

Removal of uterine fibroids by mini-laparotomy technique in women who wish to preserve their uterus and fertility

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Abstract

Introduction: The minilaparotomy is considered to be a safe and effective alternative to laparoscopy and abdominal laparotomy in myomectomy cases.

Aim: To perform a retrospective analysis of pre-surgical assessment, surgical course and post-operational parameters in women wishing to preserve their uterus and fertility who underwent myomectomy by minilaparotomy in the Department of Gynecology and Gynecological Oncology at the Polish Mother's Memorial Hospital – Research Institute in Lodz in the years 2008–2014.

Material and methods: A total of 76 patients were qualified for minilaparotomy due to a benign gynecological pathology. Only 21 patients with uterine fibroids who wanted to preserve their uterus and fertility were appropriate for this study. Patients' records were analyzed in terms of: epidemiological history, surgical course, postoperative stay and pathological data. All studied patients were asked in 2014 about conception and pregnancy after minilaparotomy.

Results: The median age was 35.7 years. The median patient body mass index (BMI) was 24 kg/m². The average decrease of hemoglobin was 1.5 g/dl. The size of the myoma was between 1.5 and 15 cm. There were no serious post-surgical complications. The size of the myoma did not correlate significantly with operation time, BMI or blood loss. There was no statistically significant dependence between operation time and average hematocrit and hemoglobin decrease. In our group 7 patients who had undergone myomectomy tried to achieve conception. Four of them succeeded in pregnancy and gave birth to healthy infants.

Conclusions: Myomectomy performed via minilaparotomy is a safe procedure for patients willing to preserve their uterus and fertility, and it combines some advantages of both laparotomy and laparoscopy.

Key words: infertility, uterine myomas, fertility, minilaparotomy.

Introduction

Uterine fibroids are the most common estrogen-dependent uterine benign tumors in women. They are present 3 times more often in females whose first-degree relative suffered from fibroids, indicating the existence of some genetic predisposition, and are more frequently diagnosed in nulliparous, obese women [1–3]. About 3–10% of fibroids appear in reproductive age and could distort the

uterine cavity and change uterine contractility, provoking profound menstrual and/or inter-menstrual bleeding. They could also be risk factors for decreased fertility or even infertility, and in the group of infertile women uterine fibroids are diagnosed in up to 2.5% of cases [4, 5]. The probable reasons for their adverse action are: endometritis localized in the uterine wall adjacent to myoma, negative effect on embryo implantation, as well as disturbance in

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spermatozoa and oocyte migration [6, 7]. The risk of miscarriage, premature delivery and placental abruption is more frequent in the group of patients with fibroids. Therefore, many authors claim that large (over 5 cm in diameter, single and multiple) fibroids, especially when distorting the uterine cavity, should be removed in reproductive age women who are planning, or according to their age, may potentially plan reproduction in the future. That is even more true for women who suffered from miscarriages or unexplained infertility [8–13].

Noninvasive uterine artery embolization does not apply to women who wish their fertility to be preserved, as this method compared with surgical myomectomy increases the risk of miscarriage, premature delivery, intrauterine growth restriction, and postpartum hemorrhage [14–18]. The recommended treatment in reproductive age women is abdominal laparotomy or laparoscopic myomectomy. The choice of surgical technique depends on tumor size, surgeon experience and the patient preferences [19]. Laparoscopy has many advantages including shorter hospital stay, lower intensity of pain, fast recovery and cosmetic effect [20–24]. However, the main disadvantages include the total surgery duration, increased blood loss and high risk of conversion to laparotomy, especially in the case of fibroids of greater diameter or excessive bleeding [20–22]. Moreover, after laparoscopic myomectomy an increased risk of uterine wall damage during pregnancy has been reported [25–27]. In the opinion of some authors, minilaparotomy could be a way to combine the advantages and minimally invasive potential of laparoscopy with the easy access gained by laparotomy [28–36].

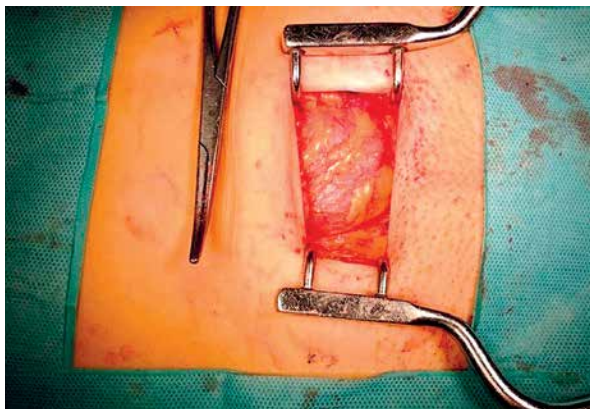


Photo 1. Size of abdominal wall incision

Aim

The aim of the study was to perform a retrospective analysis of pre-surgical assessment, surgical course and post-operational parameters in women wishing to preserve their uterus and fertility, who underwent myomectomy by minilaparotomy.

Material and methods

A total of 76 patients were qualified for minilaparotomy due to benign gynecological pathology in the Department of Gynecology and Gynecological Oncology, Polish Mother's Memorial Hospital – Research Institute between 2008 and 2014. Only patients with uterine fibroids, who wanted to preserve their uterus and fertility, were appropriate for this study. Patients' records were analyzed in terms of: epidemiological history (age, body mass index (BMI), medical and obstetrical history), surgical course (operation time, hemoglobin drop, type of anesthesia), postoperative stay (duration, use of analgesics and antibiotics, complications) and pathological data (number, size and localization of fibroids). All studied patients were asked in 2014 about conception and pregnancy after minilaparotomy.

Surgical technique

The skin incision of 4–6 cm length was done crosswise suprapubically about 2–3 cm over the upper edge of the pubic symphysis (Photo 1). Next, using monopolar cutting and coagulation, adipose tissue was dissected thoroughly crosswise until the anterior surface of abdominal fascia was unveiled. Then, using coagulation, the anterior surface of the abdominal fascia was unsheathed from the adipose tissue in the umbilical direction while the overlying skin was pushed up using the retractors. In the next move, the fascia was cut longitudinally at the length of 6–8 cm from the pubic symphysis towards the umbilicus. The rectus muscles were spread laterally, the peritoneal membrane was opened longitudinally, an automatic retractor was placed inside the wound, and the intestines were pushed back from the surgical site with surgical drapes. The longer mid-sagittal incision enabled a sufficient view into the peritoneal cavity, while the perpendicular cutaneous incision was small enough to provide a proper cosmetic effect. A diamond-shaped access to the operative site was gained, and a considerable part of the uterus was visible. In the case of a large lesion, adrenal

solution was injected into surrounding tissue in order to decrease bleeding. After the fibroid was located, it was grasped and cut off from the uterine trunk with monopolar coagulation, while being simultaneously pulled through the wound in an upward direction. Using this technique enabled the gradual removal even of fibroids of a diameter exceeding the wound dimensions. Moreover, an operator had a possibility to control visually and by palpation the position of the myoma in relation to the uterine cavity, which, in most cases, protected against its accidental opening. In the event that the uterine cavity was opened, a no. 16 Redon drain was placed inside the uterine cavity and its walls were reconstructed. After removal of the fibroid, the uterus was sutured with layered sutures. The parietal peritoneum was not sutured, and continuous sutures were adopted for the fascia and skin.

Statistical analysis

Statistical analysis was performed using the Statistica 10.0 (StatSoft, Inc., Tulsa, OK, USA) software package. Conformity with a normal distribution of quantitative data was checked using the Shapiro-Wilk *W* test. The Mann-Whitney *U* test and the Spearman rank correlation coefficient were employed to verify the dependences between selected variables. A *p*-value < 0.05 was assumed significant in all tests conducted.

Results

The median age was 35.7 years (min. 27 years old, 43 years old). The median patient BMI was 24 (range: 19.4–32.1) kg/m². Seven patients with uterine fibroids had a history of hypothyroidism, arterial hypertension, mitral valve prolapse, venous varices or asthma. Seven patients reported a history of previous abdominal surgery (appendectomy, cesarean section, removal of ectopic pregnancy, removal of teratoma).

In this study, nulliparous women were in the majority (14 patients, 66.7%). In our group, 7 (33.3%) patients who had undergone myomectomy tried to achieve conception. Four of them (pregnancy rate 57.1%), succeeded in pregnancy and gave birth to healthy infants. In 3 (75%) patients, cesarean section was performed.

In the case of 16 (76.2%) patients, spinal anesthesia was performed, while in the remaining 5 (23.8%) patients, general anesthesia was used. After surgery,

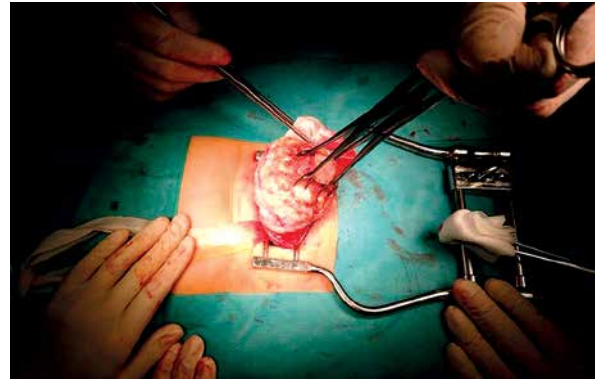


Photo 2. Intramural type of myoma uteri

analgesics were administered in each patient. The mean duration of analgesics administration was 3.8 days (min. 2 days, max. 10 days). In 5 women, antibiotics were given. Average duration of hospitalization was 4.2 days (min. 2 days, max. 10 days).

The size of the myoma (in the case of numerous fibroids, the size of the largest) was between 1.5 and 15 cm (mean: 7.2 cm). The intramural type of fibroids was most prevalent (Photo 2). One patient had a submucosal myoma. In 2 (9.5%) cases, during removal of fibroids of 15 cm and 4 cm diameter, the uterine cavity was opened. One of the patients underwent left salpingectomy due to removal of a large myoma located in the uterine horn.

The average operative time was 67.6 min (from 45 to 90 min). There were no serious post-surgical complications.

In the investigated patients, the average decrease of hemoglobin concentration was 1.5 g/dl (min. –0.3 g/dl, max. 3.6 g/dl) and the average hematocrit (Hct) decrease was 4.1% (min. –0.6%, max. 10.8%). In 18 patients, a drainage tube was applied and the volume of collected fluid averaged 218 ml (min. 20 ml, max. 450 ml).

We did not observe a statistically significant difference of tumor size between nullipara and multipara. Similarly, the size of the myoma did not correlate significantly with other tested parameters such as operation time, BMI or blood loss. There was no statistically significant dependence between the operation time and the average Hct and hemoglobin (Hgb) decrease (Table I).

Discussion

Despite the fact that in some of our patients not the restoration of fertility but rather preservation

Table I. Surgical parameters and pathological data following myomectomy by minilaparotomy

Patient	Operation time [min]	HGB drop [g/dl]	Hospital stay [days]	Total number of fibroids	Size of largest fibroid [cm]	Localization of fibroids	Complications
1	50	0.6	3	2	5	Intramural	No
2	60	0.3	6	1	10	Intramural	No
3	65	–	5	1	1.5	Intramural	No
4	50	–	5	1	5	Intramural	No
5	60	0.8	4	2	7	Pedunculated	No
6	70	1.8	3	2	10	Intramural	No
7	90	1.8	3	1	15	Intramural	Opening of uterine cavity
8	75	–	6	1	10	Intramural	No
9	45	2.4	3	1	4	Intramural	No
10	90	2.5	4	1	3	Pedunculated	No
11	70	1.5	4	1	8	Intramural	No
12	75	0.7	4	3	6	Intramural	No
13	70	3.6	4	3	4	Intramural and pedunculated	No
14	80	–	10	7	8	Intramural	No
15	60	–	3	1	10	Pedunculated	No
16	65	0.6	3	1	6	Intramural	No
17	70	2.0	4	2	5	Submucosal	No
18	65	1.6	4	1	5	Intramural	No
19	70	–	3	1	4	Intramural	Opening of uterine cavity
20	80	–	4	1	10	Intramural	No
21	60	–	4	1	9	Intramural	No

(–) No information.

of the uterus was the main goal, we were obliged to take into consideration their reproductive future. Therefore, the procedures were performed as in the infertile women. Infertility occurs in 27% of women with uterine fibroids, and myomectomy is performed in 2.4% of infertile women, where the only probable cause of infertility is myoma [37]. In our group, 7 (33.3%) patients who had undergone myomectomy tried to achieve conception. Four of them (pregnancy rate 57.1%) succeeded in pregnancy and gave birth to healthy infants. Two patients became pregnant 1 year after myomectomy, the others 3 years after surgery. In 3 (75%) patients, cesarean section was performed. In the study of Seracchioli *et al.* [21], who assessed obstetric outcome after transabdominal myomectomy in a group of 65 patients, of 59 patients who tried to become pregnant, 33 were

successful (pregnancy rate 55.9%), and cesarean section was performed in 21 (63.6%) patients. Bernardi *et al.* [38] reported recently that the conception rate after laparoscopic myomectomy was 68%, with a lower miscarriage rate after surgery. Cesarean section was performed in 46% of patients.

Like other authors, in choosing the operational technique we considered the size and number of fibroids, their localization, surgical history indicative of probable technical obstacles (e.g. severe adhesions), and finally the patient's preference [32, 34, 36, 39]. In women who wish to preserve their uterus and fertility, the surgical technique should take into consideration that palpation of the uterine body enables more precise identification of the position of intramural fibroids and their possible conflict with the uterine cavity. In the opinion of some authors,

this is an advantage of minilaparotomy over laparoscopy. Moreover, minilaparotomy should enable better uterus reconstruction in the case of a large myoma, and in the case of increased bleeding compared with laparoscopy it allows quicker and more accurate hemostasis [34]. In the majority of reports, the authors performed minilaparotomy under subarachnoid anesthesia, and this was also the case in 76.2% of our patients. The average operative time was 67.6 min, which is a result similar to that described in other studies, but much shorter compared to ordinary laparotomy or laparoscopy [20, 36, 39, 40].

The intraoperative blood loss estimated on the basis of both hemoglobin and hematocrit drop after the surgery was 1.5 g/dl and 4.1% respectively. Almost identical values were reported by Malinowski *et al.* [36] in their study devoted to use of minilaparotomy in benign gynecological diseases. Cagnacci *et al.* [20] in their group of patients subjected to myomectomy by minilaparotomy reported an average decrease of hemoglobin of 3.07 g/dl, which is twice as large as in our study, despite the fact that the maximal diameter of removed fibroid in their study was only 6.8 cm. Probably, the use of monopolar cut and coagulation as well as adrenaline injection performed during our procedures accounts for these differences. According to Tinelli *et al.* [41], laparoscopic myomectomy is characterized by less intra- and post-surgical blood loss compared to laparotomy.

We did not observe statistically significant difference of tumor size between nullipara and multipara. Similarly, myoma size did not correlate significantly with other tested parameters such as operation time or blood loss. Other authors have pointed out that the dimensions of fibroid could determine indications for the type of surgery and its range. At least a 5 cm long incision is recommended if the myoma is 9 cm in diameter [34]. Laparoscopic myomectomy is recommended when the myoma does not exceed 9 cm in diameter or the number of fibroids is not more than 2–3. Otherwise, the risk of conversion to laparotomy is higher [42]. All patients underwent intraoperative prophylactic antibiotic therapy, but only 5 (23.8%) patients were administered antibiotic treatment due to increased leukocytosis and anemia. Similarly, Seracchioli *et al.* [21] carried out antibiotic prophylaxis in all patients before transabdominal myomectomy and in 26% of patients with a febrile state of more than 38°C. We did not observe

any serious complications and no cases of reoperations were noted. The same was true in the study of Malinowski *et al.* [36]. Other authors have reported that serious complications such as excessive bleeding, paralytic ileus, urinary tract infection, wound infection, and repeat laparotomy procedures were rare and less frequent after minilaparotomy compared to normal laparotomy [43]. The average hospital stay was 4.2 days. In other studies, the average time to discharge after surgery was 1–3.7 days [28, 44, 45].

Conclusions

We conclude that myomectomy performed via minilaparotomy is a safe procedure for patients willing to preserve their uterus and fertility, and it combines some advantages of both laparotomy and laparoscopy.

Conflict of interest

The authors declare no conflict of interest.

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