Gynecol Surg (2004) 1:195–197
DOI 10.1007/s10397-004-0046-8

ORIGINAL ARTICLE

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Endoscopic stapling of large uterine vessels at laparoscopic hysterectomy for uterine fibroid masses of 500 g or more: a pilot study

Published online: 17 July 2004

Abstract From December 1996 to March 2004, 27 consecutive patients (both private and public) presented with large uterine fibroid masses to be removed, which subsequently weighed 500 g or more. All were scheduled for a laparoscopic hysterectomy procedure where the uterine vessels are secured laparoscopically using a linear cutter-stapling device. The data from these cases was collected prospectively. Twenty-six of the large uterine fibroid masses were successfully removed by planned laparoscopic hysterectomy without major complication. One case had to be opened because of dense pelvic adhesion, and it was the case with the largest mass in the series (1,280 g). The mean weight of the removed masses was 704.6 g (range: 500–1,280 g). Operating times were long (mean 220 min), but the postoperative stay was short (mean 2.26 days). Laparoscopic hysterectomy a using linear cutter-stapling device to secure the uterine vessel pedicles for large uterine fibroid masses is a useful and effective procedure in most cases with fast patient recovery.

Keywords Laparoscopy · Hysterectomy · Fibroids · Surgical staples

Introduction

A recent review of hysterectomy in the United States found that the majority performed between 1990 and 1997 were abdominal, and the most common indication was that of fibroids [1]. Of the uterine fibroid masses, 79% were removed abdominally compared with 12% vaginally and 8.5% laparoscopically.

Hysterectomy performed laparoscopically has the advantage over abdominal hysterectomy of faster patient recovery with shorter hospital stay and quicker return to normal activity [2]. Laparoscopic hysterectomy (where the uterine vessels are secured trans-abdominally [3]) has the advantage over vaginal hysterectomy (with or without laparoscopic assistance) that more difficult cases with poor access from below can be performed without having to resort to an open procedure [4].

Nezat et al. [5] described the first case of laparoscopic hysterectomy using the cutter-stapling device to secure uterine vessels, but subsequently there were case reports of ureteric injuries while performing this procedure [6, 7]. McMaster-Fay [8] described a safe technique of securing uterine vessels at laparoscopic hysterectomy by inserting the device through the umbilical port. McMaster-Fay [4] and Jones [9] have reported large series of laparoscopic hysterectomies using this device with a low incidence of complications.

Bipolar coagulation is the most commonly used method of securing uterine vessels endoscopically. Bipolar coagulators are usually reusable devices, giving them a cost advantage over disposable cutter-stapling devices.

Uterine fibroid masses usually have larger blood vessels supplying them, and Wattiez et al. [10] state that when removing them by laparoscopic hysterectomy, "the main challenge is securing uterine vessels." But bipolar diathermy has an inherent disadvantage when dealing with larger uterine vessels in that higher amounts of heat energy are required to coagulate these vessels with the concern that collateral spread of that energy may result in injury to the ureter. Also, with large uterine fibroid masses, surgical access is limited, and surgeons are forced to work closer to the pelvic sidewalls, thus increasing the risk of ureteric injury. Individual cases of large uterine fibroid masses removed by laparoscopic hysterectomy have been reported as part of larger series with varied techniques [11, 12, 13]. Two series of laparoscopic hys-

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terectomy for large uterine fibroid masses have been reported [10, 14].

Materials and methods

Patients

From December 1996 to March 2004, 27 consecutive patients presented with large uterine fibroid masses to be removed, which subsequently weighed 500 g or more. All were appropriate candidates for laparoscopic hysterectomy. Inclusion criteria were benign disease, patient informed consent and fitness for general anesthesia for laparoscopic surgery. Pneumatic calf compressors were used. Cephtriaxone 1 g is given intravenously at the beginning of the operation and repeated in 24 h.

Operative procedure

With the patient in the lithotomy position, the initial approach is transvaginal, where the cervico-vaginal reflection is incised and the utero-vaginal space is opened and the bladder is mobilized off the uterus. The vaginal incision is then sutured, and a Sairges uterine elevator (Richard Wolf) is inserted into the uterine cavity and clamped onto the cervix.

A four-port laparoscopy is then performed after pneumoperitoneum has been created with a Veress cannula, inserted through the umbilicus. A 5–12-mm port is inserted through the umbilicus, and a 5-mm port is inserted suprapubically. Two lateral 5–12-mm ports are inserted midway between the first two ports, lateral to the laparoscopically visualized inferior epigastric vessels. The anatomy is identified, and adhesions are divided. In particular, the ovaries are fully mobilized and the ureters and their course along the pelvic sidewall identified.

Two different stapling devices were used: the Endo GIA (United States Surgical Corporation, a division of the Tyco Healthcare Group LP) and the Endopath ETS (Ethicon Endo-Surgery, a division of Johnson and Johnson Medical). Both are disposable and reloadable devices that deliver two triple linear rows of staples and simultaneously divide the tissues between the central rows of staples. The ovarian and uterine vessels were divided using the device. For the uterine vessels, the device is inserted through the umbilical port with the laparoscope moved to the ipsilateral port. The device is opened and placed over the skeletonized uterine vessels, parallel and adjacent to the cervix, after the bladder pillars have been divided. The device is so placed that its distal end goes down to the vaginal suture line made in the first step of the operation. The assistant then exerts negative traction from below via the uterine manipulator, which ensures that the uterus is mobilized well away from the ureters, and only then is the device closed. The anatomy is rechecked, and then the device is fired, occluding and dividing the uterine vessels.

Most uteri were debulked transabdominally using the S.E.M.M. Moto-Drive 15-mm mechanical morcellator (WISAP) through the left-hand port. In some cases where there was generous access from below, the mass was debulked vaginally. The uterine remnant was then removed trans-vaginally. The vagina was then sutured laparoscopically under direct vision. All patient data, including any operative difficulties, intraoperative and postoperative complications, were prospectively collected as a database.

Results

Twenty-six of the 27 patients had laparoscopic hysterectomies successfully performed, with one case converted to an abdominal hysterectomy because of dense pelvic adhesions; this was also the largest mass in the series (1,280 g). One mass was delivered intact, 3 were bivalved vaginally, 16 were morcellated trans-abdominally and 6 required a combination of morcellation and vaginal debulking. Four patients had laparoscopic enterocele repairs at the time of surgery.

Mean operating time was 220.2 min (range: 135–420 min), the longest being the first patient. The mean specimen weight was 704.0 g (range: 500–1,280), and the mean postoperative hospital stay was 2.26 days (range: 1–7 days), the longest being after the open operation.

No injuries, reoperations, readmissions or blood transfusions occurred. The lowest postoperative hemoglobin was 77 g/dl in the patient who required the abdominal procedure. Four patients had minor vaginal vault infections requiring oral antibiotics 3 to 5 weeks after surgery.

Discussion

Nine cases of laparoscopic hysterectomy for uterine fibroid masses have been reported as part of larger series [11, 12, 13]. Uterine vessels were secured using bipolar coagulation in six cases [11, 13], and laparoscopic suture ligation in three [12]; no complications were reported. O'Shea et al. [14] reported the first large series (21 cases) of laparoscopic hysterectomies (where the uterine vessels are secured trans-abdominally [3]) for large uterine fibroid masses with a mean weight of 534.7 g (range 390–1,022 g). They used bipolar diathermy to secure the uterine vessels. One patient had a DVT, and another had an intraoperative blood loss of 1,000 ml. No ureteric injuries occurred in this series, although in a patient subsequent to this series there was a uretero-vaginal fistula after removal of a 600 g uterine fibroid mass (personal communication). Wattiez et al. [10] removed 34 large uterine fibroid masses weighing 500 g or more (mean weight 617 g) by laparoscopic hysterectomy. They used bipolar coagulation to secure the uterine vessels in 28, but resorted to laparoscopic suture ligation in 6 cases. They had one ureteric injury. A recent review of reported ureteric injuries in pelvic laparoscopic surgery found that electrocautery was the most commonly reported instrument to cause such injuries, electrocautery causing 50% more ureteric injuries than staples [15].

This series of uncomplicated laparoscopic securing of large uterine vessels using a cutter-stapling device confirms the efficacy of the described technique. Operating times remain longer for laparoscopic hysterectomy than for abdominal hysterectomy, but in this series a single gynecologist performed all operations with a generalist assisting. Longer operating times did not have any adverse effect on patient well-being here, but a team approach with two gynecologists operating together may be preferable and could reduce operative duration. The numbers in this study are small, and further studies are required to confirm the suitability of this technique for both patient safety and cost.

References

1. Farquhar CM, Steiner CA (2002) Hysterectomy rates in the United States 1990–1997. Obstet Gynecol 99:229–234
2. Wood C, Maher P, Hill D (1997) The declining place of abdominal hysterectomy in Australia. Gynaecol Endosc 6:257–60, 1997
3. Garry R, Reich H, Liu CY (1994) Laparoscopic hysterectomy—definitions and indications. Gynaecol Endosc 3:1–3
4. McMaster-Fay RA (2000) Laparoscopic hysterectomy combined with morcellation brings abdominal hysterectomy rate below 2%: a series of 225 consecutive hysterectomies since 1996. Presented at the 9th annual congress of the International Society of Gynecologic Endoscopy, Gold Coast, Qld, 16–19 April 2000
5. Nezhat C, Nezhat F, Silfen SL (1990) Laparoscopic hysterectomy and bilateral salpingo-oophorectomy using Multifire GIA surgical stapler. J Gynecol Surg 6:287–288
6. Woodland MB (1992) Ureteric injury during laparoscopy assisted vaginal hysterectomy with the endoscopic linear stapler. Am J Obstet Gynecol 167:756–757
7. Hunter RW, McCartney AJ (1993) Can laparoscopic assisted hysterectomy safely replace abdominal hysterectomy? Br J Obstet Gynaecol 100:932–934
8. McMaster-Fay RA (1995) Ligating uterine arteries safely with the Endo-GIA at laparoscopic hysterectomy. Presented at the 5th annual scientific meeting of the Australian Gynaecological Endoscopic Society, Melbourne, Vic, 23–25 November 1995
9. Jones RA (2000) Complications of laparoscopic hysterectomy: comparison of first 250 cases with second 250. Gynaecol Endosc 9:373–378
10. Wattiez A, Soriano D, Fiaccavento A et al (2002) Total laparoscopic hysterectomy for very enlarged uteri. J Am Assoc Gynecol Laparosc 9:125–130
11. Pelosi MD, Kadar N (1994) Laparoscopically assisted hysterectomy for uteri weighing 500 g or more. J Am Assoc Gynecol Laparosc 1:405–409
12. Salmanli N, Maher P (1999) Laparoscopically assisted vaginal hysterectomy for fibroid uteri weighing at least 500 g. Aust J Obstet Gynaecol 39:182–184
13. Clayton RD, Hawe JA, Garry R (1999) Laparoscopically assisted hysterectomy for the large uterus. Gynaecol Endosc 8:219–223
14. O'Shea RT, Cook JR, Seman EI (2002) Total laparoscopic hysterectomy: a new option for removal of the large myomatous uterus. Aust J Obstet Gynaecol 42:282–284
15. Ostrzenski A, Radolinski B, Ostrzenski KM (2003) A review of laparoscopic ureteral injury in pelvic surgery. Obstet Gynecol Surv 58:794–799