

Uterine rupture at 28 weeks of gestation after laparoscopic myomectomy – a case report

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Abstract

There are many reasons for sterility, and uterine malformations are of the greatest concern. Among uterine disorders, myomas play a significant role and are present in 27% of infertile women. The occurrence of myomas is frequent – 20-40% in women of reproductive age. Thus, for those infertile patients surgical treatment may be needed to preserve an opportunity to conceive.

This case report refers to an uterine rupture at 28 weeks of gestation after laparoscopic myomectomy (3 months before conceiving). The myomectomy was conducted correctly and two layers of sutures on the myometrium were performed.

The purpose of the myomectomy in a young woman should be well considered. In cases of infertility, removal of the lesions is usually necessary to give the patient a chance of pregnancy. At the same time, the risk of uterine rupture is increased. There are some suggestions referring to myomectomy to reduce the risk of uterine rupture in a subsequent pregnancy. It seems that the method of sewing the uterine closure is crucial. For example, multilayer uterine stitches, preservation of the endometrial cavity, and avoidance of using electrosurgery to prevent devascularization (to avoid haematoma formation) should be taken into consideration to prevent weakness of the wall of the uterus. Uterine scars differ histologically and biochemically.

Key words: uterine rupture, myoma, myomectomy.

Introduction

There are many reasons for sterility; for example, failure of ovulation, tubal and uterine malformations, cervical mucus, sperm defects, and endometriosis are of the greatest concern [1]. Among uterine disorders, myomas play a significant role and are present in 27% of infertile women [2, 3]. The occurrence of myomas is frequent – 20-40% in women of reproductive age [4]. There is an increasing amount of evidence that all kind of myomas – submucosal, intramural and subserosal – may be a cause of sterility (in decreasing order of importance) [5]. Thus, for those infertile patients surgical treatment, myomectomy, is important and needed to preserve an opportunity to conceive. However, the effectiveness and safety of the subsequent pregnancy is still uncertain. This paper describes the medical case of a pregnant patient who had undergone laparoscopic myomectomy and experienced uterine rupture in week 28 of gestation.

Case presentation

A 27-year-old woman had undergone laparoscopic myomectomy 3 months before conception. A subsero-

sal myoma 10 cm in diameter was located on the posterior wall of the uterus. The myometrium was sewn with 2 layers of stitches. Bipolar diathermy was used to maintain haemostasis. The surgery was uncomplicated. The patient conceived 3 months later without medical contraindications. The course of the pregnancy was uncomplicated. The ultrasound scans of the fetus, placenta and uterus were normal.

In week 28 of gestation the patient came to the Emergency Department because of sudden abdominal pain and nausea. The obstetrical examination revealed a formed uterine cervix, the cervical orifice closed and increased uterine tension.

Ultrasound examination revealed that the position of the fetus was transverse. There were no signs of placenta abruption. In the cardiotocography (CTG) sinusoid oscillation and decelerations were observed, and after that the patient was immediately transported to the delivery ward (Fig. 1). After 15 minutes of CTG monitoring an immediate caesarean section was performed due to sinusoid oscillation and progressive abdominal pain. The fetus within the amniotic sac, as well as the placenta, was partially expelled into the abdominal cavity. A uterine rupture of 6 cm on the posterior wall was found.

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Submitted: 14.03.2018

Accepted: 06.04.2018

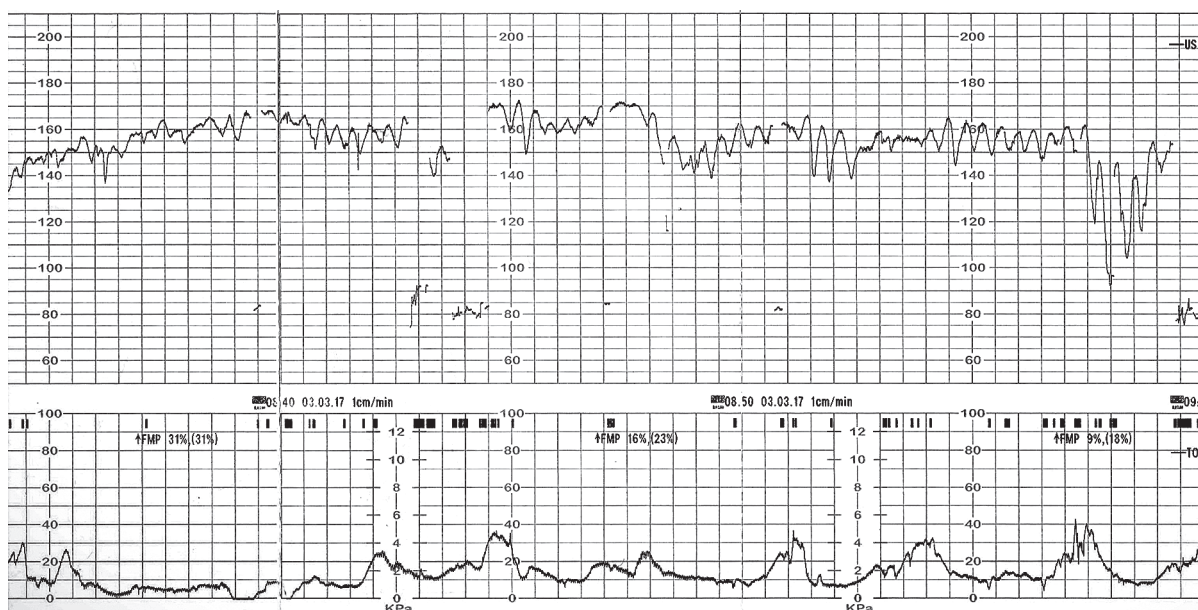


Fig. 1. Cardiotocography during admission

A boy was born alive, weight 1455 g, Apgar scale: 0, 0, 0, 2, 4. Because of intraperitoneal bleeding the patient needed transfusion of 4 x 400 ml of erythrocyte concentrate and 2 x 100 ml of plasma. Further pharmacologic agents including antibiotics – cefuroxime axetil 3 x 1500 mg *i.v.*, amikacin 2 x 500 mg *i.m.*, metronidazole 3 x 500 mg *i.v.* – as well as enoxaparin 40 mg/ml and painkillers were administered. The patient was discharged in a good condition on the 7th day after surgery.

Discussion

The incidence of uterine rupture is low, at around 0.012% in cases without previous uterine scars [6]. The total risk of rupture after abdominal myomectomy is 0-4% and after laparoscopy 0-1% [7, 8]. It seems that uterine ruptures after caesarean section occur more commonly [9]. The evidence suggests that both techniques are effective in terms of future pregnancy [5, 10]. Laparoscopy is associated with quicker recovery, lower risk of adhesions and a better cosmetic result [10, 11]. On the other hand, it is a more difficult technique. Advantages of both techniques: laparoscopy and laparotomy compounded mini-laparotomy seem to be as effective and safe and should also be considered [12]. It seems that it is not the surgical technique, but the method of sewing the uterine closure that is crucial [11-13]. Bipolar diathermy coagulation seems to weaken the wall of the uterus, and hence may be a future cause of uterine rupture during pregnancy [11, 13, 14]. Most authors indicate that the 2-layer closure with stitches is essential to maintain the resistance of the womb's wall [11, 13, 14]. The size and number of removed myomas,

and the opening of the endometrial cavity, may also be potential factors that may increase the risk of uterine rupture. Nevertheless, due to limited evidence in this field these factors remain a topic for debate.

In most cases, uterine rupture after myomectomy occurs during the third trimester or in labour [14]. However, Hamideh *et al.* described a case of uterine rupture in week 20 of gestation in a patient after abdominal myomectomy 6 years before conception [6]. However, Braun *et al.* noted 120 pregnancies after abdominal myomectomy (AM) with no uterine rupture and deliveries on time [7]. Similarly, Golan *et al.* reported 59 uncomplicated pregnancies after laparoscopic myomectomy [15]. Kumakiri *et al.* showed that vaginal deliveries may be safe after laparoscopic myomectomy (LM). From 111 pregnant patients after LM, 59 underwent natural deliveries successfully and 52 had caesarean sections (CS). No uterine rupture was observed [16]. Another interesting case report by Ivka illustrated that uterine rupture may occur even after one successful natural delivery in a patient after LM [17]. In terms of LM, Koo *et al.* studied 523 women after LM and found a uterine rupture incidence of 0.6% [18]. Bernardi *et al.* observed 10% of uterus rupture in 55 analyzed patients after LM, and the average time to conception was 73.5 months [19]. In contrast, Okada *et al.* described a case of uterine rupture even in week 10 of gestation after laparoscopic myomectomy, and therefore the occasional occurrence of uterine rupture after surgery of the uterus even in the first trimester should be considered [20].

Uterus healing consists of various processes: blood clotting, inflammation, new tissue formation and tissue remodelling. The tissue remodelling process has not been fully investigated. However, it has been reported

Table 1. Cases of uterine rupture during pregnancy after previous myomectomy

Time of uterine rupture (week of gestation)	Method of myomectomy	Time of surgery before conception (year)	Author
20	Laparotomy	6	Hamideh <i>et al.</i> [6]
16	Laparotomy	6	Al-Ramahi <i>et al.</i> [14]
10	Laparoscopy		Okada <i>et al.</i> [20]
23	Laparoscopy	1	Kiseli <i>et al.</i>
32	Laparoscopy	8	Sutton <i>et al.</i> [39]
30	Laparoscopy	1.5	Tsankova <i>et al.</i>

that the injured uterus compared to the unscarred wall of the womb is characterized by:

- similar endometrium layer,
- no perimetrium layer as well as defective scar area,
- decreased uterine wall thickness,
- increased VEGF and PDGF immunoreactivity [21].

The scar/wound healing is the result of synthesis and degradation of extracellular matrix. Growth factors as well as proteolytic enzymes such as elastase and collagenase are involved in the process [22]. Histologically, the main problem of the uterine scar is collagen deposition and its impact on native, baseline cells [23]. Collagen seems to alter the proliferation, differentiation and migration of the basalis layer of the endometrium; thus the wall of the uterus is weaker [23]. Pollio's study confirmed that the scars of women with uterine dehiscence contain higher collagen content [24]. Moreover, in the scar a reduction of expression of transforming factor- β (TGF- β) and an increase in basic fibroblast growth factor were found [24]. However, it seems that fibromodulin may improve scar strength [25]. Moreover, recent studies showed that anti-oxidative enzymes may play a significant role in the uterus healing process [21].

The study of Wu *et al.* revealed that smooth muscle volume density was significantly lower in uterine scars after CS (until 7 years after CS) compared to those without previous CS. Also in the group of patients with a scar (up to 3 years after surgery) the number of apoptotic nuclei was higher and significantly lower in the group that had CS 7-9 years before. The conclusion was that the uterine scar becomes mature at even 9 years after surgery [26].

There are no studies about the resistance of the uterine scar with respect to the intensity of uterus contractions. It seems that the injured uterus should be considered as an individual case.

Ultrasound evaluation of the caesarean uterine scar is essential. Many publications confirm that attributes of the quality of the scar include: scar thickness of 3.5 mm or more, the homogeneity of the scar, triangular shape of the scar, richer perfusion, and scar volume verified by 3D technique up to 10 cm [27, 28].

Another important issue is the time of conception after myomectomy. There is no strict recommendation, yet it seems that 6 months of recovery is the minimum time for the uterus to cicatrize. However, a longer time is also proposed, as it is much safer for a developing fetus. Al-Ramahi *et al.* noted a case of uterine rupture even in week 16 of gestation after abdominal myomectomy 6 years before conception [14]. It seems there are some other factors that may need to be taken into account. The following table (Table 1) presents cases of uterine ruptures after myomectomy due to the time of the surgery.

Rupture of the gravid uterus is a life-threatening condition for the fetus and the mother. It is necessary to perform CS as fast as possible to have a chance of saving the baby and the woman. Ten to 37 minutes is the recommended time after uterine rupture for delivering a baby and avoiding fetal morbidity [29]. The first symptoms of uterine rupture are not characteristic, so it may be difficult to establish the diagnosis. The first common sign is fetal bradycardia – up to 87% of observed cases [30]. Sudden abdominal pain, vomiting and nausea are also common [30]. Vaginal bleeding and maternal hypovolemic shock are also described [31-33].

The purpose of the myomectomy in young woman should be well considered [17]. In cases of infertility, surgery and removal of the lesions is usually necessary to give the patient a chance of pregnancy. At the same time, the risk of uterine rupture is increased. Other risk factors of uterine rupture include congenital uterine anomalies, labour induction, uterine trauma and other previous surgical procedures on the uterus, including particularly caesarean section, abdominal and laparoscopic surgery, intrauterine procedures, obstetric manoeuvres and injudicious use of oxytocin [2, 13, 15]. Uterine rupture can occur in an intact uterus but this condition is very rare [34-36].

There are some suggestions referring to myomectomy to reduce the risk of uterine rupture in a subsequent pregnancy. For example, multilayer uterine stitches, preservation of the endometrial cavity, and avoidance of using electrosurgery to prevent devascularization as a prevention of haematoma formation should be used to prevent weakness of the wall of the uterus [37-39].

Conclusions

The purpose of myomectomy in young women should be well considered.

Uterine rupture after myomectomy may occur during every trimester in subsequent pregnancies.

Multilayer uterine stitches as well as preservation of the endometrial cavity should be maintained during myomectomy (laparoscopic and abdominal).

Disclosure

The authors report no conflict of interests.

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