

Laparoscopic Myomectomy for Large Fibroids with Synchronized use of Uterine Artery Embolization

MW Kamran, TK Madhuri, WJ Walker, SA Butler-Manuel

ABSTRACT

Objective: To determine the feasibility and efficacy of the laparoscopic myomectomy for large fibroids (>10 cm) with use of synchronous uterine artery embolization.

Design: A prospective observational case series of laparoscopic myomectomy performed for single and multiple uterine fibroids.

Setting: A tertiary referral center for gynecological oncology and minimal access surgery.

Population: A 15 premenopausal women with large fibroids who wished to conserve their uterus from March 2005 to August 2011.

Materials and methods: Laparoscopic myomectomy was performed using harmonic scalpel with synchronized pre-operative uterine artery embolization (UAE) following multidisciplinary team discussion. Tissue retrieval was performed by morcellation.

Main outcome measures: Early discharge and reduced intra-operative blood loss.

Results: Of all 15 cases, mean number of fibroids removed was 2 (range: 1-4) and mean mass of tissue excised was 450 gm (range: 320-1540). The mean diameter of the fibroids removed was 13 cm (range: 10-20 cm). Mean estimated blood loss was 156 ml (range: 25-1,000 ml) and the mean operating time was 113 minutes (17-200 minutes). All cases were successfully completed laparoscopically with no conversions to open surgery. One patient who had a 13 cm broad ligament fibroid required a 2 unit blood transfusion intraoperatively and another patient developed a single port-site infection 2 weeks following the procedure. Histology confirmed benign leiomyomas in all cases.

Conclusion: Laparoscopic myomectomy with use of synchronized UAE using harmonic scalpel is feasible and efficient procedure for single or multiple large fibroids within an experienced multidisciplinary setting.

Keywords: Large fibroids, Laparoscopic myomectomy, Uterine artery embolization.

How to cite this article: Kamran MW, Madhuri TK, Walker WJ, Butler-Manuel SA. Laparoscopic Myomectomy for Large Fibroids with Synchronized use of Uterine Artery Embolization. *World J Laparosc Surg* 2013;6(2):107-110.

Source of support: Nil

Conflict of interest: None declared

INTRODUCTION

Symptomatic uterine fibroids are a common problem, particularly for premenopausal women in their later reproductive years. They principally cause either heavy periods or pressure symptoms, especially on the bladder

and other abdominal viscera. Prevalence rates vary widely depending on the age and racial mix of the study population.

A diagnostic study in the UK identified uterine fibroids in 36% of premenopausal women with abnormal uterine bleeding.¹ According to hospital episode statistics, UK 10,559 hysterectomies were performed due to menorrhagia in 2002.² A patient preference study in the UK showed that approximately 85% women would consider a 50:50 chance of treatment failure to avoid a hysterectomy.³

The successful management of uterine fibroids should depend on the presenting symptoms, size, number and location of the fibroids. A successful outcome also depends on the patient's expectations and desire or otherwise to retain her uterus and fertility. However, the standard treatment performed for large fibroids in the UK and USA remains hysterectomy, the majority of which are performed by conventional abdominal open surgery. Open myomectomy is much less frequently performed and is also associated with significant morbidity, but myomectomy is the preferred choice for patients wishing to conserve their uterus.^{4,5}

Laparoscopic removal of fibroids has been shown to be possible since the early 1990s but has not been widely adopted, especially for large fibroids, presumably due to limitations in surgical expertise and training required.^{6,7} Laparoscopic myomectomy has the great advantages of short hospital stay, reduced analgesic requirement, rapid recovery to normal activity, reduced risk of adhesions, and almost immediate symptomatic benefit. Laparoscopic myomectomy is restricted by the size and the location of the fibroids. Large fibroids limit the amount of space available within which to manipulate the uterus and laparoscopic instruments.⁸

Multiple smaller intramural or interstitial fibroids may be best treated by nonsurgical means, such as UAE alone with very good symptomatic and pregnancy outcomes.⁹ Not all patients are suitable for UAE however, including those with pedunculated fibroids, while others find the prospect of fast recovery and minimal discomfort of laparoscopic surgery appealing.

MATERIALS AND METHODS

Design and Setting

The study population includes 15 otherwise healthy non-pregnant premenopausal women with symptomatic large

fibroids undergoing laparoscopic myomectomy within a tertiary referral center for gynecological oncology and minimal access surgery. The data was collected from March 2005 to August 2011. The decision to undertake laparoscopic myomectomy combined with preoperative uterine artery embolization (UAE) was jointly taken in 15 cases of anticipated heavy intraoperative blood loss following multidisciplinary review with interventional radiology and gynecological oncology input. This approach was adopted to gain the maximum knowledge about the size, number and characteristics of abdominopelvis mass. Particular emphasis was placed on excluding any features suggestive of malignancy, such as atypical appearance of mass, retroperitoneal disease or associated ovarian pathology. Therefore, the patient exclusion criteria for the combined procedure included small uterine mass of less than 10 cm, calcification, single pedunculated lesion, clinical and or radiological features suggestive of malignancy.

INVESTIGATIONS

All patients had preoperative full blood count, blood grouping and serum saved. All cases were assessed preoperatively with ultrasound as well as MRI abdomen and pelvis scans to estimate the size, number, location and characteristics of fibroids (Figs 1 and 2). No preoperative hormonal therapy was used and surgery was not timed with any particular point in the menstrual cycle.

INTERVENTIONS

All patients were counselled appropriately in outpatient department by two specialists involved in providing care regarding the procedure and associated risks including premature ovarian failure, prospects of future pregnancy and failure of the procedure requiring further in future.

The patients were admitted on the day of surgery and remained for one night postoperatively. The selective uterine artery embolization was carried out by a single interventional radiologist through the groin approach using local anesthesia and intravenous sedation on the day of the operation in the interventional vascular suite following pelvic angiogram. Unilateral or bilateral uterine artery embolization was undertaken with 355 to 500 micron polyvinyl alcohol (PVA) particles and coils based on the angiogram.

These patients were then observed on the ward prior to surgery. All laparoscopies were undertaken by a single gynecological surgeon. Palmer's point entry in the left upper quadrant was preferred using a 5 mm laparoscope as the fibroid masses often extended close to or above the umbilicus. A second 5 mm port was inserted in the left lower quadrant, and one 12 mm port inserted through the umbilicus. This was then later exchanged for the morcellator

following excision of the fibroids. A third 5 mm port was used in 4 cases to aid with the dissection.

Following insertion of all ports and setup, confirmation was made that the planned procedure was feasible before proceeding further with the dissection. Dissection of the fibroid(s) was then performed, followed by repair of any uterine defect with a layered closure using 2/0 absorbable braided monofilament sutures using intracorporeal knot tying. In all cases harmonic scalpel was used for the uterine and other tissue dissection. Bipolar forceps were available for additional hemostasis for larger vessels. Tissue extraction was performed by laparoscopic morcellation. The blood loss was measured by volume collected in the suction apparatus. A final check laparoscopy and lavage was performed, with infiltration of local anesthesia, prior to closure of the ports.

RESULTS

The mean age of myomectomy in our population was 37 years (31-49). All 15 cases had synchronized uterine artery embolization on the day prior to the laparoscopic myomectomy. In total 34 fibroids were excised and the mean number of fibroids removed was 2. Of all those, there were 22 fundal, 8 anterior or posterior uterine wall, 2 lateral uterine wall/broad ligament and 2 cervical leiomyomas. 26 fibroids were intramural and 8 subserosal (including 2 cervical fibroids). The mean weight of the excised fibroid tissue was 450 gm (350-1,540 gm). The mean fibroid size in largest dimension was 13 cm (10-20 cm). The mean estimated blood loss measured in suction was 156 ml and the mean operating time was 113 minutes (65-200 minutes). One patient who had broad ligament fibroid received a 2 unit blood transfusion postoperatively due to an estimated intraoperative blood loss of 1 liter from the aberrant blood vessels in the broad ligament. The blood transfusion was

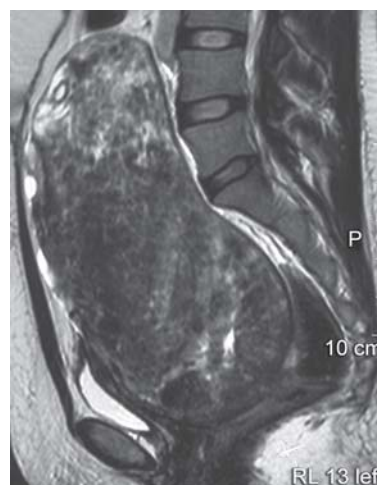


Fig. 1: MRI sagittal view showing large fibroid uterus



Fig. 2: MRI pelvis showing fibroid

given due to the clinical symptoms and a drop in post-operative hemoglobin (Hb) by 2.1 gm/dl (preop Hb 9.4 gm/dl). Another patient had single port site infection, which required a course of oral antibiotic treatment. All patients were discharged home within 24 hours after an overnight stay. Tissue specimen histology confirmed leiomyomas in all cases. One patient subsequently delivered a healthy infant at 37 weeks gestation by an elective cesarean section. None of these women have undergone subsequent hysterectomy or further treatment for their fibroids. All cases were successfully completed laparoscopically without conversion to open surgery.

DISCUSSION

Size and intractable intraoperative bleeding has been cited in previous published series as a common reason for conversion from a laparoscopic approach to laparotomy in 41.4% cases¹⁰ or even hysterectomy¹¹ but that has not been our experience. An upper limit of size for laparoscopic myomectomy has been suggested at 10 cm to minimize blood loss.¹² Numerous preoperative and intraoperative chemical and mechanical interventions have been described to reduce the intraoperative blood loss during uterine myomectomy.^{6,13} These include the preoperative use of gonadotropin releasing hormone (GnRH) analoges, injection of vasopressin or other vasoconstrictive agents under the capsule of the fibroid, or the application of mechanical clips or tourniquets around the uterine vessels. All of these strategies have some merit. Use of vasopressin has been shown to reduce blood loss¹⁴ as have the use of either temporary or permanent laparoscopic clips.^{15,16} However, the application of clips on uterine vessels becomes more difficult, the larger the fibroid mass due to the restricted operating space available.

We have adopted a simple reproducible technique of myomectomy with no special pre- or peroperative measures, but with use of UAE in selected cases following multidisciplinary discussion and review of imaging. The use of preoperative UAE followed by laparoscopic myomectomy has proved to be a reliable method to help reduce intraoperative blood loss and also to treat multiple smaller intramural or interstitial fibroids simultaneously with surgical removal of the largest of the masses. This approach has enabled the most complex of cases to be managed laparoscopically without fear of intractable hemorrhage.^{17,18} Preoperative UAE makes uterine surgery simpler due to the bloodless field and does not increase the complication rate.¹⁹

Recent studies have suggested that UAE alone may not provide effective symptomatic relief in nearly 1 in 4 women and hence patients may need further intervention over time²⁰ and that nearly 30% patients with previous UAE may require a hysterectomy due to insufficient symptomatic improvement.²¹

The best symptomatic outcomes may be achieved by combining UAE with synchronized myomectomy which ideally should be undertaken laparoscopically to give patients the considerable benefits of endoscopic surgery. The advent of robotic surgery may well make such minimal access surgery more widely available to women with symptomatic fibroids, as it makes suturing of the uterine defect easier to perform than with 'conventional' laparoscopic surgery.

In all of these cases disposable morcellators were used. Tissue morcellation remains the most time-consuming part of laparoscopic myomectomy for large fibroids, and further improvements in mechanical tissue morcellation would further enhance these procedures and reduce operating time.

CONCLUSION

We have successfully demonstrated the feasibility and efficacy of laparoscopic myomectomy for large fibroids of diameter up to 20 cm using harmonic scalpel combined with preoperative UAE. The size of fibroids should not necessarily be the limiting factor to performing myomectomy laparoscopically. Laparoscopic myomectomy for large fibroids should be undertaken with multidisciplinary team approach in centers with particular expertise in both minimal access surgery and interventional radiology.

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