Emergency peripartum hysterectomy – a challenge or an obstetrical defeat?

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Abstract

OBJECTIVES: Peripartum hysterectomy remains an obstetric nightmare. Most obstetricians consider it a defeat. The aim of our study was to assess the prevalence, indications, procedures and complications of emergency peripartum hysterectomy (EPH) in the 2nd Department of Obstetrics & Gynecology, Medical University of Warsaw during a 7 year period (2007-2013).
METHODS: A retrospective evaluation of 21,144 deliveries was performed. We analyzed all cases of EPH, including the maternal characteristics, obstetrical history, course of pregnancy and delivery, type of surgery and complications.
RESULTS: Nineteen peripartum hysterectomies were performed between January 1, 2007 and October 30, 2013 (0.9/1000), including 16 EPH (0.76/1000). The rate of EPH was between 0.66 and 1.0 per 1000 deliveries. The majority of the patients were multiparous (79.0%), and EPH was performed after at least one cesarean section (75.0%). Fifteen women had a singleton pregnancy and one woman had a triplet pregnancy. The mean gestational age was 34.2 weeks. The delivery mode was cesarean section in 93.8% of the cases. The most common reason for peripartum hemorrhage and the indication for EPH was abnormal placentation (75.0%). All patients underwent a total hysterectomy, including 43.8% during the same operation and 50.0% during a reoperation. There was no maternal death. The serious maternal complication rates were relatively low in our study and included one case of cardiac arrest that required cardiopulmonary resuscitation and one case of sepsis with pulmonary embolism.
CONCLUSIONS: EPH is typically performed as a result of massive hemorrhage associated with abnormal placentation, and it should be treated as a challenging, life-saving procedure.

ORIGINAL ARTICLE

INTRODUCTION

Peripartum hysterectomy is defined as the removal of the uterus in advanced pregnancy in the course or directly after labor or cesarean section (Poręba, 2012). Peripartum hysterectomy is a dramatic event not only because of the gravity of the overall condition of the bleeding patient but also because of the emotional burden to operators who will deprive the patient of chances to have future offspring. An additional difficulty results from the gestational or peripartum anatomical changes of the genital organ. The decision to perform a peripartum hysterectomy should be made by a team of obstetricians who attend the patient and after all possible means of uterus conservation have been attempted, including the administration of contraction inducing drugs, tamponade of the cavity, B-Lynch suture placement, embolization or ligation of the iliac vessels. The surgery should be performed by the most experienced member of the surgical team (Poręba, 2008).

Depending on the clinic's order of reference, the incidence of peripartum hysterectomy procedures ranges from 0.2 to 2.8 per 1000 deliveries and is increased at more specialized sites (Akar *et al.* 2004; Imudia *et al.* 2010; Sakse *et al.* 2004; Zetero glu *et al.* 2005). The most common risk factors include: multiparity (history of more than 3 deliveries), a history of cesarean section, manual removal of the placenta, enucleation of myomas, a maternal age greater than 35 years, multifetal pregnancy, placenta previa and placenta increta (Knight, 2007).

Peripartum hysterectomy is typically performed as an emergency indication in cases of improper placental implantation or premature placental separation, atonic hemorrhage, uterine inversion, placenta previa, uterine rupture, a growing hemorrhage within the pelvis minor, or infections (uterine muscle abscesses or generalized infection that originates from the uterine mucosa) (Poręba, 2012; Kwee *et al.* 2006). The non-emergency indications include malignant tumors (endometrial cancer, ovarian cancer, or sarcomas) and, at some centers, large uterine myomas (adversely located, necrotic)

(Poręba, 2012). Authors of English-language publications have also reported postpartum hysterectomy to be an elective indication in cases of multiple cesarean sections, a willingness to become sterilized, and gynecological disorders (endometriosis, pelvis minor adhesions, or abundant and painful menstruation) (Bakshi & Meyer, 2000; Yamasmit & Chithngwongwathana, 2009; Jagielska *et al.* 2014; Flodd, 2009).

There are two techniques for performing a peripartum hysterectomy: supracervical removal of the uterine body and total hysterectomy. The advantages of supracervical hysterectomy include shorter operation times, an ability to limit heavy bleeding and a reduced risk of damage to the ureters and urinary bladder. However, the method does not warrant complete stoppage of bleeding when the remaining cervical stump is an obstacle to the convenient management of parauterine hematoma (Poręba, 2012).

The most commonly reported complications of peripartum hysterectomy include intravascular coagulation syndrome in the course of the hemorrhage, urological complications, hematoma within the vaginal apex, infections (of the wound or urinary tract), thrombophlebitis, or pneumonia (Poręba, 2012). The less common complications include delayed vesicovaginal, ureterovaginal, or rectovaginal fistulas. The peripartum mortality of mothers subjected to hysterectomy is in the range of 0-16% (Zeteroglu, 2005; Chen *et al.* 2013; Yucel *et al.* 2006).

The objective of this study was to analyze the causes, frequency, perioperative management and complications of peripartum hysterectomy performed as an emergency indication at the 2nd Department of Obstetrics & Gynecology of the Medical University of Warsaw during the years 2007-2013.

MATERIALS AND METHODS

A retrospective analysis was performed on 21,144 deliveries that occurred between January 1, 2007 and October 30, 2013. The study investigated the characteristics of the patient population that underwent peripartum hysterectomy as an emergency indication, including

Table 1. Frequency of peripartum hysterectomy

Year	Number of deliveries	Cesarean section rate (%)	Number of emergency hysterectomies	Emergency hysterectomy rate (per 1000 deliveries)
2007	3050	30.62	2 (2)	0.66
2008	2972	31.86	2 (2)	0.67
2009	3063	33.43	4 (3)	0.98
2010	3227	36.01	2 (2)	0.62
2011	2997	38.44	5 (3)	1.00
2012	2979	39.64	2 (2)	0.67
2013	2856	40.70	2 (2)	0.70
All	21144	35.60	19 (16)	0.76

Table 2. Obstetric history of the women who underwent an emergency peripartum hysterectomy

Obstetric history	n (%)
Primiparas	3 (19,0%)
Multiparas	13 (79,0%)
Number of previous deliveries:	
0	3 (18.8%)
1	8 (50.0%)
>1	5 (31.2%)
Previous cesarean section:	12 (75.0%)
1 cesarean section	8 (66.0%)
2 cesarean sections	2 (17.0%)
3 cesarean sections	2 (17.0%)

Table 3. Indications for cesarean section in women who underwent an emergency peripartum hysterectomy

Indications	n (%)
Elective:	9 (60.0%)
Placenta previa:	
during first pregnancy	7 (77.8%)
history of one cesarean section	2 (22.0%)
history of two cesarean sections	3 (34.0%)
history of three cesarean sections	1 (11.0%)
Abnormal implantation (ultrasound) and	1 (11.0%)
history of one cesarean section	1 (11.0%)
Triplet pregnancy	1 (11.0%)
Emergency:	6 (40.0%)
Prolonged second stage of labor	1 (16.7%)
Transverse position during delivery	1 (16.7%)
Vaginal bleeding (and placenta previa)	3 (49.9%)
Suspicion of cesarean section scar defect	1 (16.7%)

Table 5. Perioperative complications of emergency peripartum hysterectomy

Complications	n (%) mean [min-max]
Reoperations as a result of bleeding:	
Peritoneal	5 (31.3%)
Vaginal	3 (18.8%)
Admission to ICU	3 (18.8%)
Sepsis	1 (6.3%)
Pulmonary embolism	1 (6.3%)
Blood transfusion shock	1 (6.3%)
Bladder injury	2 (12.5%)
Iliac artery ligation following hysterectomy	2 (12.5%)
Thromboembolic complications	2 (12.5%)
Wound dehiscence	1 (6.3%)
Abdominal wound hematoma evacuation	1 (6.3%)
Heart arrest during operation	1 (6.3%)
Mortality	0
Mean length of postoperative hospital stay (days)	12.7 [4-45]

Table 4. Data regarding the neonates (n=17) of the mothers who underwent an emergency peripartum hysterectomy

Neonatal data	n (%) mean [min-max]
5th minute Apgar score	
1 - 3 points	1 (5.9%)
4 - 7 points	3 (17.6%)
8 - 10 points	13 (76.5%)
Birth weight (g)	2647.1 [800 – 3820]
Premature infants	9 (52.9%)
Respiratory disorders	7 (41.2%)
Admission to NICU*	6 (35.3%)
Heart defects	2 (11.8%)
Anemia	2 (11.8%)
Mean length of hospital stay (days)	17.3 [5 – 57]

NICU* - Neonatal Intensive Care Unit

the patient age, body weight, obstetric history, natural history of pregnancy and delivery, type of hysterectomy and postoperative complications.

Nineteen peripartum hysterectomy surgeries were performed (0.9/1000). In 16 cases, the surgery was performed as an emergency indication (0.76/1000); the remaining three surgeries were performed for oncological reasons (endometrial cancer in 2 patients and ovarian cancer in 1 patient). The annual rate of emergency peripartum hysterectomies in the years 2007–2013 ranged between 0.66 and 1.0 (*Table 1*). The obstetric history of the patients is presented in *Table 2*.

RESULTS

The patients who underwent a peripartum hysterectomy as an emergency indication were characterized by an average age of 33.3 years (25–41), an average pre-

pregnancy body weight of 63.1 kg (50–95 kg), an average pre-pregnancy body mass index (BMI) of 23.1 kg/m2 (17–39 kg/m2), and a mean gestational body weight gain of 11.5 kg (0–25 kg).

Fifteen patients were pregnant with singlets; the sixteenth case was a triplet pregnancy. The mean gestational age at delivery was 34.2 weeks (22–40 weeks). Eleven deliveries (69%) occurred prior to the end of week 37. A peripartum hysterectomy post spontaneous vaginal delivery was performed at gestation week 22 in one patient with amniotic fluid leakage, which began in week 17. The patient was informed of the potential pregnancy complications and did not agree to terminate the pregnancy; the delivery was spontaneously initiated in the course of developing an infection.

Nearly 70% of the patients were hospitalized for placenta previa; 56% of the patients experienced an episode of genital bleeding in the second half of gestation;

19% of the patients were suspected of placenta increta (based on ultrasound scans); and 44% of the patients required tocolytic treatment because of the risk of pre-term birth.

Only one of the women subjected to peripartum hysterectomy gave birth via natural labor (6.2%); the remaining patients were subjected to cesarean section (93.8%), most often because of placenta previa (*Table 3*). Most patients (68.8%) were under general anesthesia during the cesarean section.

Most (72.0%) neonates born from the mothers who required an emergency peripartum hysterectomy were born in good overall condition. Data regarding the neonates are presented in *Table 4*. One peripartum death occurred in a baby born in gestation week 22, with a gestational body weight of 300 g (data not included in the table).

In 7 cases, a postpartum hysterectomy was performed immediately after the cesarean section during a single operation (46.7%). In 8 cases, the decision to resort to a hysterectomy was made after the cesarean section and suturing of the integuments; thus, a postpartum hysterectomy was performed in a reoperation setting (53.3%). The mean time between the completion of the cesarean section and the reoperation was 95 minutes (15 to 240 minutes). The surgeries were performed because of life-threatening hemorrhages. The decision to resect the uterus was made by the most experienced member of the team, which was most often the team leader, after all other methods to terminate the bleeding had failed. In most cases, the surgery involved a total hysterectomy, excluding the adnexae.

The most common (12 cases, i.e., 75.0%) cause of perioperative bleeding and the indication for hysterectomy was improper implantation of the placenta, which was confirmed by histopathology, including 8 patients (50%) with improper placental implantation in the central placenta previa, and 4 patients (25%) with improper implantation of the placenta that was properly aligned. The remaining indications for a postpartum hysterectomy included placenta previa without improper implantation in 2 cases (12.5%), uterine rupture with extraperitoneal hemorrhage in the course of the cesarean section in the second phase of delivery in 1 case (6.25%) and uterine atony following a triplet birth in 1 case (6.25%).

The mean estimated loss of blood until the decision to remove the uterus was 2950 mL (1500-4000 mL). Uterine tamponade was performed in 8 patients (50.0%) prior to the hysterectomy; a B-Lynch suture was placed in 2 patients (12.5%). Ligation of the iliac arteries was performed in two cases following the hysterectomy procedure because of intra-abdominal bleeding. All patients required transfers of packed red blood cells (PRBCs) and freshly frozen plasma (FFP); 43.8% of the patients received cryoprecipitate, and 1 patient received platelet concentrate. On average, each patient received 10 units of PRBCs (2-28) and 8.8 units of FFP (2–30). Active factor VII (Novo Seven) was used in 7 patients (43.7%), and carbetocin (Pabal) was used in 6 patients (37.5%), with active factor VII available for use from 2008 and carbetocin available for use from 2009. The average total loss of blood in the analyzed group of patients was 4495 mL (1500 to 7500 mL). The average pre-partum hemoglobin level was 11.6 g/dL (10.0 to 13.6 g/dL) compared with 7.8 g/dL (3.7 to 9.9 g/dL) immediately after the surgery. The mean total surgery time was 197.8 minutes (62 to 335 minutes).

The perioperative complications are presented in *Table 5*; the most common complications included bleeding that required reoperation. There were no deaths among the mothers. The most serious complications included circulatory arrest with successful cardiopulmonary resuscitation (CPR) and puerperal sepsis accompanied by pulmonary embolism that required 18 days of hospitalization in the emergency unit.

DISCUSSION

As noted by numerous authors, the current era of an increasing number of cesarean sections is associated with an increased number of postpartum hysterectomies (Flodd *et al.* 2009; Yucel *et al.* 2006; Bateman *et al.* 2012; Francois 2005). The rate of surgeries in patients who give birth via cesarean section is 0.52–4.68% (Flodd *et al.* 2009; Yucel *et al.* 2006; Bateman *et al.* 2012; Francois 2005; Zwart *et al.* 2010) and is higher than the range of 0.1–0.7% in vaginal deliveries (Flodd *et al.* 2009; Francois *et al.* 2005). The rates of postpartum hysterectomy surgeries are typically calculated per 1000 deliveries.

In an analysis of more than 56 million deliveries in the US (in years 1994–2007), Bateman *et al.* (Bateman *et al.* 2012) categorized the causes of emergency postpartum hysterectomy using ICD codes. The observed rate of postpartum hysterectomies increased from 0.7% to more than 0.8% in the analyzed period. The authors highlighted the increasing incidence of improper placental implantations and uterine atony as causes of bleeding that led to decisions to perform a hysterectomy. In the analysis of more than 870,000 births that occurred during the years 1966-2005, Irish researchers could not confirm an increase in the rate of emergency postpartum hysterectomy surgeries; instead, there was a significant decrease from 0.85 to 0.2% (Flodd *et al.* 2009). Similar to their US colleagues, the Irish researchers identified an increasing share of placenta increta, whereas the incidence of uterine rupture was lower compared with the US study.

Akar (Akar *et al.* 2004) presented an analysis of more than 14,000 deliveries from a university hospital in Turkey where the rate of postpartum hysterectomy surgeries was very low (0.26%). In 34% of the cases, the bleeding that led to a hysterectomy was caused by pathological placenta increta; 29% of the cases were a

result of uterine rupture, and 21% of the cases were a result of uterine atony .

In a retrospective analysis of data from our site, the rate of postpartum hysterectomy surgeries remained relatively stable despite the increasing frequency of cesarean sections, and it ranged from 0.62 to 1.0%. In 47% of the cases, the need to remove the uterus was caused by bleeding in the course of the cesarean section as a result of placenta previa. In 79% of the cases, bleeding that led to a hysterectomy was caused by an improper implantation of the villi of placenta previa (50%) or a normally aligned placenta (25%). Post-partum uterine atony was identified in 2 cases, including one triplet pregnancy and one uterine rupture (12.5%).

Spiliopoulos *et al.* (Spiliopoulos *et al.* 2011) analyzed more than 1 million deliveries during the period of 1997–2005; 853 emergency hysterectomies were performed, including 300 vaginal births and 553 cesarean section deliveries. The authors indicated that vaginal birth did not increase the risk of hysterectomy provided that it was spontaneous and the patient had no history of a cesarean section. The relative risk of a hysterectomy was 1.85 in vaginal births by patients with a history of cesarean section and 2.1 in assisted vaginal births. Compared with vaginal birth, the relative risk of a hysterectomy in the course of a cesarean section was 2.2, which increased to 4.5 in the case of a consecutive cesarean section. A substantial (23.7-fold) relative risk of postpartum hysterectomy was associated with placenta previa and was even higher in the patients with placenta previa and a history of a cesarean section (43.95-fold).

Wingprawat *et al.* (Wingprawat *et al.* 2005) analyzed 57 cases of emergency postpartum hysterectomy among 13,000 births during the years 1997-2002. The rate of emergency hysterectomies reported was very high and amounted to 1.43%. According to the authors, a cesarean section increased the risk of a hysterectomy by a factor of 2, whereas a history of a cesarean section increased the risk by a factor of 5. Chen *et al.* (Chen *et al.* 2013) assessed 64 cases of postpartum hysterectomy among 34,000 of deliveries and indicated that as many as 89% of the hysterectomies were performed following a cesarean section. The authors reported that multiparity increased the relative risk by a factor of 2.5, a history of a cesarean section increased the risk by a factor of 3, and placenta previa increased the relative risk by a factor of 10. In our data, most cases of postpartum hysterectomy (93.9%) were performed during the course of a cesarean section. Seventy-five percent of the patients in the study group had a history of a cesarean section, whereas 79% of the patients were multiparous.

The most common complications of a postpartum hysterectomy as reported in the literature are thromboembolic complications: 2.9% (Yucel *et al.* 2006; Zwart *et al.* 2010) to 33% (Imudia *et al.* 2010; Francois *et al.* 2005); postoperative fever: 26% (Yucel *et al.* 2006) to 47% (Imudia *et al.* 2010; Zeteroglu *et al.* 2005; Francois

et al. 2005); postoperative wound infections: 5% (Yucel *et al.* 2006) to 13% (Francois *et al.* 2005); urinary bladder injuries: 8% (Yucel *et al.* 2006) to 16% (Imudia *et al.* 2010; Zeteroglu *et al.* 2005; Francois *et al.* 2005); bowel injury: 3% (Akar *et al.* 2004; Yucel *et al.* 2006) to 13% (Imudia *et al.* 2010; Zeteroglu *et al.* 2005, Selo-Ojeme *et al.* 2005) and reoperations: 12% (Zeteroglu *et al.* 2005) to 15% (Akar *et al.* 2004; Imudia *et al.* 2010; Zwart et al 2010). At our site, the most common complications were reoperation as a result of intra-abdominal hemorrhage (26%), urinary bladder injuries (13%), thromboembolic events (12%), and postoperative wound infections (6%).

The most serious complication is maternal death, which has been reported in 0 to 16% of patients following a postpartum hysterectomy (Zeteroglu *et al.* 2005; Chen *et al.* 2013; Yucel *et al.* 2006) .

Zwart *et al.* (Zwart *et al.* 2010) assessed the efficacy of uterine vessel embolization in the course of peripartum bleeding. Overall, in the three-year period of analysis, the authors performed 108 hysterectomies, including 17 procedures performed following a failed embolization. The maternal mortality was 2.6%. At our site, complications of hemorrhages with a subsequent hysterectomy did not lead to maternal deaths; however, CPR was required following circulatory arrest in one patient. The patient experienced no delayed complications of the surgery. Pulmonary embolism occurred in two patients who required intensive treatment at a specialized department.

The decision to perform a postpartum hysterectomy in a woman of reproductive potential is very difficult and is typically made in extreme conditions that require life-saving measures. At our site, the moment at which the efficacy of a conservative treatment is about to be questioned and a hysterectomy will be considered reflects an estimated blood loss of 2000 mL. The mean estimated blood loss before hysterectomy procedures are performed at our site was 2950 mL, whereas the total mean blood loss was estimated as 4495 mL. Chen *et al.* estimated the total blood loss at approximately 2500 mL (Chen et al 2013) , whereas Imudia estimated it as approximately 3000 mL (Imudia *et al.* 2010). According to bibliographic data, the average surgery time ranged from 128 minutes (Zeteroglu *et al.* 2005) to 176 minutes. In our analysis, the mean total surgery time was 197.75 minutes (62 to 335 minutes). These data highlight the dramatic nature of the situation and should sensitize obstetricians to not underestimate the potential risk factors and identify the risk at an earlier stage. The shortest surgery time, i.e., 62 minutes, was associated with a case of placenta increta that involved the entire thickness of the uterine muscle wall diagnosed by ultrasound scan prior to the delivery; in this case, premises regarding the potential need for a hysterectomy were known prior to the surgery.

CONCLUSION

An emergency postpartum hysterectomy is most commonly performed in the course of massive bleeding associated with improper placental implantation. The surgery should be considered a life-saving challenge.

STATISTICS

The results are presented in tables as number of cases (n) and percent (%) or as mean with maximum and minimum values.

CONFLICTS OF INTEREST

The authors have no potential conflicts of interest to disclose.

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