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Laparoscopic Myomectomy: Do Size, Number, and Location of the Myomas Form Limiting Factors for Laparoscopic Myomectomy?

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ABSTRACT **Study Objective:** To assess whether it is possible for an experienced laparoscopic surgeon to perform efficient laparoscopic myomectomy regardless of the size, number, and location of the myomas.

Design: Prospective observational study (Canadian Task Force classification II-1).

Setting: Tertiary endoscopy center.

Patients: A total of 505 healthy nonpregnant women with symptomatic myomas underwent laparoscopic myomectomy at our center. No exclusion criteria were based on the size, number, or location of myomas.

Interventions: Laparoscopic myomectomy and modifications of the technique: enucleation of the myoma by morcellation while it is still attached to the uterus with and without earlier devascularization.

Measurements and Main Results: In all, 912 myomas were removed in these 505 patients laparoscopically. The mean number of myomas removed was 1.85 ± 5.706 (95% CI 1.72–1.98). In all, 184 (36.4%) patients had multiple myomectomy. The mean size of the myomas removed was 5.86 ± 3.300 cm in largest diameter (95% CI 5.56–6.16 cm). The mean weight of the myomas removed was 227.74 ± 325.801 g (95% CI 198.03–257.45 g) and median was 100 g. The median operating time was 60 minutes (range 30–270 minutes). The median blood loss was 90 mL (range 40–2000 mL). Three comparisons were performed on the basis of size of the myomas (<10 cm and ≥10 cm in largest diameter), number of myomas removed (≤4 and ≥5 myomas), and the technique (enucleation of the myomas by morcellation while the myoma is still attached to the uterus and the conventional technique). In all these comparisons, although the mean blood loss, duration of surgery, and hospital stay were greater in the groups in which larger myomas or more myomas were removed or the modified technique was performed as compared with their corresponding study group, the weight and size of removed myomas were also proportionately larger in these groups. Two patients were given the diagnosis of leiomyosarcoma in their histopathology and 1 patient developed a diaphragmatic parasitic myoma followed by a leiomyoma of the sigmoid colon. Six patients underwent laparoscopic hysterectomy 4 to 6 years after the surgery for recurrent myomas. One conversion to laparotomy occurred and 1 patient underwent open subtotal hysterectomy for dilutional coagulopathy.

Conclusion: Laparoscopic myomectomy can be performed by experienced surgeons regardless of the size, number, or location of the myomas. Journal of Minimally Invasive Gynecology (2008) 15, 292–300 © 2008 AAGL. All rights reserved.

Keywords: Laparoscopic myomectomy; Myomas; Enucleation; Morcellation; Devascularization; Uterus

Uterine myomas are common benign tumors of the myometrium with the highest incidence in women of reproductive age, affecting African-American women 3 times as often as Caucasian women [1]. Prevalence rates of leiomyomas may be as high as 50% in some populations [2].

In patients with symptomatic myomas in the reproductive age group who desire fertility, myomectomy is the surgical procedure of choice. Myomectomy is also ideal in the many symptomatic women with myomas who may desire to preserve their uteri, despite having completed childbearing, for social, cultural, and emotional reasons. Published studies indicate that laparoscopic myomectomy may be an appropriate alternative to abdominal myomectomy in well-selected patients [3].

The criteria, which constitute proper selection of patients for this procedure, are still, however, a matter of great debate. Various researchers have proposed several exclusion criteria, based on size, number, and location of the

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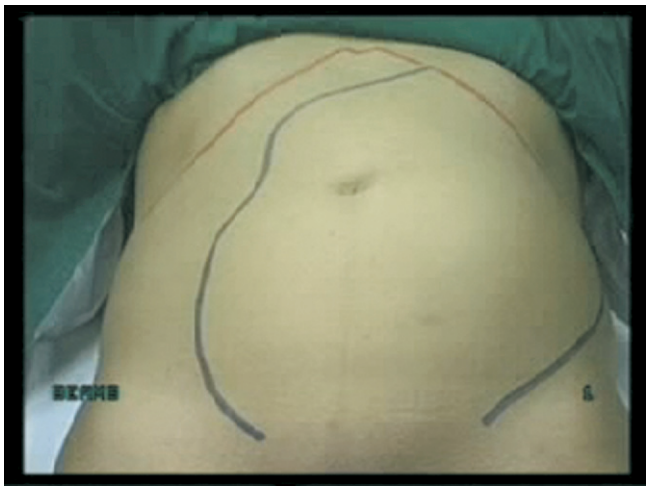

Fig 1. Large myoma. *Red marking* = costal margin; *blue marking* = myoma dimension.

myomas [4,5]. However, do size, number, and location of myomas form limiting factors for laparoscopic myomectomy? The procedure is also technically very demanding. As no 2 myomas are alike, technical difficulties can never be predicted until the telescope is inside the patient [6]. Before embracing laparoscopic myomectomy, this approach must be proved to be as safe and effective as abdominal myomectomy [3]. In the case of very large myomas, the procedure can be recommended as a routine procedure for patients only after its technical feasibility, complication rates, conversion rate, and long-term outcomes are assessed [6].

Materials and Methods

We prospectively analyzed 505 healthy nonpregnant patients with symptomatic myomas who underwent laparoscopic myomectomy at our endoscopy center from 1998 through 2005. No exclusion criteria existed based on size, number, or location of the myomas and all women with symptomatic myomas who desired fertility or preferred to retain their uteri and opted for laparoscopic myomectomy were included in the study (Fig. 1). Preoperatively they were evaluated for fitness for anesthesia. The mean patient age was 34.36 $\pm$ 5.706 years (95% CI 33.85–34.87) and the mean patient weight was 54.96 $\pm$ 7.58 kg (95% CI 54.28–55.64). Main indications for surgery were abnormal uterine bleeding (243 patients), primary infertility (137 patients), secondary infertility (38 patients), abdominal pain (85 patients), and abdominal mass with pressure symptoms (29 patients).

All patients underwent transvaginal and abdominal ultrasound examination before surgery. Size, location (with respect to uterine layers), position (with respect to the uterine axis), and number of myomas were evaluated and recorded [7].

No patient included in the study underwent preoperative hormonal therapy. Twelve patients received preoperative blood transfusion as their hemoglobin was less than 10 g/dL (1 U in 11 patients and 2 U in 1 patient). An additional 2 U of blood were cross-matched for postoperative use if required. The patients were kept to a liquid diet for 2 days before the procedure to ensure that the bowel loops would be empty at the time of the procedure. Bowel preparation with pegelac was also done in all patients. Antithromboembolic prophylaxis measures adopted included low molecular–weight heparin subcutaneous injection and sequential compression devices. Two g of cefazolin was administered intramuscularly as antibiotic prophylaxis in all patients.

Operative Technique

Diagnostic hysteroscopy was performed in all patients. Hysteroscopic myomectomy was performed in all patients with submucosal myomas less than 5 cm in largest diameter. We prefer to use 10-mm 30-degree foroblique telescope for all our laparoscopic myomectomies to ensure good visualization of the myomas from various angles. This is imperative in large myomas beyond 10 cm as vision may get obscured with a zero-degree telescope.

Placement of Ports

Port geometry is extremely important for efficient surgery and intracorporeal suturing especially in the case of large myomas. It might well decide the fine line between a surgery that progresses smoothly and a difficult and technically challenging one. The veress needle is placed at the Palmer point in all patients except when significant splenomegaly exists. We perform all our laparoscopic myomectomies with a midline supraumbilical 10-mm port for the telescope. An umbilical 10-mm port would cause the telescope to be too close to the suture line and might hamper the smooth and precise handling of the instruments and the myoma screw as a result of a smaller operating field. We first place a 5-mm left upper quadrant port blindly and then insert the 10-mm port supraumbilically under vision of a 5-mm telescope inserted through the left port [6]. We use 3 5-mm accessory ports, 1 each in the left (the first one placed blindly as mentioned above) and right lateral upper quadrants and 1 in the left lateral lower quadrant. We had earlier placed the third port suprapubically in the midline but since 2002 we reverted to the above port geometry. The 2 accessory ports in the upper quadrants must be above the upper limit of the uterus so as to ensure an unobstructed passage above the fundus of the uterus. In some patients with multiple and large myomas beyond 10 cm in largest diameter, we insert an additional 5-mm accessory port in the right lateral lower quadrant of the abdomen. Later the left lateral upper quadrant 5-mm port is converted to a 15-mm one for the insertion of the morcellator.

The technique of myomectomy in most cases is as described elsewhere [6]. Appropriate manipulation of the uterus with means of a uterine manipulator with blades that reach up to the fundus is of utmost importance. We use an