

A Review Study Comparing Myomectomy by Laparoscopy and Laparotomy

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Abstract

The purpose of this study was compare the advantages and outcomes in current practice for the procedures of laparoscopically and open surgery. *Materials and methods* : We analysed review study of 13 multicentre study about laparoscopy versus abdominal myomectomy. A literature research was performed using internet. *Discussion* : Laparoscopic myomectomy may be a reliable technique because the study (40 and 24 month) abdominal showed comparable results with laparoscopy (NS) in recurrence rate. The mean overall VAS score at 24, 48, and 72 h was statistically significantly lower pain in the laparoscopic group compared with the laparotomy group. The laparoscopic cases required a longer median operative time (222.5/115.8/264 minutes) than the abdominal cases (180.0/100.6/133 minutes). Blood loss was estimated to be lower for LM (200 ± 50 ml versus 230 ± 44) and no difference was detected in estimated blood loss from surgery in another studies. Study about adhesion, there was a statistically significant drop in the degree of post-operative adhesions and the proportion of patients with adhesions connected with use of the laparoscopic route and underwent a second look after laparoscopic myomectomy, the rate of adhesions after laparoscopic is low. A multivariate analysis shows no cases of ectopic pregnancy or uterine rupture occurred. *Conclusions* : A laparoscopic approach to myomectomy may be safely chosen for patients to be proposed for surgical treatment. *Keywords* : Laparoscopic Myomectomy, Abdominal Myomectomy

Introductions

Fibroid uterus is the most common pathology affecting about 25% of women in their reproductive years, causing a spectrum of symptoms, such as pain, discomfort, vaginal bleeding, abdominal enlargement and infertility. The current trend in the world to postpone marriage and birth coincides with advanced age, and increased frequency and risk of uterine fibroids. Despite this trend, there is a growing tendency to preserve fertility potential, and thus conservative uterine surgery, instead of definitive, irreversible hysterectomy, is preferred [1].

Laparoscopic myomectomy was described for the first time at the end of the 1970s, exclusively for subserous myomata (Semm and Mettler, 1980). From the beginning of the 1990s, the technique was developed to include exeresis of intramural myomata (Daniell and Gurley, 1991; Dubuisson *et al.*, 1991; Nezhat *et al.*, 1991; Hasson *et al.*, 1992). At present, a large number of teams use this technique to ablate subserous and intramural myomata because of the proven advantages with respect to post-operative pain and the shorter hospitalization and convalescence (Mais *et al.*, 1996), and for cosmetic reasons, due to the absence of scars [2].

However, laparoscopic myomectomy is the subject of considerable debate. In particular, for intramural myomata the technique is reputed to be technically difficult, long, with more blood loss and, finally, is said to involve a high risk of conversion to laparotomy (DaraI *et al.*, 1996). The obstetric quality of the uterine scars obtained by this technique is another questionable subject (Harris, 1992; Nezhat *et al.*, 1996).

In our centre we have acquired valuable experience in the matter, since between March 1989 and April 1999 we carried out 407 laparoscopic myomectomy . The purpose of this review is to clarify the operative technique for laparoscopic myomectomy , to try to establish if there are any risks specifically connected with the use of laparoscopy for myomectomies, and to compare the advantages and disadvantages of this technique compared with myomectomy by laparotomy [2].

In the last decade, laparoscopy has developed into an effective tool that facilitates a wide range of pelvic surgery, including conservative myomectomy. The most common motive for conservative myomectomy, and hence laparoscopic myomectomy, is the patient's will to avoid hysterectomy for personal reasons, or conserve fertility. The decision regarding the route of operation should rely on the risks and benefits of all options. Laparoscopic myomectomy may be performed in selected cases, particularly in cases of subserous and interstitial myomas (Semm and Mettler, 1980; Nezhat et al, 1991; Dubuisson et al, 1992; Mettler and Semm, 1994). Before surgical operation, the size, number and localization of the myomas is established by echography [3].

Laparoscopic myomectomy can reduce the chance of the complication. The suturing will be done outside so decreasing the operating time and secure layered suturing ensures uterus does not rupture in later pregnancy. Pelvic observation during the laparoscopy allows the diagnosis and treatment of any other disease like endometriosis or adhesion. The criteria for laparoscopic myomectomy are myoma greater than 5 cm, numerous myomas, requiring vigorous use morcellator, deep intramural myoma and removal that require uterine repair with sutures [4]. The many advantages of laparoscopic myomectomy include short hospitalization, discharge of most patients within 1-2 days of surgery, short recovery period, and resumption of normal activities within 1-2 weeks. Post-operatively, pain is considerably less and post-operative complications such as ileus and the sequelae of venous stasis are significantly fewer [5].

Nevertheless, the disadvantages should also be considered: a 'unique', and possibly greater degree of skill is necessary in laparoscopic suturing; the number of instruments and various angles of insertion to approach the surgical site are limited; flexibility in planning the surgical technique and removal of the fibroids from the abdominal cavity is also limited; operating time is frequently longer. Furthermore, the difficulty in obtaining accurate apposition of the edges of the uterine wound after myomectomy may produce more adhesions. Thus, fertility initially associated with fibroids may become obstructive infertility [5].

Myomectomy by way of any route is a controversial subject. The accepted indications for myomectomy are secondary infertility with a past history of second-trimester loss and preservation of fertility in women with either hypomenorrhoea leading to anaemia, or a large lower abdominal mass. Nonetheless, the technique is limited by the number, size and location of the tumours [1].

Numerous (four or more, >3 cm in diameter) or voluminous (>10 cm in mean diameter) fibroids are contraindications to laparoscopic surgery and should be treated medically prior to surgery to reduce size and vascularity. Laparoscopic myomectomy is suitable only for subserous fibroids and those intramural fibroids to which access can be easily gained without entering the uterine cavity. Deep intramural fibroids are difficult and tedious to remove laparoscopically, and there is little justification for this surgical method if it is likely to take several hours. Furthermore, there are significant technical difficulties in removing intraligamentous fibroids because of the potential risks of damage to the ureter and uterine artery and haematoma formation [6].

The purpose of this study was compare the advantages and outcomes in current practice for the procedures of laparoscopically and open surgery.

Materials and Methods

A literature search was performed using Google, Yahoo, Springerlink and Highwire Press. The following search terms were used: *laparoscopic myomectomy*, *abdominal myomectomy*, *complications of laparoscopic myomectomy* and *complication abdominal myomectomy*.

The 13 number of quality citations reviewed was selected for this review.

The criteria for selection were:

- At least 13 cases should be included in the study especially for complicated cases.
- Method of analysis : retrospective analysis.
- Type of operative procedure : Laparoscopic and laparotomy myomectomy.
- The institution where the procedure was practiced (preference for those specialized for laparoscopic surgery) .

Laparoscopic pelvic *myomectomy* procedures practiced :

- Performed with a standard technique using three suprapubic ports.
- The uterus was always cannulated to allow the correct exposure of myomas.
- For pedunculated myomas, the pedicle was secured using a pre-tied or extracorporeally-tied loop and coagulated and transected with bipolar forceps and scissors.
- To reduce vascularization and blood loss, injected myomas with diluted: ornithine vasopressin.
- For subserous and intramural myomas, carried out the serosal incision vertically over the convex surface of the myoma using a monopolar hook.
- After exposure of the myoma pseudocapsule, grasping forceps were positioned to apply traction to the myoma and expose the cleavage plane.
- Enucleation was carried out by traction on the fibroid and by division with a unipolar hook or mechanical cleavage.
- Haemostasis during dissection was achieved by bipolar coagulation. Suturing was usually done along one or two layers depending on the depth of incision with interrupted, simple or more frequently cross-stitches tied intracorporeally using 1 or 0 Polyglactin sutures.
- Removal of myoma : larger myoma may be removed through posterior colpotomy. Medium and large size fibroid is morcellated using a morcellator or scissors. For infected and suspected carcinoma tissue retrieval bag should be used.

Review of citations

- Long-term results of laparoscopic myomectomy: recurrence rate in comparison with abdominal myomectomy, from Rossetti A et al (2001) [8].
- Laparoscopic Versus Open Myomectomy: A Double-Blind Study to Evaluate Postoperative Pain, from Holzer A et al (2006) [9].
- A case-control study to compare the variability of operating time in laparoscopic and open surgery, from Shushan A et al (1999) [10].
- A retrospective multicentre study comparing myomectomy by laparoscopy and laparotomy in current surgical practice What are the best patient selection criteria?, from Marret H et al (2004) [11].
- Adhesion formation after laparoscopic myomectomy, from Bulletti C et al (1996) [12].
- Adhesions: Laparoscopic Surgery versus Laparotomy, from Milingos S et al (2000) [13].
- Case-Control Study of Laparoscopic versus Abdominal Myomectomy, from Silva BAC et al (2000) [14].
- Comparison of 49 laparoscopic myomectomies with 49 open myomectomies, from Stringer NH et al (1997) [15].
- Reproductive outcome before and after laparoscopic or abdominal myomectomy for subserous or intramural myomas, from Campo SA et al (2003) [16].
- Laparoscopic myomectomy: indications, surgical technique and complications, from Seiner P et al (1997) [17].
- Laparoscopic versus abdominal myomectomy: a prospective, randomized trial to evaluate benefits in early outcome, from Mais V et al (1996) [18].

- Spontaneous uterine rupture at thirty three weeks subsequent to previous superficial laparoscopic myomectomy, from Pelosi M et al (1997) [19].
- Second look after laparoscopic myomectomy, from Dubuisson JB et al (1998) [20].

Discussion

- **Recurrence Rate :**

165 myomectomies (Rossetti A et al, 2001) were performed for symptomatic myomas measuring at least 3 cm in diameter and numbering seven or less per patient. 81 patients were randomized for abdominal or laparoscopic myomectomy and after period of 40 month, the study the group of abdominal myomectomies showed nine recurrences (23 %) against 11 (27 %) of the laparoscopic group [8]. In the other research (Marret H et al, 2004) had recurrence rate at 2 years was 2.5% for LM versus 3.6% for AM ($P=0.506$) [11]. (Table 1)

Table 1. Recurrence rate myomas

Study	Period of rec	No	% rec LM / patient	% rec AM / patient	<i>p</i>
Rossetti A et al (2001)	40 month	81	27% / 41	23% / 40	NS
Marret H et al (2004)	24 month	302	2.5% / 126	3.6% / 176	0.506 (NS)

With the laparoscopic route it is impossible to palpate the myometrium thoroughly, which means that small intramural nuclei that do not deform the uterine serosa can be overlooked, resulting in incomplete myomectomy than uses laparotomy. Pre-operative detection of the myomata (ultrasonography, hysteroscopy) should be performed if myomas was removed completely. In recurrence rate, laparoscopic myomectomy may be a reliable technique and may offer comparable results with those obtained by laparotomy.

- **Pain**

The advantages of laparoscopic over open surgery have been documented in pain settings. Holzer A et al (2006) performed to evaluate pain scores 72 h after surgery by comparing patients who underwent laparoscopic myomectomy or with laparotomy. After stratification (myoma size, number of myomas, and surgeon), patients were randomized to either laparoscopy ($n=19$) or laparotomy ($n=21$) and received a standardized anesthesia and patient-controlled analgesia for 24 h after surgery. The mean overall VAS score at 24, 48, and 72 h was statistically significantly lower in the laparoscopic group compared with the laparotomy group (2.28-1.38 versus 4.03-1.63; $P<0.01$) [9]. Mais V et al (1996) were performed about pain, the intensity of postoperative pain was lower ($p<0.05$) after laparoscopy than after laparotomy. A higher ($p<0.05$) proportion of patients was analgesic free on day 2, discharged from hospital by day 3, and feeling fully recuperated on day 15 after laparoscopy compared with laparotomy [18]. Laparoscopic myomectomy reduces postoperative pain after surgery compared with laparotomy.

- **Operating times**

The laparoscopic cases (Silva BAC et al, 2000) required a longer median operative time (222.5 minutes [192.5, 270.0]) than the abdominal cases (180.0 minutes [160.0, 220.0]); $p = 0.001$ (S) [14]. A case control about laparoscopy myomectomy (Sushan A et al, 1999) analysed for 13 case myomas, it resulted to operating time : mean 115,8 minutes (LM) for size 6,9 cm compared

mean 100,6 minutes (AM) for size 8 cm, with $p=0,35$ (NS) [10]. Ninety-eight women with symptomatic uterine leiomyomata to intervention about 49 consecutive laparoscopic myomectomies and 49 open myomectomies were performed this procedures, mean operating time for open myomectomies was 133 minutes versus 264 minutes for laparoscopies ($p < 0.0001$) [15]. (Table 2)

Table 2. Operating time

Study	No	Mean operating time (LAM)	Mean operating time (AM)	p
Sushan A (1999)	13	115,8	100,6	0,37 (NS)
Silva BAC (2000)	76	222,5	180,0	0,001 (S)
Stringer NH (1997)	98	264	133	<0,001 (S)

The variability of operating times for some of the most common gynaecological procedures performed laparoscopically and by open surgery. Comparison of laparoscopy and laparotomy showed that the mean procedure times were tends to be much greater than with laparotomy.

- ***Risk of haemorrhage***

Laparoscopic myomectomy could reduce the haemorrhagic risk connected with myomectomy. In the randomized clinical trial by Mais (Mais *et al.*, 1996) blood loss was estimated to be lower for cases of LM than for myomectomies by laparotomy (200 ± 50 ml versus 230 ± 44) [18]. In study Silva BAC *et al* (2000), no difference was detected in estimated blood loss from surgery ($P = 0.57$) [14]. Excised myomas (Marret H *et al*, 2004) weighed four times more, the decrease in haemoglobin was greater (1 g/dl) and nine patients needed transfusions (compared to none for LM) [11]. A retrospective study (1997) was carried out of 54 patients with myomas (3 cm), mean blood loss was 84 ml [17]. Stringer (Stringer *et al.*, 1997) in a comparative, non-randomized study found a statistically significant drop in estimated blood loss in the LM group compared with the group of myomectomies carried out by laparotomy Three women in the open group required postoperative transfusions, compared with none in the laparoscopic group [15]. What is more, no transfusion was required in the first group whereas three patients were transfused in the laparotomy group. In this study, however, there is no matching of size or number of myomata operated.

These studies confirms the feasibility of laparoscopic myomectomy as a technique leading to a low complication rate of haemorrhagic. The laparoscopic route presents two advantages over laparotomy in terms of limiting the haemorrhagic risk during myomectomy: the pressure of the pneumoperitoneum prevents blood extravasation from the intramyometrial capillaries and veins, and the magnification provided by the laparoscope lens helps to identify the cleavage plane more precisely and enables selective coagulation of the small vessels feeding the myoma.

- ***Post-operative adhesions***

Several arguments strongly suggesting that the risk of post-operative adhesions is reduced when myomectomy takes place via the laparoscopic route. In a non-randomized comparative study (Bulletti *et al.*, 1996), there was a statistically significant drop in the degree of post-operative adhesions and the proportion of patients with adhesions connected with use of the laparoscopic route [12].

A prospective collection of data (Dubuisson JB *et al*, 1998), 45 patients underwent a second look

after laparoscopic myomectomy. The rate of adhesions after laparoscopic myomectomy is low and the adhesions rarely involved the adnexa [20].

Although this kind of difference can be explained by differences in the size and number of myomata between cases dealt with by laparoscopy and laparotomy, it is probable nevertheless that the use of the laparoscopic route for myomectomy would reduce the risk of adhesions. Laparoscopic surgery effectively offers the advantage of respecting the principles of microsurgery by its very nature (atraumatic manipulation, fine instruments, thorough washing). In addition it avoids intraperitoneal contamination and has less effect on the equilibrium of the peritoneum.

- **Pregnancy**

A multivariate analysis (Campo SA et al, 2003) shows 19 patients abdominal and 22 to laparoscopic myomectomy : a miscarriage rate of 57.1%, following surgery 29 pregnancies occurred in 25 patients (60.9%), pregnancy rate being similar in both groups. No cases of ectopic pregnancy or uterine rupture occurred. This results suggest that myomectomy significantly improves pregnancy outcome in patients with subserous or intramural fibroids, probably removing a plausible cause of altered uterine contractility or blood supply [16]. Obstetric uterine rupture has previously been reported after the laparoscopic removal of deep intramural myomas, but never has it been reported to follow the removal of superficial myomas (Pelosi M et al, 1997) [19].

Myomectomy scars after laparoscopy is considerable debate because possibility of miscarriage and uterine rupture during pregnancy after operative. However, when performing laparoscopy myomectomy, particular care must be given to the uterine closure. Indeed, intraperitoneal sutures need surgeons who are well-experienced in laparoscopic surgery.

Conclusions

A laparoscopic approach to myomectomy may be safely chosen for patients to be proposed for surgical treatment of subserous and intramural myomata of average size and few in number. In recurrence rate, laparoscopic myomectomy may be a reliable technique and may offer comparable results with those obtained by laparotomy. Laparoscopic myomectomy reduces postoperative pain after surgery compared with laparotomy. Comparison of laparoscopy and laparotomy showed that the mean procedure times were tends to be much greater than with laparotomy. In particularly use of the laparoscopic route could reduce the risk of haemorrhage during myomectomy. Laparoscopic myomectomy might reduce the risk of post-operative adhesions compared with laparotomy. Myomectomy scars after laparoscopy is considerable debate because possibility of miscarriage and uterine rupture during pregnancy after operative. The risk of uterine rupture after laparoscopic myomectomy seems low.

References

- Cunningham FG LK, Bloom SL, Hauth JC, Gilstrap III LC, Wenstrom KD. Williams Obstetrics. 22th ed. USA: McGraw-Hill Companies; 2005: 274-83.
- Dubuisson JB, Fauconnier A, Babaki-Fard K, Chapron C. Laparoscopic myomectomy: a current view. Human Reproduction Update 2000; 6 (6): 588-594.
- Donnez J, Mathieu PE,, Bassil S, Smets M, Nisolle M, Berliere M. Fibroids: management and treatment: the state of the art. Human Reproduction 1996; 11(9): 1837-40.
- Mishra RK. Textbook of Practical Laparoscopic Surgery. New Delhi : Jaypee Brothers Medical Publishers; 2008: 312-19.

- Nutan Jain. State of the art Atlas of Endoscopic Surgery in Infertility and Gynecology. New Delhi : Jaypee Brothers Medical Publishers; 2004: 386-95.
- Dicker D, Dekel A, Orvieto R, Hava B, Peleg D, Rafael ZB. The controversy of laparoscopic myomectomy. Available from : 935.pdf
- Dubuisson JB, Chapron C, Mouly M, et al. Laparoscopic myomectomy. In Donnez J, Nisolle M, eds. An Atlas of Laser Operative Laparoscopy and Hysteroscopy. New York : Parthenon Publishing; 1994: 187-93.
- Rossetti A, Sizzi O, Soranna L, Cucinelli F, Mancuso S, Lanzone A. Long-term results of laparoscopic myomectomy: recurrence rate in comparison with abdominal myomectomy . Hum Reprod 2001; 16 (4): 770-4.
- Holzer A, Jirecek ST, Illievich UM, Huber J, Wenzl RJ. Laparoscopic Versus Open Myomectomy: A Double-Blind Study to Evaluate Postoperative Pain. Anesth Analg 2006; 102: 1480 –4
- Shushan A, Mohamed H, Magos AL. A case-control study to compare the variability of operating time in laparoscopic and open surgery. Hum Reprod 1999; 14(6): 1467–9.
- Marret H, Chevillot M, Giraudeau B. A retrospective multicentre study comparing myomectomy by laparoscopy and laparotomy in current surgical practice What are the best patient selection criteria? EJOGRB 2004; 117: 82-6.
- Bulletti C, Polli V, Negrini V, Giacomucci E, Flamigni C. Adhesion formation after laparoscopic myomectomy. **J Am Assoc Gynecol Laparosc** 1996; 3: 533-6
- Milingos S, Kallipolitis G, Loutradis D, Liapi A, Mavrommatis K, Drakakis P, Tourikis J, Creatsas G, Michalas S. Adhesions: Laparoscopic Surgery versus Laparotomy. *Annals of the New York Academy of Sciences* 2000; 900: 272-85.
- Silva BAC, Falcone T, Bradley L, Goldberg JM, Mascha E, Lindsey R, Stevens L. Case-Control Study of Laparoscopic versus Abdominal Myomectomy. Journal of Laparoendoscopic & Advanced Surgical Techniques 2000; 10(4): 191-7.
- Stringer NH, Walker JC, Meyer PM. Comparison of 49 laparoscopic myomectomies with 49 open myomectomies. J Am Assoc Gynecol Laparosc. 1997; 4(4): 457-64.
- Campo SA, Campo VA, Gambadauro PA. Reproductive outcome before and after laparoscopic or abdominal myomectomy for subserous or intramural myomas. EJOGRB 2003; 110: 215-9.
- Seinera P, Arisio R, Decko A, et al. Laparoscopic myomectomy: indications, surgical technique and complications. Hum Reprod 1997; 12: 1927-30
- Mais V, Ajossa S, Guerriero S, et al. Laparoscopic versus abdominal myomectomy: a prospective, randomized trial to evaluate benefits in early outcome. Am. J. Obstet. Gynecol 1996; 174: 654-8.
- Spontaneous uterine rupture at thirty three weeks subsequent to previous superficial laparoscopic myomectomy. Pelosi M, Pelosi MA. Am J Obstet Gynecol 1997; 177: 1547-9.
- Dubuisson JB, Fauconnier A, Chapron C, et al. Second look after laparoscopic myomectomy. Hum Reprod 1998; 13: 2102-6.

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