Laparoscopic myomectomy: indications, surgical technique and complications

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The indications and complications of laparoscopic myomectomy were evaluated with regard to its limitations, benefits and feasibility. Surgical technique with related difficulty was also reported. From a population of 89 patients, a total of 104 myomas were removed laparoscopically. A retrospective study was carried out of 54 patients with myomas >3 cm. Indications for surgery were pain or abnormal bleeding (37%), increase in size of the myoma in infertile patients (48.1%) and infertility requiring assisted reproductive technology (14.9%). A total of 57 myomas >3 cm were removed from these patients. The number of myomas per patient varied from 1 to 4. The myomas were intramural (n = 34), subserosal (n = 19) and submucosal (n = 4). The size of the dominant myoma ranged from 3–8 cm (mean 4.16). In all cases the uterine wall was sutured either in one (n = 42) or two planes (n = 15) depending on the depth of the myometrial defect. The laparotomy conversion rate was 1.8% (n = 1); mean blood loss was 84 ml; average hospital stay was 2.09 days and the overall complication rate was 1.8%. Five patients went on to conceive; the pregnancy was uneventful and proceeded to Caesarean section at 38 weeks. No adhesions at myomectomy sites were observed in these patients. At 6 months follow-up, 18 out of 20 patients with pain or haemorrhagic disorders prior to surgery showed remission of their complaints. Our study confirms the feasibility of laparoscopic myomectomy as a technique leading to a low complication rate and remission of symptoms. At the present time, statistically significant data concerning post-surgical adhesion formation or pregnancy outcome are not available.

Key words: complications/laparoscopic myomectomy/surgical technique

Introduction

Until recently, the main approach in patients with large or symptomatic fibroids who wished to retain the uterus was laparotomy, regardless of fertility status. However, advances in endoscopic surgery have proven the feasibility of laparoscopic myomectomy, despite its technical difficulties. This offers reduced post-operative care, shorter hospital stays, more favourable cost-benefit ratios, with a considerably shorter convalescence and a consequent earlier return to normal activities.

Laparoscopic myomectomy has been suggested for the treatment of patients with growing myomas or infertile women requiring ovarian hyperstimulation or IVF. The benefits of avoiding laparotomy are obvious; nevertheless, the complication rate must be considered before proposing laparoscopy as a routine treatment. We therefore conducted a retrospective study of patients undergoing laparoscopy for the removal of myoma in order to assess the limitations, feasibility and benefits of this technique.

Materials and methods

Between January 1992 and September 1996, 89 patients underwent laparoscopic myomectomy, with a total of 104 myomas removed. In 35 of these patients the myomas were <3 cm. These were removed during diagnostic laparoscopy for infertility or during laparoscopy for ovarian cysts, adhesions or pelvic pain, to avoid the possibility of symptomatic growth. Only those patients with myomas >3 cm (n = 54) were included in this study.

The indication for surgery was symptomatic fibroids (n = 20): the main symptoms were pain, lower abdominal discomfort or, less frequently, bleeding (n = 4). An additional indication was progressively increasing myoma size, evaluated by ultrasound. In infertile patients, surgery was performed when the fibroid exceeded 3 cm (n = 26) within a period of 6 months from detection. Definitive criteria regarding the size at which a myoma requires removal are difficult to establish. Our criteria were determined by the observation that patients with leiomyomas >3 cm had significantly increased rates of complication during pregnancy (Rice et al., 1989). Stevenson (1964) has shown that myomas >3 cm always cause symptoms, whereas smaller fibroids are often discovered and removed incidentally at the time of surgery.

In patients undergoing ovarian hyperstimulation, surgery was indicated regardless of myoma growth rate (n = 8). A total of 30 patients had been infertile for at least 24 months and in ten the presence of fibroids was the only known cause of infertility. The average age of patients was 34.59 ± 5.21 years (range 23–48).

Myomas were diagnosed and evaluated by transvaginal sonography. At least two ultrasounds, 6 months apart, were necessary to assess tumour growth. Gonadotrophin releasing hormone agonists (GnRHa) were prescribed in 16 cases (29.6% of the study group). Treatment consisted of intramuscular depot leuprolide acetate (Einantone; Takeda, Osaka, Japan), administered once a month for 3 months. Leuprolide was administered during the luteal phase of the menstrual cycle, thus avoiding withdrawal bleeding in the following cycle. This preparative medical treatment was used for large myomas (>5 cm)
and/or anaemia due to uterine bleeding. A total of 55% of patients showed tumour shrinkage, with an average reduction of 45%.

**Surgical procedure**

All procedures were performed by the same surgeon (P.S.) using a similar technique. Two suprapubic access routes were used in 41 cases. When the fibroid was deeply embedded in the uterine wall, requiring two planes of suture, three entry points were necessary. Uterine cannulation was always used in order to obtain optimal exposure of the myoma, especially when in a posterior location.

Ornithine-8-Vasopressin (POR 8; Sandoz, Berne, Switzerland) was injected around the myoma at a concentration of 5 IU/100 ml saline solution. Use of this vasoconstrictor reduced intraoperative bleeding, allowing the surgeon to operate more efficiently.

Scissors were used to incise the uterus down to the pseudocapsule of the myoma.

The myoma was then enucleated with claw forceps and scissors, by entering into the cleavage plane, between the tumour and uterus. Traction on the myoma, combined with countertraction on the uterus, facilitated dissection.

The uterine wall was sutured in one or two layers, according to the depth of the hysterotomy. A 5 mm needle holder with 2/0 Maxon (polyglyconate; Davis and Geck, Gosport, UK) was used to reconstruct the perimetrium, with separate sero-serosal stitches. For the myometrium, intracorporeal knots tied by a knot-pusher (Ethi-endonahnt, Doxycycline (100 mg/day for 5 days) or Micamycin (600 mg twice daily for 5 days) were administered post-operatively in all patients and were well tolerated. Febrile morbidity (fever higher than 38°C) was absent. The average hospital stay was 2.09 days (range 2–5). No post-operative hernias were observed at the trocar insertion sites.

Five of the 30 patients (33%) presenting with infertility subsequently conceived, underwent Caesarean section at 38 weeks and showed no sign of adhesion formation at myomectomy sites.

During follow-up, 6 months post-surgery, 18 of the 20 patients who had experience of pain or haemorrhagic disorders prior to surgery reported no complaints.

**Discussion**

Since transvaginal sonography allows an accurate and early diagnosis of even small fibroids, care must be taken not to operate before a true surgical indication arises. The diagnosis of a uterine myoma does not necessarily require surgery and, initially, non-surgical management can be an alternative option.

With the introduction of GnRHa, capable of inducing a substantial volume reduction of fibroids (50%), medical treatment has become feasible. However, regrowth of fibroids back to baseline size occurs within approximately 12 weeks of cessation of therapy (Friedman et al., 1991).

Currently, long-term GnRHa administration concomitant with low dose cyclic or continuous oestrogen and progesterone therapy is under investigation. For the above reasons, the only indications for medical treatment are an imminent onset of menopause or to reduce the size and symptoms in patients awaiting surgery.

When considering the surgical options, three important aspects, i.e. symptoms, myoma growth rate and patient fertility status, should be evaluated.

Surgery is indicated for large fibroids associated with severe...
or debilitating symptoms such as pelvic pain or menorrhagia. Continued growth of leiomyomas, especially in reproductive age women desiring pregnancy, should also be an indication for surgery, since no definitive and effective medical options are available.

Finally, fertility status of a patient must be addressed: failure to conceive after 12 months of unprotected intercourse or recurrent abortion indicate the need for myomectomy (ACOG technical bulletin, 1994). In these cases, if other infertility factors can be excluded, the tumour may be responsible for reproductive failure (Farrer-Brown et al., 1970; Hunt and Wallach, 1974). Patients requiring ovarian hyperstimulation or IVF should be treated surgically, since fibroids may enlarge under these conditions or complicate subsequent pregnancy (Muram et al., 1980; Rice et al., 1989).

When surgery is required, the question as to which technique is best indicated, laparoscopy or laparotomy, arises. Concerns regarding laparotomic myomectomy include intraoperative blood loss, longer hospital stays and adhesion formation (Verkauf, 1992). Laparoscopic myomectomy, by lowering costs and post-operative morbidity, is a promising alternative in view of the fact that uterine fibroids are the most frequent neoplasms of the female pelvis (Buttram and Reiter, 1981; Vollenhoven et al., 1990).

To date, only few randomized comparative studies, which have shown the benefits of laparoscopic procedure, have been carried out. However, comparing the two techniques may not necessarily be correct, since the indications with regard to size, number and fertility status, as well as patient age, may be quite different. Nevertheless, each technique has controversial features. In the past abdominal myomectomy was thought to be more complicated than hysterectomy (Wallach, 1979), while, on the other hand, laparoscopic myomectomy is regarded as a difficult procedure, requiring a highly skilled endoscopic surgeon (Nezhat et al., 1996). Dubuisson and Chapron (1996) have stated that laparoscopic surgery can be performed under satisfactory conditions when the myoma is not larger than 8 cm and the number of fibroids does not exceed two. In selected cases, therefore, if the surgical indication is correct, laparoscopy might be performed earlier, when the tumours are still small. Thus, the practice of removing only large or symptomatic myomas could be reconsidered. Fibroid location on the anterior uterine wall has been considered (Dubuisson et al., 1996a) to be a risk factor for conversion to laparotomy. However, in our experience, tumour location created no difficulty or complications. The number of myomas should be considered, since removal of more than two can be difficult and time consuming. Suggested limits, varying from 2–5, have been suggested (Dubuisson and Chapron, 1996; Mais et al., 1996).

The main operative step of laparoscopic myomectomy is the uterine suture, which requires an experienced surgeon. In all cases an introflecting and intersecting suture is necessary correctly to reapproximate the uterine serosa and achieve haemostasis. We have avoided the use of electrosurgery for uterine wall incision and haemostasis, since tissue necrosis could cause defective scarring and increase the risk of uterine rupture during subsequent pregnancy (Dubuisson et al., 1995).

One of the more frequent complications encountered during laparoscopic myomectomy is related to multi-layer suturing particularly under haemorrhagic conditions (Dubuisson et al., 1996b). Location may also contribute to suture difficulty. The use of laparoscopically-assisted myomectomy, with a minilaparotomic access, has been suggested (Nezhat et al., 1994; Dicker et al., 1996). In our study population conversion to minilaparotomy due to suturing difficulty of a haemorrhagic site occurred in one case (1.8%). A single case of post-operative complication (1.8%) was apparently due to clinical signs of shocks but in reality was not related to bleeding.

Contrary to other reports (Tulandi et al., 1996), the extensive utilization of a vasoconstrictor agent proved to be safe. This was confirmed by Semm and Mettlter (1988). Our mean operative time was similar to other laparoscopic myomectomy studies (Daniell and Gurley, 1991; Hasson et al., 1992).

Laparoscopy proved successful in the four cases of symptomatic submucosal myomas which were predominantly located in the myometrium. Hysteroscopic removal was not recommended because of their diameter (>5 cm).

Dehiscence is an uncommon complication of myomectomy (Harris, 1992; Dubuisson et al., 1995; Mecke et al., 1995; Friedmann et al., 1996). Five patients in our population underwent Caesarean section 2 weeks before term. The laparoscopic myomectomies had been performed between 8–14 months before pregnancy. No complications occurred during pregnancy.

Concerns regarding the solidity of the scar (Dubuisson et al., 1995) led us to evaluate the uterine suture by ultrasonography: the presence of a haematoma along the scar was checked on days 1, 7 and 30 post-surgery. Follow-ups showed no haematoma in the first ten cases examined.

The risk of adhesions is not specific to laparoscopic surgery, but may be encountered. This risk is very high for laparotomy: from 80% (Tulandi et al., 1993) to 100% (Starks, 1988). No adhesions were observed in the six patients who underwent subsequent Caesarean section or laparoscopy for other reasons. However, the limited number of patients who underwent such a follow-up limits the value of the result observed.

No patients, during our study, developed post-operative fever. This complication has been reported to occur in 45% of laparotomic myomectomies (Ecker et al., 1995).

In light of these results, laparoscopic myomectomy appears to offer a number of advantages. It allows a shorter hospital stay, little or no post-operative care and less physical stress and the patient is able to resume normal activities relatively quickly. The risk of complications is low. These factors taken together lead to a favourable cost-benefit ratio.

Despite these encouraging results, it must be borne in mind that laparoscopic myomectomy is one of the more challenging operative procedures. More than in other endoscopic procedures, the key to successful treatment lies in the appropriate selection of patients.

References
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