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Peripartum Hysterectomy

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INTRODUCTION

Emergency peripartum hysterectomy is an unequivocal marker of severe maternal morbidity and, in many respects, the treatment of last resort for severe postpartum hemorrhage (PPH)[1]. Between 2001 and 2010, 32 reports of peripartum hysterectomy have been identified and reviewed[2–33]. Table 1 provides a summary of the maternal outcomes in these reports. A number of consistent factors emerge from this review. There is a preponderance of cesarean deliveries in both the index and previous pregnancies, and this association was established in several studies[3,5–8,10,14,16,19–24,30]. The main indications for hysterectomy were almost evenly divided between abnormal placentation (usually placenta previa and/or accreta) and uterine atony, although two reports from Africa cite uterine rupture as the primary indication[3,33].

The range of prevalence is wide (0.2–5.4/1000), with the higher figures usually found in low-resource countries. Furthermore, most reports were hospital-based and high risk referral patterns were likely to influence this figure. Three population-based studies show prevalence at the lower end of the scale: 0.3/1000 in The Netherlands[19], 0.5/1000 in Israel[10] and 0.5/1000 in one Canadian province[6].

The incidence of peripartum hysterectomy is increasing in some countries, due to higher cesarean delivery rates and concomitant increases in placenta previa and/or accreta in subsequent pregnancies. In Canada from 1991 to 2000, the peripartum hysterectomy rate almost doubled from 0.26/1000 deliveries to 0.46/1000 (RR 1.7, 95% CI 1.48–2.08)[34]. There are reasons to believe that obstetric hysterectomy rates may continue to rise as other factors contribute to the increasing cesarean delivery rate. Multiple pregnancy rates are rising due to assisted reproductive treatments, and the need for critical care and hysterectomy is higher in these women[15,35]. Francois *et al.* found a six-fold increased risk of emergency peripartum hysterectomy in multiple compared with singleton pregnancies, and an almost 24-fold increase in higher order multiple pregnancies[15]. Other changing maternal demographic factors, such as increasing age and obesity also contribute to rising cesarean delivery rates.

The incidence of hysterectomy in women having their first delivery was only recorded in five reports, in which the range was 18–43% and the average 28.4%[5,6,11,22,29]. A study of primigravid women at a teaching hospital in Ghana found an incidence of peripartum hysterectomy of about 1 in 1000 (39 of 36,550) nulliparous deliveries[36].

Maternal mortality in this review was documented to have a wide range, from zero to 23.8%; with deaths tending to occur in, but not limited to, low-resource areas. Severe maternal morbidity was high in all reports and manifest by blood transfusion, disseminated intravascular coagulation (DIC), injury to the bladder and ureter, reoperation, sepsis and the need for intensive care, as outlined in Table 1.

This chapter describes emergency hysterectomy in the immediate postpartum period following vaginal or cesarean delivery.

Table 1 Summary of maternal outcomes in 32 reports of peripartum hysterectomy from 2001 to 2010[2–33]

	Incidence	
Outcome	*Mean*	*Range*
Prevalence of peripartum hysterectomy (32)*	1.2/1000	0.2–5.4/1000
Primary indication (32) Abnormal placentation (16)† Atonic PPH (14) Uterine rupture (2)		
Primigravid (5)	28.4%	18–43%
Subtotal hysterectomy (9)	57.1%	6–96.5%
Maternal mortality (25) No deaths in (13) Deaths in (12)	8.9%	2.8–23.8%
Maternal morbidity		
Blood transfusion (7)	90.2%	72–100%
Bladder/ureter injury (7)	10.8%	5.6–21%
Reoperation (3)	23.6%	7.8–38%
Intensive care (7)	41%	17.6–77%

*Number of papers reporting the outcome is in parentheses
†Placenta previa and/or accreta, abruptio placentae

INDICATIONS

By far the most common indication for hysterectomy is hemorrhage associated with the following conditions.

Abnormal placentation

In developed countries, placenta previa, with or without associated accreta, is the most common indication for hysterectomy. This is secondary to the rising incidence of these conditions associated with increasing numbers of women previously delivered by cesarean section. Despite the fact that numerous techniques aimed at preserving the uterus have been proposed and are discussed in this book, hysterectomy is still used in the majority of hospitals to stem the sometimes frightening hemorrhage associated with placenta previa or accreta.

In addition, on rare occasions, concealed abruptio placentae may be associated with extravasation of blood into and through the full thickness of the myometrium (Couvelaire uterus) to such an extent as to make it unresponsive to oxytocic drugs, thus necessitating hysterectomy. It must be emphasized, however, that in the majority of cases of abruptio placentae with Couvelaire uterus, the response to oxytocic drugs is appropriate and the hemorrhage is due to DIC rather than failure of the uterus to contract.

Uterine atony

As outlined elsewhere in this book (see chapters in Section 8), the range of modern oxytocic drugs has greatly improved the management of uterine atony. Nonetheless, there are times when the uterus is refractory to all such agents. This is most commonly present in the prolonged, augmented and/or obstructed labor: simply stated, the exhausted and infected uterus may be unresponsive to oxytocic agents. The majority of these cases are seen at the time of cesarean section for dystocia or cephalopelvic disproportion.

Uterine rupture

The most common cause of complete uterine rupture is a tear within a previous cesarean section scar. If the rupture is extensive and hemorrhage cannot be contained by suture of the lacerated area, hysterectomy may be necessary. In addition, rupture of the intact uterus can occur in multiparous women in response to inappropriate use of oxytocic agents in the first and second stages of labor. In remote areas with limited resources uterine rupture can occur in obstructed, multiparous labor.

Uterine trauma

Traumatic rupture, that is, perforation or laceration of the uterus, can occur with a variety of obstetric manipulations, including internal version and breech extraction, especially in obstructed labor; instrumental manipulation, such as the classical application of the anterior blade of Kielland's forceps; manual exploration of the uterus and manual removal of the placenta or its fragments after obstructed labor with a ballooned and thin lower uterine segment; and during curettage for secondary postpartum hemorrhage.

Cesarean section in the second stage of labor with the fetal head deeply impacted in the vagina may be associated with lateral extension of the lower uterine segment incision into the major vessels[37]. This is more likely if the surgeon has used a straight line as opposed to a curved or 'smile' incision. On rare occasions, the extent of this tear may necessitate hysterectomy, especially if one or both uterine arteries are lacerated and a hematoma obscures the surgical repair. External traumas, such as assault, a fall or motor vehicle accident, are relatively rare causes of uterine perforation and rupture.

Sepsis

In the era of modern antibiotics, sepsis is not a common reason for emergency hysterectomy. However, it still may be necessary in cases with extensive uterine sepsis, particularly with clostridial infections and myometrial abscess formation, in which antibiotic treatment fails to control the infection. Other septic causes of secondary PPH include cesarean scar infection and necrosis, arteriovenous fistula formation secondary to uterine trauma and infection, and endomyometritis associated with retained placental fragments followed by hemorrhage. All may rarely require hysterectomy.

SURGICAL PRINCIPLES

Although the technique of obstetric hysterectomy is similar in principle to that of abdominal hysterectomy in gynecology, numerous anatomical and physiological changes in pregnancy create potential surgical difficulties.

(1) The uterine and ovarian vessels are enlarged and distended, often markedly so, and the adjacent pelvic tissues are edematous and friable.

(2) Abdominal entry may have been via Pfannenstiel or lower midline incision, depending on the urgency and speed required. Many surgeons prefer the midline incision because it provides better exposure.

(3) Maneuvers to obtain hemostasis depend on the cause of the hemorrhage. In cases of uterine rupture, Green-Armytage clamps or sponge forceps can be used to compress the bleeding edges of torn uterine muscle. The uterus should be eventrated from the abdominal wound. The structures of the adnexa on each side are pulled laterally by an assistant, and the surgeon applies straight clamps adjacent to the top sides of the uterus to include the round ligament, the Fallopian tube and the utero-ovarian ligament. This serves to control the collateral blood flow to the uterus from the ovarian arteries. Using transillumination, the avascular spaces in the broad ligament, roughly opposite the level of a transverse lower segment cesarean

incision, should be identified and a catheter passed through on each side to encircle the lower uterine segment just above the cervix. This should be twisted tightly and closed around the lower uterine segment with a clamp, thereby compressing the uterine arteries. These two maneuvers, if properly applied, should occlude the main collateral ovarian and uterine artery supply to the uterus (see Chapter 1).

(4) The vascular pedicles are thick and edematous and should be double clamped. Remove the proximal clamp first and apply a free tie, and then replace the distal clamp with a transfixing suture. The proximal free tie should ensure that there is no hematoma formation in the base of the pedicle.

(5) If the cervix and paracolpos are not involved as the source of hemorrhage, subtotal hysterectomy should be adequate to achieve hemostasis, the objective of the intervention. Additionally it is safer, faster, easier to perform and less likely to injure the bladder or ureters than total hysterectomy. However, if the lower segment and paracolpos are involved in the hemorrhage, such as in cases of placenta previa, total hysterectomy will be necessary for hemostasis.

(6) The ureters should be avoided by placing all clamps medial to those used to secure the uterine arteries.

(7) It may be difficult to identify the cervix, particularly when the hysterectomy is being performed at full cervical dilatation. If a uterine incision has been made, a finger can be placed through this and hooked up to identify the cervical rim. It is safest to enter the vagina posteriorly, identify the rim of the cervix and then proceed anteriorly.

(8) The bladder is particularly vulnerable in cases previously delivered by cesarean section, as it may be adherent to the lower uterine segment and cervix. It is therefore essential to check the integrity of the bladder intraoperatively. This can be done by manipulating the bulb of the Foley catheter to see if it is visible through the bladder wall. The bladder also can be filled with a colored fluid such as methylene blue or sterile milk taken from the neonatal nursery. The latter is preferable as it does not cause permanent staining of the tissues. Accordingly, after repair of any bladder injury, it is easier to check its integrity by instillation of milk into the bladder. Tears in the bladder should be repaired with two layers of 3/0 polyglactin (Vicryl) or equivalent suture. Otherwise, No. 1 polyglactin (Vicryl) or equivalent is used throughout the procedure.

(9) If the integrity of the ureters is in doubt, and after any extensive repair of bladder injury, postoperative cystoscopy can confirm that they are intact by observing urine coming from each ureteric orifice; this test may be facilitated by giving intravenous indigo carmine and waiting 10–15 min.

(10) Within the context of the emergency situation and the available resources, it is best to diagnose and deal with any bladder or ureteric injury at the time of the hysterectomy. If lower urinary tract injuries are not diagnosed until the postoperative period, clinical morbidity is increased, diagnostic and surgical management is more complex, and litigation more likely[38].

(11) In rare cases following hysterectomy traumatized tissues at the base of the pelvis may continue to bleed despite ligation of obvious bleeding pedicles. This bleeding is usually, but not always, associated with DIC. In these cases the application of a pelvic pressure pack can be life-saving and provide hemostasis, either permanent or temporary, until hematological stability and/or vascular embolization is achieved[39]. The details of applying a pelvic pressure pack are described in Chapter 54.

(12) Perioperative antibiotic prophylaxis should be continued for 24–48 hours. Thromboprophylaxis with heparin should be instituted as soon as one is satisfied that hemostasis is secure.

(13) Detailed, timed postoperative notes should be made to include the preoperative events, indications for hysterectomy and the surgical details.

(14) After the initial postoperative recovery, the woman should receive a comprehensive outline of events from an experienced obstetrician. Many women are emotionally traumatized by the rapid sequence of major complications, culminating in the loss of her uterus; a sympathetic explanation and supportive follow-up are necessary.

In a number of series, as many as 25% of women who received an emergency obstetric hysterectomy were primigravid, for whom the fertility-ending nature of the procedure can be devastating. Therefore, particularly in this group of women, obstetricians should be familiar with and be prepared to perform alternative procedures to control the hemorrhage. The application of other techniques to arrest hemorrhage that can be both life-saving and uterus-preserving are outlined in several chapters in this book. When conditions are recognized in the antenatal period that may lead to increased risk of severe obstetric hemorrhage, such as placenta previa and/or accreta, referral of these cases to hospitals with the equipment and personnel to provide the alternative techniques to hysterectomy should be undertaken where feasible.

Ultimately, one has to strike a balance between spending excessive time on alternative techniques that are proving ineffective, leading to delay, further hemorrhage and probably DIC, and moving to the definitive and life-saving hysterectomy. Such is the art of obstetric judgment in trying circumstances.

References

1. Baskett TF. Epidemiology of obstetric critical care. Best Pract Res Clin Obstet Gynaecol 2008;22:763–74
2. Engelsen IB, Albrechsten S, Iverson OE, Peripartum hysterectomy – incidence and maternal morbidity. Acta Obstet Gynaecol Scand 2001;80:409–12
3. Sebitloane MH, Moodley J. Emergency peripartum hysterectomy. East Afr Med J 2001;78:70–4
4. Wenham J, Matijevic R. Post-partum hysterectomies: revisited. J Perinat Med 2001;29:260–5
5. Kastner ES, Figueroa R, Garry D, Maulik D. Emergency peripartum hysterectomy:experience at a community teaching hospital. Obstet Gynecol 2002;99:971–5
6. Baskett TF. Emergency obstetric hysterectomy. J Obstet Gynaecol 2003;23:353–5
7. Bai SW, Lee HJ, Cho JS, Park YW, Kim SK, Park KH. Peripartum hysterectomy and associated factors. J Reprod Med 2003;48:148–52
8. Kacmar J, Bhimani L, Boyd M, Shah-Hosseini R, Peipert J. Route of delivery as a risk for emergent peripartum hysterectomy: a case-control study. Obstet Gynecol 2003;102:141–5
9. Rabenda-Lacka K, Wilczyñski J, Radoch Z, Breborowicz GH. Obstetrical hysterectomy. Ginekol Pol 2003;74:1521–5
10. Sheiner E, Levy A, Katz M, Mazor M. Identifying risk factors for peripartum cesarean hysterectomy. A population-based study. J Reprod Med 2003;48:622–6
11. Yamani Zamzami TY. Indications of emergency peripartum hysterectomy: review of 17 cases. Arch Gynecol Obstet. 2003;268:131–5
12. El-Jallad MF, Zayed F, Al-Rimawi HS. Emergency peripartum hysterectomy in Northern Jordan: indications and obstetric outcome (an 8-year review). Arch Gynecol Obstet 2004;270:271–3
13. Ezech OC, Kalu BK, Njokanma FO, Nwokoro CA, Okeke GC. Emergency peripartum hysterectomy in a Nigerian hospital: a 20-year review. J Obstet Gynaecol 2004;24:372–3
14. Forna F, Miles AM, Jamieson DJ. Emergency peripartum hysterectomy: a comparison of cesarean and postpartum hysterectomy. Am J Obstet Gynecol 2004;190:1440–4
15. Francois K, Ortiz J, Harris C, Foley MR, Elliott JP. Is peripartum hysterectomy more common in multiple gestations? Obstet Gynecol 2005;105:1369–72
16. Eniola OA, Bewley S, Waterstone M, Hooper R, Wolfe CD. Obstetric hysterectomy in a population of South East England. J Obstet Gynaecol 2006;26:104–9
17. Ding DC, Hsu S, Chu TW, Chu TY. Emergency peripartum hysterectomy in a teaching hospital in Eastern Taiwan. J Obstet Gynaecol 2006;26:635–8
18. Katchy KC, Ziad F, Al Nashmi N, Diejomaoh MF. Emergency obstetric hysterectomy in Kuwait: a clinico pathological analysis. Arch Gynecol Obstet 2006;273:360–5
19. Kwee A, Bots ML, Visser GH, Bruinse HW. Emergency peripartum hysterectomy: a prospective study in The Netherlands. Eur J Obstet Gynecol Reprod Biol 2006;124:187–92
20. Whiteman MK, Kuklina E, Hillis SD, Jamieson DJ, Meikle SF, Posner SF. Incidence and determinants of peripartum hysterectomy. Obstet Gynecol 2006;108:1486–92
21. Yoong W, Massish N, Oluwu A. Obstetric hysterectomy: changing trends over 20 years in a multiethnic high risk population. Arch Gynecol Obstet 2006;274:37–40
22. Daskalakis G, Anastasakis E, Papantoniou N, Mesogitis S, Theodora M, Antsaklis A. Emergency obstetric hysterectomy. Acta Obstet Gynecol Scand 2007;86:223–7
23. Habek D, Becareviç R. Emergency peripartum hysterectomy in a tertiary obstetric center: 8-year evaluation. Fetal Diagn Ther 2007;22:139–42
24. Smith J, Mousa HA. Peripartum hysterectomy for primary postpartum haemorrhage: Incidence and maternal morbidity. J Obstet Gynaecol 2007;27:44–7
25. Kayabasoglu F, Guzin K, Aydogdu S, Sezginsoy S, Turkgeldi L, Gunduz G. Emergency peripartum hysterectomy in a tertiary Istanbul hospital. Arch Gynecol Obstet 2008;278:251–6
26. Rahman J, Al-Ali M, Qutub HO, Al-Suleiman SS, Al-Jama FE, Rahman MS. Emergency obstetric hysterectomy in a university hospital: A 25-year review. J Obstet Gynaecol 2008;28:69–72
27. Umezurike CC, Feyi-Waboso PA, Adisa CA. Peripartum hysterectomy in Aba southeastern Nigeria. Aust NZ J Obstet Gynaecol 2008;48:580–2
28. Knight M, Kuriuczuk JJ, Spark P, Brocklehurst P. Cesarean delivery and peripartum hysterectomy. Obstet Gynecol 2008; 111:97–105
29. Glaze S, Ekwalanga P, Roberts G, Lange I, Birch C, Rosengarten A et al. Peripartum hysterectomy, 1999 to 2006. Obstet Gynecol 2008;111:732–8
30. Güngördük K, Yildirim G, Dugan N, Polat I, Sudolmus S, Ark C. Peripartum hysterectomy in Turkey: a case-control study. J Obstet Gynaecol 2009;29:722–8
31. Lone F, Sultan AH, Thakar R, Beggs A. Risk factors and management patterns for emergency obstetric hysterectomy over 2 decades. Int J Gynaecol Obstet 2010;109:12–5
32. Mlyncek M, Kellner M, Uharcek P, Matejka M, Lajtman E, Boledovicová M. Peripartum hysterectomy – an audit in Slovakia in 2007. Ceska Gynekol 2010;75:88–92
33. Rabiu KA, Akinlusi FM, Adewunmi AA, Akinola OI. Emergency peripartum hysterectomy in a tertiary hospital in Lagos, Nigeria: a five-year review. Trop Doct 2010;40:1–4
34. Wen SW, Huang L, Liston RM, Heaman M, Baskett TF, Rusen ID. Severe maternal mortality in Canada, 1991–2001. Can Med Assoc J 2005;173:759–63
35. Baskett TF, O'Connell CM. Maternal critical care in obstetrics. J Obstet Gynaecol Can 2009;31:48–53
36. Seffah JD, Kwame-Aryee RA. Emergency peripartum hysterectomy in the nulliparous patient. Int J Gynaecol Obstet 2007;97:45–6
37. Allen VM, O'Connell CM, Baskett TF. Maternal and perinatal morbidity of caesarean delivery at full cervical dilatation compared with caesarean delivery in the first stage of labour. Br J Obstet Gynaecol 2005;112:986–90
38. Gilmour DT, Baskett TF. Disability and litigation from urinary tract injuries at benign gynaecological surgery in Canada. Obstet Gynecol 2005;105:109–14
39. Dildy GA, Scott JR, Saffer CS, Belfort MA. An effective pressure pack for severe pelvic haemorrhage. Obstet Gynecol 2006;108:1222–6