPH was defined as hysterectomy performed for hemorrhage unresponsive to other therapeutic interventions, at the time of cesarean section or vaginal delivery, or within puerperium. Inclusion criteria included all women who delivered in the hospital between August 2006 and July 2014 after 24 weeks of gestation, and who underwent hysterectomy for obstetric indications at the time of delivery or subsequently within the defined period of puerperium (42 days). All women who delivered outside the hospital and were referred for obstetric complications meriting a hysterectomy and fulfilling all the above conditions were also included in the study. Women who delivered before 24 weeks of gestation, undergoing hysterectomy for indications other than obstetric, or outside the stipulated time of 42 days post-delivery were excluded from the study. After collecting relevant data from the operation theatre records, each patients case record was scrutinized with regard to incidence, age, parity, antenatal high risk factors, indications, hysterectomy type, and complications, along with the ultimate feto-maternal outcome. Institutional ethical committee approval was obtained for the study.

RESULTS

Out of 67,572 deliveries, the incidence of obstetric hysterectomy in our study was 0.030% (30 hysterectomies per 100,000 deliveries) following vaginal delivery, and 0.27% (270 hysterectomies per 100,000 deliveries) following cesarean section. The overall incidence was 0.083% (83 hysterectomies per 100,000 deliveries). Table 1 shows the association of cesarean section with EOH. The cesarean section rate during the study period was 17%.

The youngest woman to undergo hysterectomy was 20 years old and the oldest was aged 38 years. Women in the 20 to 30 year-old age group constituted over 70% of cases, and 82% of cases were multiparous [Table 2].

Of the 56 cases of EOH studied, 92% of deliveries were institutional where as 8% of patients delivered outside the hospital and were later referred for further management. Atony, morbidly adherent placenta, and uterine rupture were the three chief indications for the procedure[Table 3]. Atonic postpartum hemorrhage was the indication for EOH in 14 cases.

Table 1: Incidence of emergency obstetric hysterectomies (EOH) following vaginal delivery and cesarean section.

	Number of patients	EOH	Incidence (%)
Normal vaginal delivery	52935	16	0.030
Cesarean section	14637	40	0.270
Total	67572	56	0.083

Atony was associated with previous cesarean in five cases, with sepsis, anemia or obstructed labor in three cases each, with a distended uterus as in multiple pregnancy or polyhydramnios in two cases each, and with placental causes in two cases.

Morbidly adherent placenta was the indication for EOH in 12 cases and was associated with one or more cesarean sections previously in 11 cases, previous curettage in four cases, placenta previa in three cases, and with a history of manual removal of the placenta and fibroid uterus in one case each. More than one factor was associated in many cases, for example, one woman had history of one prior cesarean and one prior curettage. In the index pregnancy, she had placenta previa and morbidly adherent placenta. Two other women had a history of one prior cesarean and one prior curettage. One of

Table 2: Age and parity distribution of women included in the study.

Age (years)	Parity					
	P1	P2	P3	P4	≥P5	Total
20–25	7	10	3	0	0	20
25–30	2	4	12	2	0	20
30–35	1	2	3	1	2	9
35–40	0	0	3	3	1	7
Total	10	16	21	6	3	56

Table 3: Indications of emergency obstetric hysterectomy in the study population.

Indication	Number	Percentage (%)
Atonic postpartum hemorrhage	14	25.0
Morbidly adherent placenta	12	21.4
Uterine rupture	10	17.9
Abruptio placentae	9	16.1
Placenta previa	5	8.9
Other*	6	10.7
Total	56	100.0

**Two cases of broad ligament hematoma; two cases of extensive extension of uterine scar; one case of fibroid uterus; and one case of sepsis.*

Table 4: Feto-maternal complications (n=56).

Complications	Number	Percentage (%)
Maternal		
Fever	14	25.0
Coagulopathy	7	12.5
Wound sepsis	6	10.7
Relaparotomy	2	3.6
Need for vasopressors	19	33.9
ICU admission	20	35.7
Mortality	10	17.9
Fetal		
NICU admission	10	17.9
Mortality	16	28.6

Table 5: Use of vassopressors.

Vasopressors	Number	Percentage (%)
Single agent	13	23.2
Multiple agent	6	10.7
Total	19	33.9

our subjects had one earlier cesarean birth and had undergone curettage twice. A fourth woman had a history of one previous cesarean and had multiple fibroids (submucous and subserous) during her present pregnancy.

Uterine rupture led to hysterectomy in 10 instances. It was associated with previous cesarean in six cases and with grand multiparity, prolonged labor, sepsis and multifetal gestation in one case each.

Only 15% of cases underwent total hysterectomy in our study. In the remaining 85% sub-total hysterectomy was performed. Total hysterectomy was performed mainly for cases of low-lying placenta, adherent or otherwise, where removal of the cervix was considered mandatory for complete hemostasis.

Three cases (5.7%) were performed following manual removal of the placenta. Bilateral uterine and ovarian artery ligation was performed in eight cases (14.3%). B-Lynch sutures were applied in 10 cases (17.9%). Uterine packing or tamponade was employed in eight cases (14.3%). Cervical, vaginal, or paraurethral tears were stitched in three cases (5.7%).

Table 4 shows the incidence of feto-maternal complications vasopressor drugs. Nineteen cases experienced resistant hypotension and were managed with single or multiple agent vasopressor drugs as per intensive care unit (ICU) protocols [Table 5].

Dopamine was used as the first-line agent to manage shock. Adrenaline or noradrenaline infusion was added at the discretion of the anesthetist whenever required. Patients received transfusion of blood and blood products, as per requirement, ranging from one to 18 units, with an average of six units [Table 6]. Hospital stay ranged from six hours to 28 days. ICU stay ranged from 1.5 hours to six days. Nearly 18% of neonates were admitted to the neonatal intensive care unit (NICU). Neonatal mortality in this study was 28.5%.

DISCUSSION

Storer performed the first cesarean hysterectomy in the United States in 1869.[8] Soon thereafter, Porro of Milan described the first cesarean hysterectomy in which the infant and mother survived. As a mark of honor, the procedure is frequently referred to as the Porro operation.[8]

Cesarean hysterectomy traditionally is classified as elective for the management of incidental diseases like cervical intraepithelial neoplasia (CIN), or for

Table 6: Total transfusion of blood products.

Indication	Number	Packed cell units Total (average+)	Fresh frozen plasma units Total (average+)	Platelets units* Total (average+)
Atony	14	57 (4.1)	42 (3)	
Morbidly adherent placenta	12	40 (3.3)	28 (2.3)	
Uterine rupture	10	29 (2.9)	11 (1.1)	
Abruptio	9	38 (4.2)	34 (3.8)	12 (1.3)
Placenta previa	5	15 (3)	3 (0.6)	
Other	6	20 (3.3)	12 (2)	
Total	56	199 (3.5)	130 (2.3)	12(0.2)

Only two patients of Abruptio placentae received platelet concentrates (six units each).
+Average number of units transfused per patient, for a given indication.

the purpose of sterilization, and in cases of emergency to control intractable hemorrhage. With changes in practice in the light of modern evidence, the former two indications seem to have lost relevance. However, there has been an upsurge in cases of postpartum hemorrhage requiring hysterectomy[9] primarily due to the changed settings in which postpartum hemorrhage presents itself in modern obstetrics. Despite wider availability of contraceptives and abortion services, and reduced family size the world over, there has been a consistent rise in the rates of cesarean section attributable, in part, to patient preferences and medico-legal implications on medical fraternity. Additionally, advances in anesthesia, blood bank facilities, and intensive care back-up have made it a safer and painless alternative to labor. This has not only given rise to a surge in complications like abnormal placentation and uterine rupture, but also in the incidence of atonic postpartum hemorrhage. This is why EOH has become increasingly relevant in modern obstetric practice. An analysis of patient discharge notes in Canada has revealed a rise in the rate of postpartum hemorrhage necessitating hysterectomy.[9]

The incidence of EOH in our study was 0.08%, which is similar to that reported from Columbia[10] (0.08%) and the US[11] (0.06%). It is considerably lower than that reported in Nigeria[12] (0.51%), China[13] (0.22%), Pakistan[14] (0.27%), and another study from India[15] (0.52%). This can be attributed to the fact that our study looked at a centrally located urban center, which caters to a higher proportion of booked cases with institutional deliveries rather than referred cases.

The greater association of EOH with cesarean delivery compared to normal vaginal delivery in our study (0.27% vs. 0.026%) is similar to studies from China[13] (90.1% vs. 6.5%), Turkey[16] (0.078% vs. 0.016%), and another from India[15] (0.79% vs. 0.24%). This apparently obvious association has socially relevant implications. Improving general awareness regarding the long-term morbidity associated with cesarean sections can help reduce requests of 'section on demand' and may prove lifesaving for many women in the long run.

A very important observation was the prominent association of prior cesarean delivery with the three major indications of EOH. History of prior caesarean section was associated with atony in 41.6% of cases, with morbidly adherent placenta in 81% of cases, and with uterine rupture in 56% of cases. It may be prudent to emphasize here that morbidly adherent placenta was associated with a previous cesarean section in 36% of cases and with two previous cesareans in 45% of cases. Bateman et al,[17] also found that the rate of EOH for atony increased four-fold following repeat cesarean section, 2.5-fold following primary cesarean section, and 1.5-fold following primary vaginal delivery over a period of 14 years. There, in fact, seems much to be gained from reducing the primary cesarean rate in obstetric practice.

The most common indication of EOH in our study was uterine atony (25%) followed by morbidly adherent placenta (21%) and uterine rupture (17%). This reflects the situation in most developing countries where atony accounts for the majority of cases of EOH, but also shows a rising contribution of placental causes, which is replicating the trend in the developed world. Studies from other tertiary care centers in India,[15] the UK,[18] and Turkey[16] also revealed atonic postpartum hemorrhage to be the most common indication for EOH.

In our case, morbidly adherent placenta was the second most common indication for EOH. This was also the case in Turkey[16] and the UK[18], contributing to 40% and 38% of cases, respectively.

A total of 17.3% of cases underwent hysterectomy for uterine rupture, 55% of these had a scarred uterus. Uterine rupture leads to EOH in 8% of cases in the UK,[18] and close to 17% in Turkey, which is similar to our study. However, statistics reported from Nigeria gave figures of 93.2% for uterine rupture, 2.7% for atonic postpartum hemorrhage, 2.7% for puerperal sepsis, and 1.4% for morbidly adherent placenta. In Nigeria spiritual churches are a common first center for delivery. Prolonged labor, owing to late referral from these places is responsible for the high proportion of cases of uterine rupture.[19] Korejo et al,[14] from Pakistan, recently reported that 47.1% of cases were the result of uterine rupture, 28.9% from atony, and 17.4% from placental causes. Of all the cases of uterine rupture, 74% had an unscarred uterus.

Eight percent of atony cases and 11% of uterine rupture cases were associated with multiple gestation in our study. A study from the US concluded that higher-order births are associated with a 24-fold increase in the incidence of emergency hysterectomy. Uterine distension, use of tocolysis to avert preterm

labor, and placental causes have been postulated to be responsible for this increase.[20] Walker et al,[21] from Canada have also reported a similar association. However, a study by Bodelon et al,[11] did not find a positive correlation.

In China, over half the cases operated needed intensive care.[13] In our study, approximately 36% of parturients and 18% of neonates were admitted into the ICU. Vasopressors were needed for resuscitation in 26.2% cases in China[13], which was close to our result of 33.9%.

Barring the need for vasopressors, intra- or postoperatively, febrile morbidity was the most common complication in our study and others.[13,15]

Complication due to coagulopathy was variable (6% to 37%) in all case of EOH in various publications: 12.5% of our cases experienced disseminated intravascular coagulation DIC.

Almost one fifth of cases (19.6%) underwent a re-exploration and further surgery to arrest hemorrhage in one study from the UK[18]and 12.5% of cases in a study from Hong Kong.[22] In our study, the incidence was 3.6%. Damage to the urinary tract was one of the chief indications for re-exploration in a study from the UK where injury to the ureter or bladder was more commonly encountered in cases of morbidly adherent placenta (38%). The lesser need for repeat surgery in our study could be attributed to the fact that we had no cases of urinary tract injury or fistula formation. Incidence of urinary tract injury in studies from the UK[18], Nigeria[19], China[13], and another center from India[15] were 12.2%, 3.6%, 4.1%, and 7.93%, respectively. This difference can be explained by the fact that 85% of our patients underwent a subtotal procedure. Many reports and guidelines have advocated the preference for subtotal hysterectomy over total hysterectomy since it offers the advantage of less blood loss, fewer instances of damage to the urinary tract, and takes less time to complete in the face of hemodynamic compromise/instability.[23,24] However, in cases of morbidly adherent placenta total hysterectomy may prove more beneficial as removal of the cervix leads to better hemostasis.[25] In our study, eight cases underwent total hysterectomy. Seven of these cases were those of morbidly adherent, low lying placenta and one case was of uterine rupture.

Maternal mortality in our series is towards the higher end of the range when compared to other countries. The figures from different parts of the world range from 7% to 17%. We reported a slightly higher value of 17.9%. This could probably be explained by the fact that many other studies from single centers have less total deliveries per year. We have reported from a pool of 67,572 child births whereas many other single center studies have reported on fewer number of subjects (e.g. 31,767[15] and 44,612[14]).

Our study had a few limitations, including data collection from a single center. Options like internal iliac ligation may in some cases remove the need for hysterectomy. Nevertheless, the strength is that we have reported the facts in the setting of a rapidly developing country with easy hospital access, booked cases, and institutional deliveries.

CONCLUSION

EOH is a necessary evil in obstetrics. Although it curtails the future child bearing potential of the woman, in many cases it saves the life of the mother. Most of its morbidity is attributable to its indications and underlying disorders rather than to the procedure itself. Training postgraduate trainees in this rare skill can prove lifesaving in situations where expertise or facilities for newer modalities of management, such as uterine artery embolization, do not exist, or fail. Rising rates of cesarean section and multiple pregnancies are bound to increase the incidence of EOH in the future.

Disclosure
The authors declared no conflict of interests.

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