

Laparoscopic treatment of uterine myomas in women of reproductive age

Pawel KAMINSKI¹, Malgorzata GAJEWSKA¹, Mirosław WIELGOS¹, Krzysztof SODOWSKI², Iwona SZYMUSIK¹, Robert BARTKOWIAK¹, Piotr MARIANOWSKI¹ and Bartosz CZUBA²

1. 1st Department of Obstetrics and Gynecology, Medical University of Warsaw, Poland

Head of the Department: Professor LESZEK BABŁOK MD, PhD

2. Obstetrics and Gynecology Clinic Ruda Śląska, Silesian Medical University, Katowice, Poland

Head of the Clinic: Ass. Professor KRZYSZTOF SODOWSKI

Correspondence to: Ass. Prof. Mirosław Wielgos MD, PhD
1st Department of Obstetrics and Gynecology, Medical University of Warsaw,
Plac Starynkiewicza 1/3, 02-015 Warsaw, Poland
TEL: +48 22 5021421; FAX: +48 22 5022157
E-MAIL: mwielgos@amwaw.edu.pl

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Abstract

OBJECTIVES: To analyze the indications, safety and feasibility of laparoscopic myomectomies performed during the last 10 years.

MATERIAL AND METHODS: The studied material consisted of 187 typically performed laparoscopies, mostly due to uterine myomas. All the patients underwent an ultrasound examination at the time of admission and those with the maximum of 3 tumors, where the largest tumors were less than 10cm in diameter, were qualified for endoscopic surgery.

RESULTS: Out of 187 women, 39 patients had laparoscopy performed twice, with a 3–4 months interval for GnRH analogues treatment. Among 164 operative laparoscopies myomas were enucleated in 132 of the women (80.5%). In the case of 18 patients (9.6%) there was a need for laparoconversion resulting from the difficulties with enucleation, adhesions, and the size or localization of the tumor. There were also 62 cases of diagnostic laparoscopy, where myomas were either too large or too small to be enucleated. On analyzing the number and size of the tumors it occurred that a single myoma was the most frequent finding, while more than half of all the enucleated uterine tumors found during diagnostic and operative endoscopies were up to 2cm in diameter.

CONCLUSIONS: Laparoscopic myomectomy is a safe and reliable surgical alternative for women suffering from symptomatic myomas and is a method of choice in young patients of reproductive age. Beside skillful surgical techniques, a proper qualification for the operation is essential for the desired outcome.

INTRODUCTION

Uterine myomas (fibromas) are the most common benign tumors found in female reproductive organs. Their prevalence increases with age and is assessed to be 20 to 50%. Most of the fibromas are asymptomatic, diagnosed incidentally during a routine gynecological or ultrasound examination. Pelvic pain, menometrorrhagia and abnormal bleeding are the most typical symptoms of bigger / unfavorably localized uterine myomas, however their relationship to infertility is still controversial. According to ACOG (American College of Obstetricians and Gynecologists) myomas rarely result in infertility, except those causing tubal occlusion. Submucosal fibroids are more likely to be associated with menstrual disorders and subfertility – hysteroscopic myomectomy has been assigned a golden standard of treatment in those cases [9, 15]. Jedrzejczak et al. [7] claim that the presence of myomas decreases uterine contractility, resulting in abnormal sperm migration, and the changes in vascularization which accompany fibroids may cause difficulties in embryo implantation.

The treatment of uterine myomas remains a very important issue – it may either be pharmacological or operative (endoscopy, classical open procedure), including uterine artery embolisation / occlusion, myomectomy or hysterectomy. Proper qualification to an operation is crucial; the main criteria taken into account are: the number, size and localization of myomas, the age of a patient and her will to preserve fertility. Laparoscopy, as a less invasive procedure than classical laparotomy, with a smaller rate of adhesion formation and faster recovery, has become a popular method of benign uterine tumors surgical treatment [8].

The aim of the study was to analyze the indications, safety and feasibility of laparoscopic myomectomies performed at our centers over the last 10 years.

MATERIAL AND METHODS

The studied material consisted of 187 women who had laparoscopy performed due to uterine myomas or the tumors were found during laparoscopic procedures conducted for other ailments, in years 1996–2006.

Laparoscopy was performed typically in general anesthesia with endotracheal intubation. Karl Storz optics and Karl Storz, Olympus, Stryker and Pajunk instruments were used for the procedure.

At the time of admission, all the patients had gynecological and ultrasound examinations performed. Those with the maximum of 3 tumors, where the largest tumors were less than 10cm in diameter, were qualified for endoscopic surgery. If the intraoperative situation was different than preliminary diagnosis revealed (multiple fibromas, tumors larger than 10cm, unfavorable localization), laparoscopy was discontinued. Considering the patient's age and will to preserve fertility, either laparoconversion with enucleation of the myo-

mas / hysterectomy was performed or the decision to administer GnRH analogues for 3–4 months was made before a subsequent laparoscopic surgery.

RESULTS

Out of 187 women in the studied period, 39 patients had laparoscopy performed twice, with a 3–4 months interval for GnRH analogues treatment. 80 patients had more than one indication for the surgery (Table 1).

Among 164 operative laparoscopies myomas were enucleated in 132 of the women (80.5%). Table 2 illustrates all the additional procedures performed during those operations. In the case of 18 patients (9.6%) there was a need for laparoconversion resulting from the difficulties with enucleation, adhesions, and the size or localization of the tumor (Table 3). One of the patients had laparoscopic hysterectomy performed, while another one had LAVH (laparoscopic assisted vaginal hysterectomy). Women were also operated on because of other indications, and had uterine fibroids diagnosed intraoperatively – those tumors were left untouched because their size did not exceed 1cm.

Out of 152 patients who had uterine fibromas removed during laparoscopy or after laparoconversion, 39 (25.6%) had diagnostic laparoscopy in the past followed by GnRH analogues treatment. After the pharmacological treatment 30 (78%) had laparoscopic enucleation performed, while in 9 (22%) cases laparoconversion was still necessary.

Among 62 diagnostic laparoscopies 12 women (19%) had only small intramural uterine fibromas, which were not an indication for enucleation. In 6 cases (9.6%) the tumors were either too big or the anatomical conditions were unfavorable and laparoscopy was discontinued. Those patients were qualified for laparotomy later on (five for classical open enucleation and one for hysterectomy). There was also one woman (1.6%) with small fibromas up to 2cm in diameter and bilateral tubal occlusion, who was qualified for an in vitro fertilization procedure. The remaining 43 patients (69%) were qualified for GnRH analogues treatment because of the size and localization of the myomas or coexisting endometriosis.

The number and size of uterine fibromas in operated patients were also analyzed (excluding 12 women with small tumors diagnosed intraoperatively and left untouched). A single myoma was the most frequent finding, both during diagnostic and operative laparoscopy (Figure 1). Ten coexisting uterine myomas were found during a diagnostic endoscopy in one woman. The maximum of four uterine fibroids were enucleated during one procedure in 10 patients (7%).

More than half of all the enucleated uterine tumors found during diagnostic and operative endoscopies were up to 2cm in diameter (Figure 2). The largest removed myomas were 10cm in diameter and were found in 2 patients (0.8%).

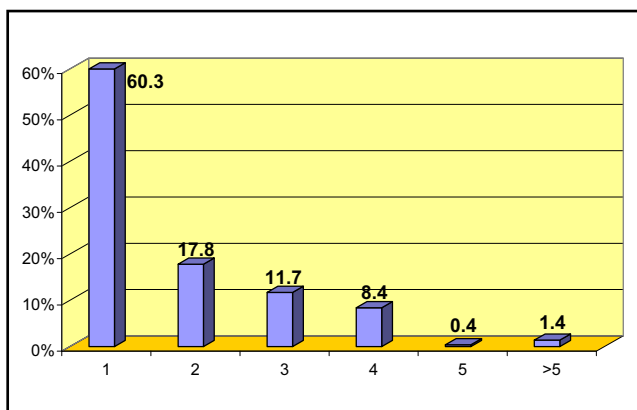


Figure 1. The number of uterine myomas stated intraoperatively per patient

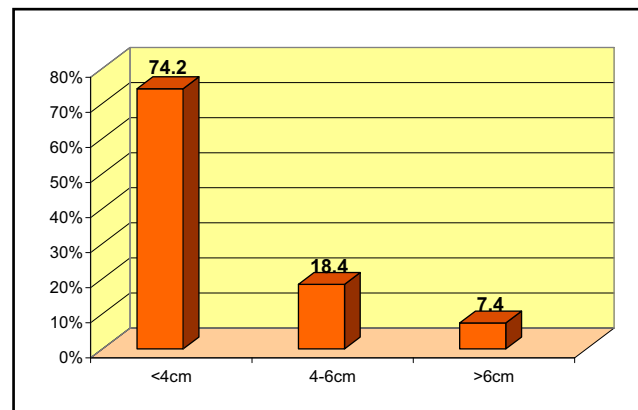


Figure 2. The size of uterine myomas assessed at laparoscopic surgery (cm in diameter)

Table 1. Indications for laparoscopic surgery (more than one indication possible)

Indications	Number of patients n=187	%
Uterine myomas	148	65.5
Infertility	76	33.6
Adnexal tumor	36	15.9
Suspicion of endometriosis	31	13.7
Other	19	8.4

Table 3. The causes of laparoconversions

Cause of laparoconversion	Number of patients n=18	%
Hemostatic problems	5	27.8
Adhesions	4	22.2
Unfavorable fibroid localization	4	22.2
Fibroid size >10cm in diameter	3	16.7
Other	2	11.1

The postoperative period was uneventful throughout the group studied.

DISCUSSION

Laparoscopic myomectomy has become a widely used method for the treatment of uterine fibromas; this is due to the development of knowledge, surgical skills, techniques and modern instruments. Laparoscopic myomectomy offers a uterus-conserving alternative to hysterectomy. Being less invasive than traditional abdominal approach, laparoscopic myomectomy has better acceptance and a higher rate of satisfaction among patients suffering from symptomatic uterine myomas [2, 3]. It is however underlined that a proper qualification for such a type of operation is very important to achieve a satisfying outcome [5, 10, 11, 19]. Dubuisson's

Table 2. Other laparoscopic procedures performed in women who underwent enucleation of uterine myomas

Laparoscopic procedures	Number of patients n=132	%
Enucleation of myomas	132	100
Enucleation of adnexal tumor	55	41.6
Tubal patency assessment	53	40.1
Adhesion removal	23	17.4
Ovarian electrocautery	13	9.8
Uterine myomas coagulation	12	9.0
Salpingectomy	8	6.0
Adnexectomy	6	4.5
Other	3	2.2

qualification criteria include the number of myomas to be removed (no more than 3) and their size – not bigger than 10cm in diameter [4]. According to others [5], the total number should not exceed four. In the above presented study, ten patients had four myomas resected during one operation. The tumors were mostly subserous and quite small, but there were also few cases of preoperative misdiagnosis. Malzoni et al. [9] reported a total of 8 fibroids enucleated during one operation, Jedrzejczak et al. – six [7], Altgassen et al. as many as 14 myomas [2].

According to suggested qualification criteria there were no tumors greater than 10cm removed in the above studied material. However, many researchers describe bigger fibroids resected during laparoscopic procedures. The range of size varies from 11cm [7] up to 20 and 21cm in diameter [9, 17, 18].

GnRH agonists used to play an important role in the treatment of myomas. Administered for 3–4 months in the pre-surgical period, they induced the decrease in tumor vascularization and therefore its volume (in our material the decrease in volume after 3–4 months reached about 40%). Additionally, amenorrhea allowed the normalization of blood morphology parameters. Currently, however, randomized trials support the idea that there is no apparent benefit of preoperative use of GnRH analogues, as their administration results in degenerative changes of the fibroma and its fragility makes the enucleation more difficult [6]. It appears that the difficulty of the procedure elongates the total operating time and increases the risk of laparoconversions [19]. Reron et al. [14] used GnRH agonists only in some cases of infertility where the diameter of the tumor exceeds 5cm, while Park et al. [12] administered analogues only when myomas were larger than 8cm. Their goal was to make the uterine scar as small as possible in order to lower the risk of uterine rupture during pregnancy following the surgery. In the studied material there were 39 women operated on after GnRH agonists administration. They were, however, hospitalized in the '90s, as currently such treatment in our Department is limited to selected cases of infertile patients.

Proper suturing of the enucleated uterine tumor site is another very important matter. According to Dubuisson et al. [4] the suture has to penetrate the full depth of the site, with one layer being generally enough. A precise multilayer closure should be performed when the tumor site penetrates deep into the myometrium or when the uterine cavity is open [9, 13]. Such suturing techniques prevent the development of hematomas and adenomyosis foci. Hematomas may lead to fistula formation resulting in the weakening of the cicatrix, especially important for future pregnancy. However, the data regarding the risk of uterine rupture in pregnancies following laparoscopic myomectomies is limited [13]. It seems to be very low with good surgical technique [2, 15].

The need of laparoconversion in the presented material occurred in 18 (9.6%) patients. The rate was similar to that reported by Dubuisson et al. – 11.2% [4]. Malzoni et al. described a very low conversion rate of 1.29% [9], while Takeuchi et al. [20], Wang et al. [23] and Jedrzejczak et al. [7] had no such cases at all. According to Dubuisson et al. [4] there are four preoperative risk factors of laparoconversions: the size of the myoma exceeding 5cm in ultrasound examination, intramural localization, the largest tumor in the anterior uterine wall and pre-surgical GnRH analogues administration. In our material the rate of laparoconversions after GnRH agonists treatment reached 22% (9 out of 39 women). Marret et al. [10] aimed at identifying the preoperative factor affecting the risk of conversions among a population of surgeons at the beginning of their experience in laparoscopic myomectomy. The rate they encountered was 28%, while expected according to Dubuisson's

score equaled 7.8%. They therefore confirmed that the surgeon's experience was another risk factor, and skilled operators should help their trainees during their learning curve.

The extraction of the resected myomas is a substantial step of the operation. There are four different ways for the removal of the tumors: culdotomy, minilaparotomy (widening the primary incisions), fragmentation with the use of scissors or mincing with the use of electric morcellator with the extraction through the trocar. Morcellator and fragmentation with the use of scissors were the two methods used in the presented study. The literature reports various methods with the preference on the power morcellator [2, 9], as the removal time is shorter than through culdotomy [22].

The problem of intraoperative complications is also frequently discussed by the clinicians. In our material hemostatic problems (excessive bleeding in the operating field) were the only major complication resulting in the conversion to an open procedure in 5 out of 152 operative laparoscopies (3.3%). Altgassen et al. [2] reported a rate of 2.7% of intraoperative complications, where bowel damage was the most frequent complication encountered. They also mentioned arterial bleeding, subcutaneous emphysema and cardiovascular problems. Some authors reported no major complications at all [9, 16, 17, 19]. Wang et al. [21] successfully used oxytocin infusion during laparoscopic myomectomy – they proved that the intraoperative blood loss and blood transfusion rate were significantly lower when intravenous oxytocin administration was combined with skillful surgical techniques. Vasoconstrictive agents were also injected into the deep intramural myomas by Malzoni et al. [9] in order to decrease the blood loss and facilitate the enucleation.

In our material there were no major postoperative complications, such as anemia requiring blood transfusion or infection of the operating field. The equity of antibiotic prophylaxis is also underlined in the literature [2]. Altgassen et al. [2] reported a rate of 5.7% of postoperative complications. Wang et al [23] had 2 cases of pelvic abscesses requiring a second laparoscopic operation. They also had a high rate of blood transfusions (22.1%) in the group of patients with resected myomas weighing more than 80g (in our material no blood transfusion was performed).

Finally, according to literature, the risk of recurrence seems higher after laparoscopic myomectomy compared with laparotomy [1]. Therefore a careful evaluation of the dimensions and localization of the tumors is crucial for the right choice of the best surgical approach.

CONCLUSIONS

Laparoscopic myomectomy is a safe and reliable surgical alternative for women suffering from symptomatic myomas and is a method of choice in young patients of reproductive age. Beside skillful surgical techniques, a proper qualification for the operation is essential for the desired outcome.

REFERENCES

- 1 Advincula AP, Song A. Endoscopic management of leiomyomata. *Semin Reprod Med* 2004; **22**: 149–55.
- 2 Altgassen C, Kuss S, Berger U, Loning M. Complications in laparoscopic myomectomy. *Surg Endosc* 2006; **20**: 614–618.
- 3 Berger U, Altgassen C, Kuss S, Schneider A. Patients' satisfaction with laparoscopic myomectomy. *J Psychosom Obstet Gynaecol* 2006; **27**: 225–30.
- 4 Dubuisson JB, Fauconnier A, Babaki-Fard K, Chapron C. Laparoscopic myomectomy: a current view. *Hum Reprod Update* 2000; **6**: 588–94.
- 5 Holub Z. [Laparoscopic myomectomy: indications and limits] [Article in Czech with an English abstract]. *Ceska Gynekol* 2007; **72**: 64–68.
- 6 Hurst BS, Matthews ML, Marshburn PB. Laparoscopic myomectomy for symptomatic uterine myomas. *Fertil Steril* 2005; **83**: 1–23.
- 7 Jedrzejczak P, Pawelczyk L, Grewling K, Pelesz M, Serdynska M. [Ability to conceive and the course of pregnancy in women after laparoscopic myomectomy]. [Article in Polish with an English abstract]. *Przegl Lek* 2004; **61**: 65–69.
- 8 Kaminski P, Gajewska M, Wielgos M, Szymusik I, Ziolkowska K, Bartkowiak R. The usefulness of laparoscopy and hysteroscopy in the diagnostics and treatment of infertility. *Neuro Endocrinol Lett* 2006; **27**: 813–817.
- 9 Malzoni M, Sizzi O, Rossetti A, Imperato F. Laparoscopic myomectomy: a report of 982 procedures. *Surg Technol Int* 2006; **15**: 123–9.
- 10 Marret H, Chevillot M, Giraudeau B. Factors influencing laparoscopic conversions during the learning curve of laparoscopic myomectomy. *Acta Obstet Gynecol Scand* 2006; **85**: 324–9.
- 11 Palomba S, Zupi E, Russo T, Falbo A, Marconi D, Tolino A et al. A multicenter randomized, controlled study comparing laparoscopic versus minilaparotomic myomectomy: short-term outcomes. *Fertil Steril* 2007 Mar 7; [Epub ahead of print].
- 12 Park KH, Chung JE, Kim JY, Kim YT. Endoscopic management of uterine myoma. *Yonsei Med J* 1999; **40**: 583–8.
- 13 Peacock K, Hurst BS. Laparoscopic Myomectomy. *Surg Technol Int* 2006; **15**: 141–5.
- 14 Reron A, Trojnar-Podlesny M. [Laparoscopic myomectomy: preparation for procedure and operation technique]. [Article in Polish with an English abstract]. *Gin Pol* 2003; **74**: 1578–1584.
- 15 Saridogan E, Cutner A. Endoscopic management of uterine fibroids. *Hum Fertil (Camb)* 2006; **9**: 201–208.
- 16 Seracchioli R, Rossi S, Govoni F, Rossi E, Venturoli S, Bulletti C et al. Fertility and obstetric outcome after laparoscopic myomectomy of large myomata: a randomized comparison with abdominal myomectomy. *Hum Reprod* 2000; **15**: 2663–2668.
- 17 Sinha R, Hegde A, Warty N, Mahajan C. Laparoscopic myomectomy: Enucleation of the myoma by morcellation while it is attached to the uterus. *J Min Inv Gynecol* 2005; **12**: 284–289.
- 18 Sinha R, Hegde A, Warty N, Patil N. Laparoscopic excision of very large myomas. *J Am Assoc Gynecol Laparosc* 2003; **10**: 461–468.
- 19 Szymanowski K, Skrzypczak J, Banaszewski S, Jedrzejczak P, Wilczak M, Pawelczyk L. [Laparoscopic myomectomy]. [Article in Polish with an English abstract]. *Gin Pol* 2000; **71**: 413–418.
- 20 Takeuchi H, Kuwatsuru R. The indication, surgical techniques, limitation of laparoscopic myomectomy. *JSL* 2003; **7**: 89–95.
- 21 Wang CJ, Lee CL, Yuen LT, Kay N, Han CM, Soong YK. Oxytocin infusion in laparoscopic myomectomy may decrease operative blood loss. *J Minim Invasive Gynecol* 2007; **14**: 184–188.
- 22 Wang CJ, Yuen LT, Lee CL, Kay N, Soong YK. A prospective comparison of morcellator and culdotomy for extracting of uterine myomas laparoscopically in nullipara. *J Minim Invasive Gynecol* 2006; **13**: 463–6.
- 23 Wang CJ, Yuen LT, Lee CL, Kay N, Soong YK. Laparoscopic myomectomy for large uterine fibroids. A comparative study. *Surg Endosc* 2006; **20**: 1427–30.