

A third-trimester rupture in a scarred uterus: a case report

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Summary

Acute abdomen in pregnancy is a diagnostic and therapeutic challenge. Among its causes, uterine rupture complicates a minority of surgical emergencies with severe consequences, but occasionally constitutes an urgent medical situation in those pregnant women with uterine surgery history, especially in the third trimester. The authors present a case with an atypical presentation of uterine rupture occurring at 34⁺⁴ weeks of gestation, simultaneously suspected with acute appendicitis. Due to the potentially devastating outcomes and her surgical history of laparoscopic myomectomy, the suspected case was offered surgical emergencies. The authors' aim is to assess whether what they decided has helped to protect both mother and the unborn in this emergency. The risk of previous uterine surgeries for pregnant women, available differential diagnoses, and finer treatment points for this population are all discussed at length.

Key words: Uterine rupture; Acute abdomen; Late pregnancy; Emergency; Laparoscopic myomectomy; Acute appendicitis.

Introduction

Uterine rupture is a surgical emergency in pregnancy, especially in the third trimester. The non-traumatic, acute abdomen in pregnancy is a cause of grave concern to the surgeons in charge given that the lives of the patient and the unborn child are at stake. The differential diagnosis can be divided into obstetrical (uterine rupture, placental rupture, ruptured ectopic pregnancy), gynecological (ovarian cyst rupture, adnexal torsion, degenerating myoma), or gastrointestinal (acute appendicitis, acute cholecystitis, acute pancreatitis, intestinal obstruction) etiologies [1]. As known, previous uterine surgery is one of significant risk factors for uterine rupture during pregnancy, especially in the late pregnancy [2, 3]. The following case report exemplifies an atypical incidence of uterine rupture, initially suspected acute appendicitis in a pregnant woman with a laparoscopic myomectomy history, while the discussion delves into the finer points of working up and managing such a case.

Case Report

A 31-year-old female (gravid 1, para 0) in 34⁺⁴ gestational weeks was admitted with a nine-hour history of an acute onset of unremitting abdominal pain, localizing to the right lower quadrant and 5 out of 10 in intensity. She did not complain of other symptoms and vital signs were all normalized. Her past medical history was unremarkable except for a previous laparoscopic myomectomy in another hospital one and a half years before, but she could not provide valid records. What she remembered was that the largest myomas existed in the right corner of the uterus, and post-surgery course was uneventful. The actual gravidity was conceived spontaneously, and there were no exceptional situations during antenatal care.

Physical examination confirmed moderate tenderness and re-

bound tenderness over the whole abdomen, greatest in the right lower quadrant. Laboratory values indicated hemoglobin level (129 g/L), and possible infection: high white cell count ($13.48 \times 10^9/L$) and elevated neutrophil ratio (91.9%). Transabdominal ultrasound examination showed unclear epityphlon borderline, suggestive but not conclusive of acute appendicitis. No sign revealed abnormal post-myomectomy scar or other abnormalities. It showed an intrauterine pregnancy with fetal measurements consistent with gestational age. When consulted with the general surgery department, the surgeon found some intra-abdominal fluid by ultrasound, suspected acute appendicitis, and suggested to perform an exploratory laparotomy, but the patient and her families refused because of risks of premature birth. Also considering a normal fetal heart rate without decelerations, the initial decision was to delay the surgery. Anti-inflammatory therapy with cefuroxime sodium and maintaining pregnancy using ritodrine hydrochloride were all instituted. Fetal heart rate and uterine contractions were monitored continuously.

Two hours after admission, the patient suffered from worsening abdominal pain, accompanied by nausea. The pain was aggravated on changing postures or during contractions, but the pain did not radiate to other parts of the body. At the same time, uterine contractions were 15 seconds long with moderate pressure tension at 5-6 minute intervals. Decreased fetal heart rate variability (the minimum: 60 bpm), and frequent variable decelerations with occasional late decelerations were noted on the monitor, indicating fetal distress.

Given the surgical history, aggravating symptoms and clinical findings, the suspicion of ruptured uterine was also reported, the patient consented to an emergency cesarean delivery, and diagnostic exploratory laparotomy. Perioperative antibiotics were given. Cesarean section was performed under general anesthesia, and a healthy male infant weighing 2,520 grams was delivered with Apgar score of 6 at one minute (breathing, muscle tone, stimulation response, and skin color were all given minus one point), 8 in five minutes, and 10 in ten minutes. Immediately after fetal delivery, 20 units oxytocin intramuscular injection followed by a continuous infusion of 20 units oxytocin mixed in 500 ml glucose

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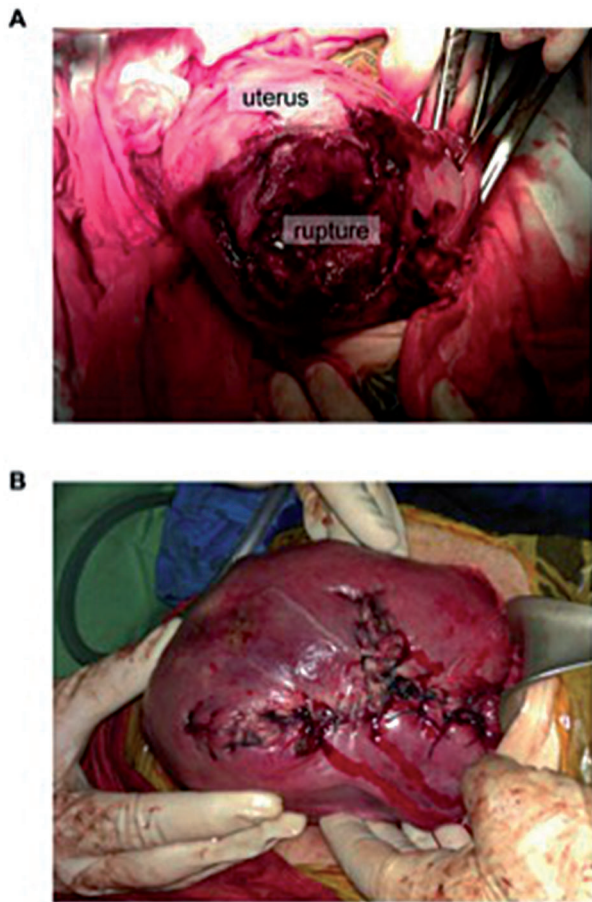


Figure 1. — Intraoperative photographs.

A) Ruptured uterus with fetus and partial placenta already removed. B) After repair of the right cornual ruptured site.

and sodium chloride injection were given. Approximately 600 ml intra-abdominal bloody fluid and clot were evacuated. Intraoperatively, a large tear on the right uterine horn with placenta accreted and moderately active bleeding, was recognized and the lesion extended into a quarter of the uterine wall (Figure 1A). The whole placenta was extra-uterine via the tear and intactly removed. A tiny piece of tissue on the rupture was sent for histopathological examination. Bleeding sites were first clamped and a cornual repair was successfully performed (Figure 1B). To encourage uterine instauration and reduce postpartum bleeding, 250 µg carboprost tromethamine injection and 100 µg carbetocin injection were given. Moreover, the appendix appeared grossly normal, but given the appendicitis suspicion, surgeon's suggestion, and relatives' demands, appendix was released by sharp dissection and also sent for histopathological examination. The abdomen was then thoroughly examined and no macroscopic changes were found. An intra-abdominal drainage tube was placed. During the operation, blood loss amounted to 1.2 L, and 400 ml packed red blood cells and 400 ml fresh frozen plasma were administered.

In histological examination, the specimen showed placenta percreta invading the site of previous incision scar (Figure 2). However, the appendix confirmed no presence of inflammation. Nursery care provided to the infant reached a stable body weight and was able to feed by mouth. The patient recovered uneventfully and was discharged six days later in a healthy condition. Followed

up for two months, the women and infant did not have any complaints.

Discussion

The present case exemplifies an atypical incidence of uterine rupture in a pregnant woman. The woman's increase in white blood cell count may not be particularly helpful because pregnant patients often have a physiologic leukocytosis, but the elevated neutrophil rate suggested an infectious etiology. Differential diagnoses for lower abdominal pain in pregnancy combined with infection can be divided into obstetrical (uterine rupture, heterotopic pregnancy, etc.), gynecological (adnexitis, ovarian cyst rupture, etc.), gastrointestinal (acute appendicitis, acute cholecystitis, etc.), other (peritonitis, urinary tract infection) etiologies. A delay in diagnosis and intervention may have significantly negative impacts on maternal and fetal survival. Uterine rupture complicates only a minority of cases in pregnancy, which results in fetal death and maternal death rates approaching 10% [4], but it is a cause of grave concern to obstetrists in charge given that the lives of the maternal and unborn child are at stake, especially when there is reason to question the integrity of the uterus because of previous uterus operations. Some reports highlighted the vital risk of uterine rupture after prior myomectomy [5]. A few published cases described that placenta percreta led to uterine rupture even at early stage of pregnancy [6]. Other risk factors include previous curettage or cesarean section [7]. In the present case, uterine rupture may have been attributed to the previous laparoscopy myomectomy one year and a half ago. Postoperative pathological examination confirmed placenta percreta in the ruptured site, consistent with some reports that uterine rupture with placenta percreta mainly occurs during the later period of pregnancy [8]. In the present reported case, following phenomena might have covered and occluded the uterine rupture, which masked the symptoms typical to uterine rupture, preventing early diagnosis. First, previous uterine surgeries, inducing adhesion with nearby organs at the site, may have masked the symptoms and signs of a rupture [9], although the authors did not find obvious adhesion in this case. Second, the ruptured site might have been occluded by fetal parts. A recent article described that a primiparous third-trimester uterine rupture, with the ruptured site was occluded by the fetal legs [10]. Uterine rupture may be facilitated by ultrasonography by the presence of fetal parts outside the uterine cavity or suggested by absence of amniotic fluid, but there were no typical signs in the present patient. False-negative cases are not infrequent, and the myometrial defect can be difficult to localize with ultrasound [11]. Though MRI provides more systematic evaluation of the entire abdomen and pelvis with a high diagnostic accuracy [1], the appearance consists of a focal myometrial defect which may be filled with hematoma and an

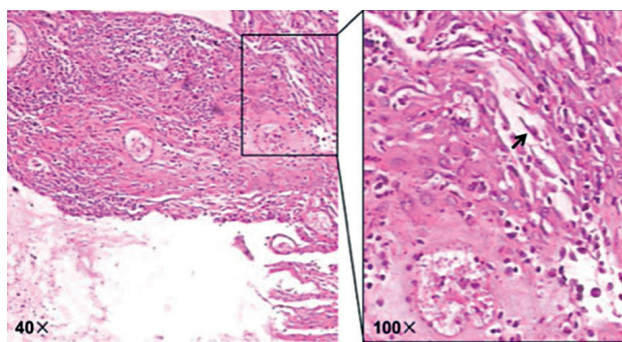


Figure 2. — Pathological images of the myometrium at the rupture (hematoxylin-eosin stain).

associated hemoperitoneum [12]. Uterine rupture is a surgical emergency, and imaging examinations should only be considered when the diagnosis is inconclusive, and/or the patient and fetus are all stable [11].

It is worth mentioning that though the present patient did not have appendicitis by pathological diagnosis and no dramatic laboratory findings were found to be diagnostic for acute appendicitis, appendicitis in pregnancy, with an incidence of one in 1,500 [13], should be suspected when a pregnant woman complains of new abdominal pain. Suspected acute appendicitis is always a surgical emergency despite higher false negative rate of up to 55% in pregnant women [14]. Of those women who are afflicted with acute appendicitis during pregnancy, the incidence by trimester is 32%, 42%, and 26%, respectively [14]. More than 40% of patients who undergo appendectomy in the second and third trimesters have a normal appendix, as that in the present case. However, a delay in the diagnosis of appendicitis leads to 4% maternal mortality rate [15], 3-5% fetal loss rate with an unruptured appendix, and 43% fetal loss rate perforated appendix [16]. In short, right-sided abdominal pain, associated with guarding and rebound, should always be considered appendicitis until proven otherwise.

Obstetricians must have a thorough understanding of maternal physiology and an appreciation of fetal viability when such emergencies occur. The combination of symptoms and clinical judgment is still vital in deciding who requires surgical therapy. If there is no evidence of other causes, laparoscopy in the first or second trimester and exploratory laparotomy after fetus removal in the third trimester may help to confirm the diagnosis. In the present patient, the authors timely performed routine cesarean delivery and exploratory laparotomy, evacuated intra-abdominal blood, performed careful repair, and harvested a tissue sample to obtain a histological diagnosis. However, in the present emergency setting, no specific diagnostic imaging for uterine rupture was performed. The diagnosis of

uterine rupture is suggested by absent fetal heart tones with severe heart rate decelerations. The choice of surgical approach should be based on the operator's experience. Clinicians should consider the diagnosis of uterine rupture when a patient presents with abdominal pain, even without evidence of hypovolemia, vaginal bleeding, contractions, or fetal compromise [10].

The potentially devastating effects of not operating or even delaying surgery are tremendous for both mother and the unborn child. There is a general reluctance to operate unnecessarily on a gravid patient, as in the present patient's initial opposition. In addition to the usual management, continuous fetal monitoring should be accomplished. In life threatening emergencies, the mother's health takes precedence over that of the fetus, unless her life is forfeit due to terminal injury, in which case the window of salvage opportunity for the fetus may be the sooner the better. In the present case, fetal severe decelerations were the indication for immediate cesarean section for a viable fetus. Twenty-three weeks or beyond fetuses are valued in their survivability and should be paid more attention. If stable, reassuring fetal heart rates are present, further assessment with ultrasonography should be performed, as the present authors did in this case. Uterine rupture should warrant prompt exploration. If future fertility is desired, debridement and layered closure may be accomplished, if technically feasible, though subsequent rupture may occur in 46% of patients who become pregnant [17]. In the present patient, hysteroscopy half a year later showed a normalized uterine cavity.

Previous uterine surgery is a well-known risk factor for uterine rupture during pregnancy [2], especially in late pregnancy, as the uterine tend to rupture later as the myometrial stretch ability increases. Uterine rupture can occur following myomectomy with both laparotomy and laparoscopy in the future pregnancies. In the past, many surgeons preferred to perform an open myomectomy due to technical difficulties or lack of experienced skills. In a retrospective study, the rate of rupture observed in the subsequent pregnancies, after myomectomy, at laparotomy was 5.3% [3]. It was documented that the laparoscopic approach offers several advantages in opposition to laparotomy, such as shorter hospitalization, reduced postoperative pain, and lower risk of postoperative adhesions [18, 19]. However, laparoscopic surgeons prefer to change over from single-layer to multilayer suturing techniques [20], probably resulting in cleavage, perioperative bleeding, the risk of conversion to laparotomy [21]. There are still studies suggesting that the risk of uterine rupture in future pregnancies after laparoscopic myomectomy seems to be very low with a good surgical technique [22]. The incidence of rupture per number of laparoscopic myomectomies is questionable, so further controlled studies on more extensive series are needed to better define indications and long-term results of laparoscopic myomectomy. In fact, the choice of

route for undertaking a myomectomy not only depends upon the size, number, and location of fibroids, but also on the skill of the surgeon and the facilities available. When performing laparoscopic myomectomy, a meticulous repair of the myometrium is essential to minimize the risk of uterine rupture during subsequent pregnancies. Based on the clinical trials and case series, it would appear that the risk of uterine rupture during pregnancy is no higher than 1% when the myomectomy incision is appropriately repaired [23]. Regardless of the surgical approach, fear about the risk of uterine rupture certainly leads to a high rate of cesarean sections in pregnant patients, who previously underwent myomectomy. With the worldwide increase laparoscopy myomectomy rates, the rate of uterine rupture will probably increase as well, and obstetricians will probably be confronted with such extreme constellations more often.

Conclusion

Uterine rupture in pregnancy is fortunately a rare occurrence but associated with significant maternal and fetal mortality. This report highlighted that in a pregnant woman with severe abdominal pain, uterine rupture has to be considered as a differential diagnosis, especially if there is a laparoscopic myomectomy history. Myomectomy may be a risk factor for uterine rupture, not only causing the rupture but also masking it to prevent early diagnosis. An appropriate individual counseling is needed regarding the risk of previous uterus surgeries.

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