US-color Doppler early diagnosis of uterine rupture with protrusion of umbilical cord

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Abstract

Objective: to analyze a case of uterine rupture in a pregnant woman that had a previous laparoscopic myomectomy.

Methods: pregnant woman at 34 weeks gestation came to our emergency room for abdominal pain. She had undergone a previous laparoscopic multiple myomectomy. Patient was evaluated in our Department, that is a tertiary center, by a team of experienced ultrasonographers.

Results: at a first clinical examination, the findings were a deep abdominal pain, dysuria and a positive Giordano’s sign on the right. 2D ultrasound showed an alive intrauterine foetus, normal anterior fundal placenta and mild reduction of amniotic fluid. It revealed also a maternal right pyelectasis. A further meticulous ultrasound evaluation plus color Doppler revealed on the left side of the uterus the presence of a small vascularised area with venous and arterial flow that seemed to be in continuity with umbilical cord and that had its ultrasound characteristics. Emergency laparotomy was performed and confirmed the hypothesis of uterine rupture.

Discussion: uterine rupture seems to occur more frequently as a consequence of a laparoscopic myomectomy and the classic signs and symptoms are fetal distress, loss of uterine contractility, abdominal pain, hemorrhage and shock, so the early US suspect of uterine rupture was extremely important in the decision to perform an emergency caesarean section.

Conclusion: the correlation between clinical examination and ultrasound-Doppler findings has been essential to recognise an obstetrical emergency and to perform prompt surgery.

Key words: ultrasound, uterine rupture, laparoscopic myomectomy.

Introduction

Uterine rupture in pregnancy is a rare and often catastrophic complication with a high incidence of foetal and maternal morbidity and mortality. It is known that the rate of uterine rupture increases in patients with a history of uterine surgery, such as caesarean section, abdominal or laparoscopic myomectomy, but it can either occur in women with a native, unscarred uterus. It has been hypothesized that uterine rupture following laparoscopic myomectomy is the result of sub-optimal healing, inadequately suture, lack of haemostasis with subsequent hematoma formation or excessive use of monopolar or bipolar electrosurgery with devascularisation of the myometrium which can interfere with myometrial wound healing, increasing the risk of rupture (1-3).

Uterine rupture refers to a complete separation of all uterine layers, including the uterine serosa (4), and it is often associated with clinically significant paroxysmal pain, uterine bleeding, fetal distress and protrusion or expulsion of the fetus and/or placenta into the abdominal cavity. It entails the need for prompt caesarean delivery, uterine repair or hysterectomy. From the time of diagnosis to delivery, generally only 10-37 minutes are available before clinically significant fetal morbidity becomes inevitable. Fetal morbidity occurs as a result of catastrophic hemorrhage, fetal anoxia, or both. The diagnosis of uterine rupture is made by clinical observation and can be confirmed by ultrasound imaging.

Case report

A 31-year-old primipara woman came to our emergency room for abdominal pain of sudden onset in the 34th week of gestation. She had undergone laparoscopic multiple myomectomy 18 months earlier; during that previous surgery, different types of myoma were excised such as an intramural (IM) myoma of the posterior wall of the uterus (5 cm), an IM myoma of the left wall (3 cm), an IM one on the fundus.
(3 cm) and a subserosal myoma of the right wall (2 cm). At a first clinical examination, the findings were a deep abdominal pain, dysuria and a positive Giordano’s sign on the right. Her blood pressure was 132/66 mmHg, heart rate 77 beats/min. She was afebrile and not pale. Fetus was alive and cardiotocographic evaluation was reassurance. There were no palpable uterine contractions, in spite of patient groaning in pain; the cervix was closed and there was no evidence of vaginal bleeding. We performed transabdominal 2D ultrasound that showed an alive intraterine foetus with appropriate growth, normal anterior fundal placenta, normal doppler waveform of umbilical cord artery and mild reduction of amniotic fluid (amniotic fluid index of 50). It revealed also a maternal right pyelectasis (pelvis equal to 3 cm), according to the Giordano’s sign previously noticed; a further meticulous ultrasound evaluation plus color Doppler revealed on the left side of the uterus the presence of a small vascularised area with venous and arterial flow that seemed to be in continuity with umbilical cord and that had its ultrasound characteristics (Figure 1 a); color Doppler analysis confirmed foetal heart rate equal to 120/bm (Figure 1 b). The suggested left uterine wall breach measured about 18 mm and was in correspondence with one of the wounds of the previous laparoscopic myomectomy. Continuous cardiotocographic assessment showed a normal foetal heart beat and the absence of uterine contractions; the patient continued complaining about abdominal discomfort compatible with renal colic but the US suspicion of an uterine rupture was great and an emergency laparotomy was performed within 30 minutes; surgical findings included a breach that passed horizontally through all the anterior wall of the uterus, the foetus that approached to the abdominal cavity with the left shoulder (Figure 2 a, b) and a moderate amount of hemoperitoneum. The baby was delivered alive with the placenta and didn’t require any emergency procedure (male, 2.250 gr, Apgar 9-10). The tear was repaired (single layer of 2-0 chromic detached stiches) and the haemoperitoneum drained. The patient made satisfactory clinical progress and was discharged home with the baby on the fifth postoperative day; neonatal follow up was normal.

Discussion

Rupture of pregnant uterus is one of the life-threatening complications encountered in obstetric practice. Several aetiopathological factors may be responsible for the rupture of the uterus, including previous caesarean section or laparotomic/laparoscopic myomectomy, trauma, uterine overdistension, uterine anomalies, placenta percreta and choriocarcinoma (5). Uterine rupture implies a defect in the uterine musculature with extravasation of fetal parts and intra-amniotic contents into the peritoneal cavity and during pregnancy seems to occur more frequently as a consequence of a laparoscopic myomectomy than a laparotomic one (6, 7), because after abdominal myomectomies the scars are of similar thickness to normal myometrium while after laparoscopy they are strained, more contracted and thinner than normal myometrium. All cautions, therefore, should be taken to minimize the risk of laparoscopic myomectomy: excessive use of diathermy for hemostasis should be avoided, and multiple-layer sutting should always be used to repair myometrial defect (1). Yet, even with ideal surgical technique, individual wound healing characteristics may predispose to uterine rupture (3). In our case of uterine rupture the previous laparoscopic multiple myomectomy followed technically all the recent surgical recommendations; we need of larger studies to better understand if uterine rupture after laparoscopic myomectomy is a “real” complication of the procedure or hypothetical “malpractice”.

The classic signs and symptoms of uterine rupture are fetal distress, diminished baseline uterine pressure, loss of uterine contractility, abdominal pain, hemorrhage and shock; however at very early stage these signs may not be reliable, making the diagnosis difficul-

Figure 1. a. 2D Transabdominal US and color Doppler findings: a loop of umbilical cord was noticed outside of the uterus and through the left uterine wall focal defect (18 mms, yellow cross) the umbilical arteries and veins were colorized. b. Doppler waveform (fhb=120 b/m) of the loop of umbilical cord herniated outside the uterus through the focal defect (arrow).
cult with the risk to delay prompt surgical treatment. In the present case, there was no fetal distress, no vaginal bleeding neither signs of shock; moreover the patient complained about abdominal pain that was not related with uterine contractions but compatible with symptoms of a renal colic. So the early US suspect of uterine rupture was extremely important in the decision to perform an emergency caesarean section, while a delay surgical treatment would have been possible if we had chosen to wait to resolve the renal colic, also according to mild prematurity (34 weeks gestation). Extra-peritoneal hematoma, intrauterine blood, free peritoneal fluid, empty uterus, gestational sac above the uterus and large uterine mass with gas bubbles have been reported as sonographic findings associated with uterine rupture (5). We report the first case with the only ultrasound-Doppler sign of a small vascularised area with venous and arterial flow that seemed to be in continuity with umbilical cord passing through a breach on the left wall of the uterus.

**Conclusion**

The correlation between clinical examination and ultrasound-Doppler findings has been essential to recognise an obstetrical emergency and to perform prompt surgery to save two lives: the mother and her newborn baby.

**Conflict of interest**

The Authors declare that they have no competing interests.

**References**