—**Report on Experiments and Clinical Cases**—

A Case Report: Change in Fetal Heart Rate Pattern on Spontaneous Uterine Rupture at 35 Weeks Gestation after Laparoscopically Assisted Myomectomy

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Abstract

A 31-year-old nulligravid woman who underwent laparoscopically assisted myomectomy 5 months before becoming pregnant suffered uterine rupture at 35 weeks gestation. A 50 g intramusclar myomatous node had been removed laparoscopically. Early signs of rupture included sudden onset of severe abdominal tenderness and frequent uterine contractions despite reassuring FHR tracing. Variable deceleration was observed as late as 7.5 hours after onset. Emergency cesarean section was performed due to increasing severity of tenderness, revealing complete uterine rupture at the fundus site without extrusion of the fetus or placenta. A male neonate (2,860 g) was delivered without asphyxia and an Apgar score of 8. Total volume of hemorrahge was approximately 50 m*l*. The ruptured uterine wall was repaired by suturing in 2 layers. The present case indicates that sudden onset of abdominal tenderness in pregnant women with a history of laproscopic myomectomy may suggest uterine rupture even in the presence of reassuring FHR. This is a rare case, as non-reassuring FHR patterns generally appear in the late stages of uterine rupture.
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Key words: uterine rupture, laparoscopic myomectomy, pregnancy

Introduction

An online search of the PubMed database for the 32-year period between 1970 and 2002 using the search terms 'laparoscopic myomectomy (LM)', 'uterine rupture' and 'pregnancy', identified 13 cases of uterine rupture during pregnancy [1–11]. Seven of these[1–5] were reported between 1990 and 2002, paralleling the advent of laparoscopic myomectomy. Laparoscopically created uterine incisions may not heal as strongly as those made at laparotomy, regardless of the method of closure[4,7]. Pregnant women with a history of LM should therefore be considered at high risk for uterine rupture[4]. The most well-known sign of uterine rupture is a non-reassuring FHR pattern[12,13]. Other signs include abdominal pain, vaginal bleeding, loss of station of the presenting fetal part, hypovolemia, and shock. However, these occur later in the clinical presentation of uterine rupture[12].

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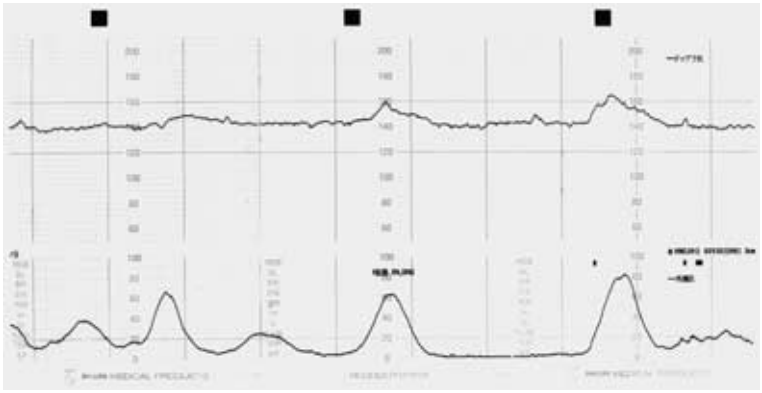

Fig. 1 At 9:11 AM on 35 weeks 5 days, FHR tracings indicated reassuring fetal status, despite frequent and irregular uterine contractions at onset of abdominal pain.

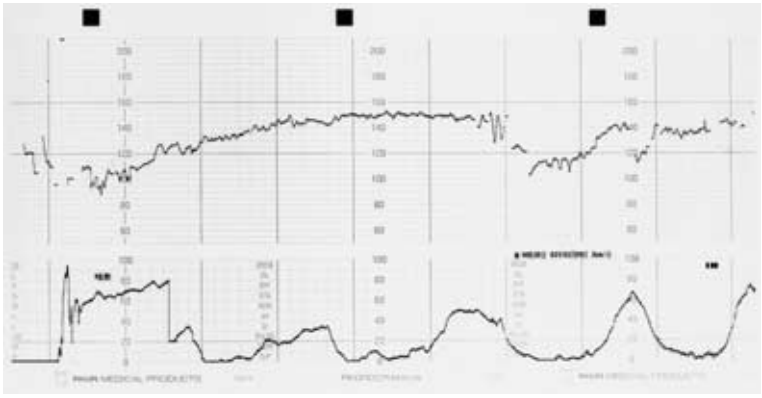

Fig. 2 Fetal Heart Rate Pattern at 2:24 PM showed that variable deceleration appeared successively.

This report presents a series of FHR tracings from just prior to and after uterine rupture.

Case Report

A 31-year-old nulligravid woman underwent LM for infertility at another hospital. According to surgical records, an intramural myomoutous nodule weighing 50 g was removed from the anterior uterine fundus. The myomectomy bed did not reach the uterine endometrium. Intraoperative hemmorrhaging was about 30 m*l*, and no postoperative complications arose.

Five months postoperatively, the patient spontaneously became pregnant. Since she had moved, she visited our outpatient clinic for prenatal care at 28 weeks gestation, following an unremarkable prenatal course. At 34 weeks and 1 day, the patient suffered threatened premature delivery with frequent uterine contractions at 5- to 6-minute intervals. FHR pattern was regular and reassuring. On admission to hospital, intravenous ritodorine hydrochloride was administered and the patient was kept at rest in bed to minimize uterine contractions. Both the external and internal os were closed on digital and transvaginal ultrasonograhic examination. Fetal membrane was intact. Uterine contractions disappeared by 24 h after admission. However, 11 days after admission (35 weeks 5 days), sudden onset of severe abdominal pain developed at 7:00 AM. Tenderness ranging from the epigastrium to the lower abdomen was too strong for the patient to be able to walk. Other than tenderness, general conditions were within normal ranges. FHR tracings indicated reassuring fetal

status, despite frequent and irregular uterine contractions at onset of abdominal pain (**Fig. 1**). At 2:24 PM, variable deceleration appeared twice successively (**Fig. 2**). Tenderness did not improve with analgesia, but increased in strength. At 3:11 PM (about 8 h after onset), cesarean section was performed. Continuous FHR monitoring did not show any development of fetal distress. At cesarean section, about 50 m*l* of bloody ascites was found. A male neonate weighing 2,860 g was delivered. He appeared non-asphxiated, with an Apgar score of 8. Umbilical arterial gases indicated respiratory acidosis (pH 7.18; pO_2 7 mmHg; pCO_2 59.8 mmHg; HCO_3 21 mmol/L; base excess −8.0 mmol/L). After removal of the placenta, a 5-cm wide uterine rupture was found at the anterior fundus, between the right and left angles of the uterine fundus. Since fresh bleeding was not observed around the rupture, the wound was repaired using 2 layers of sutures. Mother and neonate displayed normal puerperal and neonatal courses.

Discussion

Uterine rupture in this case was considered to have occurred at 7:00 AM at 35 weeks 5 days gestation with sudden onset of severe abdominal pain initiated by frequent uterine contractions.

The most common early signs of uterine rupture are non-reassuring fetal heart rate tracings with variable deceleration that may progress to late deceleration, bradycardia or undetectable heart rate[12].

Ayres et al. reported that FHR abnormality 2 h prior to uterine rupture occurs in approximately 80% of uterine ruptures[13]. They indicated that appearance of recurrent late decelerations represents an early sign of impending uterine rupture and that variable decelerations appear in a few cases. The case reported herein demonstrated variable deceleration before cesarean section. However, approximately 7.5 h elapsed from onset of rupture. Until that time, the fetus did not display non-reassuring conditions. The pathological conditions causing fetal distress vary from uterine dehiscence to complete uterine rupture, which is classified into extrusion or no extrusion of fetal parts or placenta.

In the present case, uterine dehiscence might have occurred around 34 weeks 1 day. At the time, frequent uterine contractions might have appeared as a cause or result of uterine dehiscence. A strong association exists between uterine rupture and contractions[14]. In a case report of uterine dehiscence, FHR findings were reportedly normal[1]. Eleven days after admission, true uterine rupture without extrusion of the placenta and fetus might have occurred. The ruptured wound might have formed scar tissue during the 11 days from dehiscence to overt rupture. Hemorrhage from the uterine wall was therefore minimal.

Hockstein[4] reported a case with similar site of uterine rupture to that seen in our case, with a 4-cm hole at the uterine fundus. FHR patterns changed from normal at first to hypoxic during the course of several hours from onset of uterine tenderness. FHR abnormality may depend on the site and size of uterine rupture, and elapsed time from rupture.

Small size of the ruptured wall at the fundal site, considerable time elapsed from uterine dehiscence, and a small volume of hemorrhage may represent the conditions contributing to the lack of fetal distress. This can occur only in cases without extrusion of the fetus or placenta. Additional FHR recordings are required to clarify associations between FHR pattern and clinical pathology in cases of uterine rupture.

Uterine rupture following LM may result from sub-optimal wound healing, coupled with the relatively poor vascularisation of some parts of the uterus, predisposing those sites to weak scar formation after certain types of electrosurgery[4,7]. In addition, meticulous closure of the myometrial bed following myomectomy is difficult via laparoscopy, and could interfere with subsequent integrity of the scar[11].

The interval between LM and pregnancy is assumed to be relevant to wound healing, although solid evidence is presently lacking.

In Dubbinnson's study with the largest series of pregnancies following LM, the rate of uterine rupture attributed to LM was 1%[5]. However, estimating the incidence of uterine rupture in pregnancy for women who have previously undergone LM is difficult, because published series on uterine ruptures

often do not indicate the total number of myomectomies. Accordingly, new strategies are required to reduce the risk of uterine rupture. However, the rates of uterine rupture at birth after abdominal myomectomy and after previous cesarean section were observed to be 5.3%[15] and between 0.3% and 3.8%[16], respectively. Comparing these rates of uterine rupture, the clinical relevance of LM is evident.

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