

CLINICAL CASE REPORT

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Uterine Rupture in the Second Trimester of Pregnancy as an Iatrogenic Complication of Laparoscopic Myomectomy

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Summary. Uterine rupture is one of the most dangerous obstetric emergencies carrying a high risk for the mother and the fetus. Reports about uterine rupture in pregnancy following previous laparoscopic surgery have not been frequent; however, an increasing rate of the occurrence of this complication has been observed and reviewed in contemporary literature.

We report a case of a spontaneous uterine rupture at 22 weeks of gestation in a 25-year old primigravida, who had had a laparoscopic removal of a small, peduncular, asymptomatic myoma located in the right uterine horn 20 months earlier. Ultrasound examination and subsequent urgent laparotomy confirmed a spontaneous uterine rupture with a nonviable fetus in the peritoneal cavity.

Women planning to become pregnant should be qualified for laparoscopic myomectomy with special carefulness. Special attention must be paid to the potential solutions that limit the risk of postoperative uterine rupture, if the absolute necessity for the enucleation of myomas during the reproductive age occurs and a decision about laparoscopic intervention is made.

Introduction

Uterine rupture during pregnancy, especially before the end of the second trimester, occurs relatively rarely; however, it has been known to result in the death of both the fetus and the pregnant woman. Previous surgeries carried out on the uterus and combined with the opening of its cavity are considered to be the most significant risk factor for the development of this obstetrical complication (1, 2). In addition, it seems to be of great importance to highlight that the potential development of this complication may occur not only after open abdominal operations, but also after laparoscopic interventions that are widely introduced into modern gynecology due to recent progress and interest in endoscopic techniques.

Case Report

A 25-year-old primigravida at 22 weeks of gestation was transported by ambulance to the Department of Obstetrics and Gynecology, Pomeranian Medical University in Szczecin, because of bleeding from the vagina and severe pain located in the lower part of the abdomen that was gradually aggravating for the previous 2 weeks. Seven days earlier, the patient had been admitted to the regional hospital for observation because of mildly increased tenderness in the lower abdomen and suspicion of kidney

stones. During this hospitalization, no abnormalities in biochemical blood tests, as well as in abdominal ultrasound (US) examination, were observed. After 3 days, the patient was discharged from the hospital. Before the onset of the abovementioned symptoms, the course of the pregnancy had been normal. During an interview, it was also noted that 20 months before the pregnancy, the patient had had a laparoscopic removal of a peduncular myoma (2 cm in diameter) located in the area of the right uterine horn. An asymptomatic uterine myoma was diagnosed using US during a routine periodic visit. During laparoscopic surgery, a peduncle was cut and coagulated, leading to the formation of a 2- to 3-mm superficial scar. This operation was conducted in other hospital, and the data about this procedure were collected from a discharge report and medical records about the operation.

On admission, the patient was a little confused, with a slightly lowered blood pressure (100/50 mm Hg) and body temperature (35.6°C), as well as an increased heart rate (87 beats per minute). The fetal heartbeat was not detected. Gynecological examination revealed a small amount of dark blood in the vagina and the vaginal part of the uterine cervix located in the vaginal axis, 2 cm in length with its orifice closed. The vaginal opening and cervical canal were closed. Due to intensified muscular stiffness and abdominal tenderness, the uterus was not closely examined.

Sonographic imaging revealed an enlarged uterine corpus measuring 14×8 cm with the visible uneven surface in its posterior wall. In the uterine cavity,

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neither the fetus nor the secundines were observed. A vast amount (around 1 dm³) of hypoechogenic fluid was noted in the peritoneal cavity. The fetus was lying on the posterior peritoneal wall between the intestines. The fetal heartbeat was not present, and the fetal weight according to the Hadlock formula was estimated to be 430 g.

Based on US examination, a uterine rupture accompanied by translocation of the fetus to the peritoneal cavity was diagnosed and qualified the patient for urgent laparotomy. In the course of the laparotomy, the abdominal wall was opened using a straight cut. Initial evaluation showed a volume of 1500 mL of dark blood in the peritoneal cavity and a nonviable male fetus of around 490 g in the amniotic sack. The uterus was properly contracted, and on its posterior wall, in the area of the scar made during the laparoscopic myomectomy, a rupture of around 5 cm in length extending from the right uterine horn was observed (Fig.). The fetus and intra-abdominal blood were evacuated, and the uterine rupture was double-layer sutured. The abdominal wall was reconstructed. The laboratory blood tests revealed normocytic anemia and leukocytosis accompanied by the C-reactive protein level and coagulation parameters within reference ranges (hemoglobin, 4.08 mmol/L; red blood cells, $2.05 \times 10^{12}/L$; hematocrit, 0.189; and white blood cells, $20.1 \times 10^9/L$). No abnormalities in ion concentrations were observed. Four units of red blood cells were transfused. The postoperative period was uncomplicated, and the patient was discharged after 5 days.

Discussion

Dynamic progress in laparoscopic techniques has enabled the conduction of a wide spectrum of surgeries from invasive diagnostic techniques to oncologic interventions. Myomectomy is a treatment of choice for the management of symptomatic uterine myomas (3, 4). Laparoscopic myomectomy, in contrast to laparoconverted, is advantageous for several reasons: it reduces the duration of hospitalization and patient's convalescence and is associated with lower perioperative blood loss resulting in limited postoperative pain and offering a much better esthetic outcome (1, 3, 5). Unfortunately, several authors have highlighted that during the reproductive period, this laparoscopic intervention (analogically to classic surgeries) is associated with the risk of uterine rupture during pregnancy (2, 5–10).

The first description of uterine rupture after laparoscopic myomectomy in pregnant women was reported by Harris in 1992 (1). Since then, some reports of similar cases have been published (1, 6, 8). In several multicenter studies analyzing the occurrence of this iatrogenic complication, its prevalence was estimated to be approximately 0.26%–1% (5, 11). Interestingly, several teams have not ob-



Fig. Uterine rupture on the posterior wall of around 5 cm in length extending from the right uterine horn

served such complications in their clinical experience (3, 12, 13). These authors have highlighted that such promising results can be obtained as long as clinical effort is concentrated on the limitation of several risk factors associated with this operation that lead to the development of postsurgical uterine rupture during pregnancy. First, during the laparoscopic operation, it might be difficult to judge whether the opening of the uterine cavity has occurred; thus, the application of methylene blue to the uterine cavity for a proper clinical decision making is recommended. A limited technical ability to suture the myometrium precisely is the next difficulty associated with laparoscopic intervention. Moreover, the frequent use of electrosurgery leads to the development of a very thin scar in the region of an enucleated myoma. Taking into consideration all of the abovementioned aspects, Seracchioli et al. conducted laparoscopic myomectomies in 514 women fulfilling precisely defined qualifying criteria between 1998 and 2003. In all the cases, the need for opening the uterine cavity was verified using methylene blue, the uterine walls were always single- or double-sutured, and electrosurgical techniques were avoided when possible (10). In their study, 158 pregnancies were achieved, and none of them were complicated by uterine rupture. Soriano et al. have also indicated that special attention must

be paid to the qualification process and to the role of suturing of the uterine walls after the enucleation of a myoma(s) (9). In a group of 88 infertile women after laparoscopic myomectomy, 44 pregnancies were achieved, from which 8 resulted in failures during the first trimester, 26 in vaginal delivery, and 8 in cesarean delivery. No cases of uterine rupture were observed. Analogically, Di Gregorio et al. in their study group of 635 women recorded 105 intrauterine pregnancies; 67 of them occurred in women who experienced the opening of the uterine cavity. During the enucleation of huge myomas, a bipolar or ultrasound electrode was applied in rare cases in order to induce hemostasis. The uterine wall was single- or double-sutured. Five of these patients delivered spontaneously, and 48 after cesarean delivery. No cases of uterine rupture were observed (3). Parker et al. described a case of a uterine rupture in a pregnant woman at 34 weeks of gestation, who had undergone a laparoscopic excision of a myoma 7 years earlier that was performed using a monopolar electrode and without the application of extra sutures within the uterus (7). These authors suggest that the direct reason for the occurrence of such a complication was the operating technique: the use of a monopolar electrode leads to deep devascularization of the myometrium and finally to its structural degeneration and thickening. Probably, our case study confirms this thesis. Nezhat et al. used a combination of laparoscopy and minilaparotomy in order to conduct myomectomies in 57 women (14). The authors highlight the fact that this technique is easier and allows for better suturing of the myometrium. Malzoni et al. compared the results of classic laparoscopic and minilaparotomic myomectomy in 680 women with symptomatic myomas (15). The authors determined that both techniques were therapeutically equally effective, although the laparoscopic method seemed to be technically more difficult and was more time consuming. Nevertheless, the researchers have highlighted a higher risk of postoperative adhesions forming after minilaparotomy that may have an impact on further fertility.

All the authors highlight the essential role of perioperative surgical management of the myometrium in the prevention of uterine rupture. Moreover, they indicate that special attention must also be paid to the proper judgment of indications and application of appropriate qualification criteria to surgery. The risk of developing complications may be associated not only with the operating technique, but also with the quantity, size, and localization of myomas (5, 8–10, 16). Moreover, the establishment of an adequate and safe period between surgery and planned pregnancy is problematic. The time between surgery and development of postoperative complications varies in medical literature; in the study by Parker and colleagues, it was as long as 7 years (7).

Other surgical techniques used in gynecology

apart from laparoscopy, laparotomy, and minilaparotomy are minilaparoscopy and hand-assisted laparoscopy (17–20). Such methods are relatively new, and because of the lack of access to proper equipment, they have not been widely applied so far. Nevertheless, there are already reports comparing their effectiveness, safety, and cost with the abovementioned laparoscopy and laparotomy. Most authors agree with the following statement that at the current stage of knowledge and technological development in the hands of a skilled laparoscopic surgeon, robot-assisted laparoscopic myomectomy does not offer any major advantage (17, 18). Minilaparoscopy, as well as the laparoscopic technique, poses, however, some limitations concerning the efficient and total hemostasis of the place from which the fibroma was removed (9, 14, 15, 19, 20). It appears that having in mind the future well-being of a patient during the childbearing age, management of the treated area after the removal procedure of uterine fibroids is more important than the removal technique itself.

Our case is one of the few in which a uterine rupture occurred so early in the course of pregnancy; up to now, such an iatrogenic complication has been observed in pregnancies of at least 27 weeks of gestation (6, 8, 13). Goynumer et al. described a similar case in a pregnant woman at 17 weeks of gestation, who had undergone a laparoscopic myomectomy in the area of uterine fundus 3 years earlier (21). These authors also especially emphasize the operating technique: the myoma was operated using a monopolar electrode, and the uterus was sutured. In our patient, the uterine rupture was associated with the excision of a small (detected only in ultrasonographic imaging) and clinically asymptomatic uterine myoma. Retrospective analysis of our case indicates that laparoscopic myomectomy was not clinically justified, and uterine rupture in the course of pregnancy was evidently an iatrogenic complication associated with the thickness of the uterine wall in the region of the postoperative scar.

Conclusions

Taking into consideration the risk of uterine rupture during pregnancy in patients after laparoscopic myomectomy, which is mainly caused by limited technical possibilities of layer suturing of the myometrium, women planning to become pregnant should be qualified for this type of operation with special carefulness. If absolute necessity for the enucleation of myomas during the reproductive age occurs and a decision about laparoscopic intervention needs to be made, special attention must be paid to potential solutions that limit the risk of postoperative uterine rupture.

Statement of Conflict of Interest

The authors state no conflict of interest.

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