

Case Study

Uterine rupture in labor following perforation during operative hysteroscopy—a case report and review of literature

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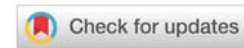
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Abstract

Background: Hysteroscopic surgeries have become the standard treatment for uterine septa, synechiae, submucous myomas and endometrial polyps. It is considered a safe procedure: the incidence of surgical complications, including uterine perforation, is low (0.95% - 2.7%). Uterine rupture secondary to operative hysteroscopy is rare but potentially catastrophic. It can occur both before the onset of labor or during labor, severely compromising fetal and maternal outcomes.

An operative hysteroscopy for retained placenta done one month after a normal vaginal delivery was complicated by a fundal uterine perforation whilst the removal of the abnormal tissue. The perforation was assessed laparoscopically and minimal bleeding was electrocoagulated. The patient was counseled that this complication should not affect future deliveries. In her subsequent pregnancy, an emergency cesarean hysterectomy was performed during advanced labor due to cornua-to-cornua fundal uterine rupture.

Conclusion: There are many potential risk factors for uterine rupture in pregnancy. While previous cesarean delivery is the most well-known, prior complex hysteroscopy appears to also be a risk factor. While the exact relative risk is still unclear we feel that patients undergoing hysteroscopy for uterine septum and cases complicated by fundal uterine perforation during hysteroscopy must be informed about the risk of future uterine rupture, both during labor and during pregnancy.

Out: We then summarize previous literature regarding hysteroscopy and uterine rupture focusing on risk factors such as surgery for uterine septum, use of electrocautery and uterine perforation. The Time interval between hysteroscopy and pregnancy does not appear to be a risk factor.

Precis: Operative hysteroscopy complicated by fundal uterine perforation is a risk factor for uterine rupture both during pregnancy and labor.

Introduction

Hysteroscopic surgeries have become the standard treatment for uterine septa, synechiae, submucous myomas, endometrial polyps and occasionally for diagnostic workup of infertility or recurrent pregnancy loss. It is considered to be a safe procedure and the incidence of surgical complications, including uterine perforation, is low (0.95–2.7%) [1,2]. One study reports a rate of 0.82% for uterine perforations specifically [3].

Uterine rupture is a rare occurrence. It can occur spontaneously or with risk factors such as prior damage

through the entire myometrial wall, as during a myomectomy [4] or in a pregnancy subsequent to cesarean delivery. Additionally, there have been case reports of uterine rupture (UR) in pregnancies after operative hysteroscopy. While this secondary complication is rare, it can have catastrophic effects on both maternal and fetal outcomes and viability.

There is only limited data on uterine rupture during labor in pregnancies subsequent to hysteroscopy, the exact incidence of that risk and the weight of independent risk factors. However, it does seem clear that there are multiple risk factors that can increase the chance of its occurrence, including the type of hysteroscopic procedure, the technique used and complications.

Herein, we report a case of uterine rupture during labor after a hysteroscopic fundal perforation made four years earlier. The case report is followed by a review of the literature, specifically focused on parsing out and summarizing major risk factors, some of which may be avoidable. We hope this information will help clinicians with counseling patients regarding their obstetrical risks after hysteroscopy.

Case presentation

A healthy 25-year-old multiparous woman, Gravida 3 Para 2, presented to the Labor and Delivery unit at 40 weeks and 3 days of gestation in spontaneous labor with uterine contractions. She did not complain of leaking fluid/rupture of membranes, vaginal bleeding, or reduced fetal movements. Physical examination at admission was unremarkable and her vital signs were within normal limits.

Her medical history included two full-term vaginal deliveries. Following the birth of her second child, four years prior to her current presentation, the patient had undergone an operative hysteroscopy for retained placenta. During that hysteroscopy, during the resection of the placental tissue using electrocautery, a 5mm by 5mm uterine fundal perforation occurred. Once the perforation was noted, a diagnostic laparoscopy was performed and an abdominal survey confirmed the fundal perforation; no trauma to the surrounding abdominal organs and tissue was noted. The surgeons did not suture the perforation area however diathermy was used to repair the base of the perforation in addition to the placement of a hemostatic material. Her discharge letter at that time stated that based on the procedure performed there is no contraindication to future attempts at labor and vaginal delivery.

At present, the patient was admitted to the delivery room in active labor. Approximately four hours later, the patient complained of sudden-onset severe abdominal pain. A pelvic exam revealed that she had advanced to 6 cm cervical dilation, however, the fetal head was noted to have regressed in the station. A general physical examination revealed abdominal tenderness and rebound. A delivery room sonogram revealed a massive collection of abdominal fluid above the fundus and also noted fetal bradycardia. The patient was thus immediately transferred to the operating room for emergency cesarean delivery. Upon opening the peritoneal cavity there was a gush of blood-stained fluid and blood clots. The fetal body was completely exteriorized from the uterus and the fetal head was located at the apex of the uterus. In order to complete the delivery of the fetal head, a vertical incision was made in the skin, leaving the patient with an inverse T-shaped skin incision. A female infant was delivered with an Apgar score of 3 at 5 minutes and a pH of 6.91. A complete inspection of the uterus revealed that the uterine fundus was ruptured from cornua to cornua through the transverse axis (Figures 1,2). This did not allow conservation of the uterus and so a hysterectomy and salpingectomy were performed. The estimated blood loss was 1.5 liters. Seven days after the surgery, the mother and child were discharged home in stable condition (Table 1).



Figure 1: Note the uterine fundus [cornua to cornua] rupture.

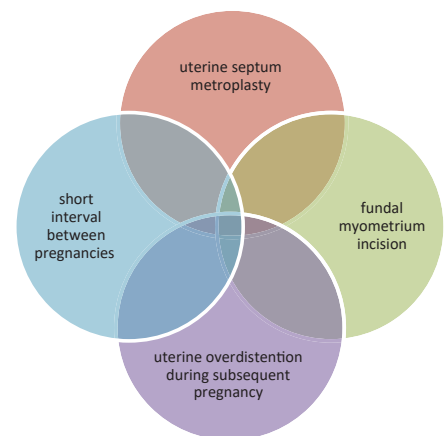


Figure 2: Risk factors for Uterine Rupture during labor in women with a history of operative hysteroscopy.

Review of literature

To provide more insight into the possible risk factors for pregnancy-related UR in women undergoing operative hysteroscopy, we performed a review of the literature.

Uccella et al [5] presented a single case report of a pre-labor uterine rupture in a primigravida IVF twin pregnancy with a history of uterine perforation during hysteroscopy. They hypothesized that possible contributing factors to the rupture were uterine over-distension due to the presence of twins compounded by uterine perforation and subsequently weakened myometrium.

[6] presented a case of uterine rupture during labor three months after an uneventful uterine septum resection via hysteroscopy. The paper theorized that a risk factor for the UR was that during the metroplasty the resection may have incised into the normal tissue, weakening the residual myometrium, and leaving a thin and weakened fundus. In their patient, concomitant laparoscopic control was used during the hysteroscopy to detect perforation. While concomitant laparoscopy is an effective method for detecting uterine perforation, it is not particularly effective at detecting penetration into the myometrium.

In [2] 2 cases of UR in pregnancies after hysteroscopy

**Table 1:** Cases of uterine rupture during labor in women with a history of operative hysteroscopy

Case	Year	Patient's Age	Indication	Operative technique	Perforation	Interval from procedure to labor	GA (wk)	Use of augmentation/ induction of labor
[3]	2004	N/A	Placental retention	Electrosurgery	Yes	5 years	40	No
[5]	1999	N/A	Uterine septa	Scissors with electrosurgery	Yes	11 months	37	Induction with prostaglandins (PGE2)
[2]	1996	N/A	Uterine septa	Electrosurgery	No	2 months	39	No
[2]	1996	N/A	Synechiae	Electrosurgery	No	5 months	41	No
[12]	2002	37	Uterine septa	Scissors with electrosurgery	No	3 months	41	No
[7]	2002	N/A	Uterine septa	cold scissors	No	N/A	37	No
[13]	2017	24	Uterine septa	N/A	No	9 months	38	No
[13]	2017	32	Myomectomy	N/A	Yes	4 months	38	No
Current case	2018	25	Placental retention	Electrosurgery	Yes	4 years	40	No

were presented. The hysteroscopies were for fibroid removal and septum resection, the two types of hysteroscopy with the highest incidence of complications [6]. In the cases presented, uterine ruptures were detected during labor at term. The interval between the hysteroscopies and pregnancies was four and nine months respectively. Therefore, the authors suggest that physicians should consider warning their patients about becoming pregnant soon after hysteroscopy.

[7] Presented the case of a patient that had recurrent uterine rupture after uterine septum metroplasty. After her first UR which occurred in the 3rd trimester of pregnancy, but prior to labor onset, she had a full uterine repair to close any uterine weakness. Nonetheless, in her subsequent pregnancy, she had a repeat UR again in the third trimester, prior to labor.

In 2006 Sentilhes, et al reviewed 18 cases of uterine rupture subsequent to operative hysteroscopy [8]. The article examined the cases to assess common risk factors for subsequent UR. Hysteroscopic metroplasty, the most significant risk factor, occurred in 16/18 (89%) of cases. Of the 18 original cases, hysteroscopic resection was performed with monopolar current cutting, rigid scissors and laser in 14 (78%), 3 (16.5%) and 1 (5.5%) cases respectively. Interestingly, a uterine perforation was recognized in (and presumably only occurred in these) only 10 (55.5%) of cases. The interval between hysteroscopy and subsequent pregnancies varied from 1 month to 5 years with an average gap of 16 months. The uterine rupture occurred between 19 and 41 weeks, occurring prior to labor in 12 (66.5%) of the cases. There was one case similar to ours, in which the UR occurred during labor (5 years) after hysteroscopic uterine perforation for placental retention [9].

[10] Suggested that metroplasty (of the uterine septum) may weaken the myometrial wall regardless of the method used and despite the absence of perforation during the procedures, this would seem to be consistent with the case described earlier [6] and the findings of Sentilhes [8].

To evaluate the exact risk of UR after hysteroscopic metroplasty, [11] presented a retrospective case-control study to evaluate the risk of uterine rupture after hysteroscopic metroplasty. They reviewed the pregnancies of 99 women who

underwent hysteroscopic metroplasty at one hospital in France between 2006–2011. The surgeries were done using monopolar electrocautery. In subsequent pregnancies, there was a non-significant increase in Cesarean delivery (8.1% vs 4.4% $p = 0.085$), but there were no uterine ruptures in any of the cases. In the 4155 control studies, there was 1 case of uterine rupture.

Conclusion

Hysteroscopy is a safe procedure and while it is efficient and low risk, it is not without risk. Our case and the others like the ones presented here show that one underappreciated secondary risk is future uterine rupture during labor specifically if uterine perforation or metroplasty occurred.

The exact risk or method to predict the risk of UR in pregnancies following hysteroscopy is still unclear based on the currently limited data. As opposed to the risk of UR after cesarean delivery which is well documented with a specific incidence, we are uninformed in terms of when to recommend an elective cesarean delivery to a patient with a history of complicated hysteroscopy.

The current studies available, which were summarized above, showed mixed results in terms of potential risk factors. While the largest retrospective study showed no measurable increased risk of uterine rupture after electrocautery metroplasty [11], most other case reports and case series do seem to document it as a risk factor [8]. Additionally, the cases seem to show that neither a long interval between operative hysteroscopy and subsequent pregnancy nor elective cesarean section is effective in preventing uterine rupture [9].

At this point, larger cohorts and epidemiologic studies are needed to elucidate the exact risk and risk factors for UR after hysteroscopy. Until such time that such studies can be conducted, we believe that it is prudent to warn patients undergoing metroplasty and/or in which a uterine perforation occurred, of the theoretically increased risk of uterine rupture during labor.

However, Since the uterine fundus has a significant part of labor contractions, an injury and wall weakness to this part



of the uterus requires maximum consideration regarding the repair of the injury.

It is possible that suturing of the damaged area instead of cauterization alone should be the standard of care, would have prevented uterine rupture and improved the patient's chance of having a normal delivery.

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