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Urogynaecology and Gynaecologic Oncology

Expanding Applications of Robotic-Assisted Laparoscopy

THE ADVENT of robotic-assisted laparoscopy has prompted an increase in minimally invasive procedures in the gynecologic subspecialties. Robotic assistance gives patients the benefits of minimally invasive surgery, while offering surgeons an ergonomic, tremorless, 3-D alternative with remote capabilities. At Cleveland Clinic, operative times for robotic-assisted procedures have been comparable to laparotomy, with less blood loss, fewer complications and shorter hospital stays.

Widespread adoption of advanced laparoscopic surgery techniques in urogynaecology and gynaecologic oncology has been deterred by the steep learning curve associated with laparoscopic suturing, the requirement for highly skilled assistants in complex procedures and inadequate postgraduate training. Although the cost of robotic-assisted surgery may limit its widespread applicability, it can serve as a stepping stone to conventional advanced laparoscopy.

CASE REPORT: UTERINE PROLAPSE

The following case illustrates how robotic-assisted laparoscopy improves operative efficiency by decreasing surgeon fatigue and suture labour associated with conventional advanced laparoscopy. Three similar procedures, two with robotic assis-

stance, were completed on the same day by the same urogynaecologic surgeon. All patients were discharged the day after surgery.

History and Diagnosis: A 65-year-old woman was referred for recurrent vaginal apex prolapse one month after a total vaginal hysterectomy, bilateral salpingo-oophorectomy, uterosacral ligament vaginal vault suspension and transobturator suburethral sling procedure. She complained of urinary urgency and frequency, incomplete bladder emptying and inability to ambulate due to pelvic pressure. Pelvic examination revealed descent of the vaginal apex 3 cm beyond the hymen, with concomitant cystocele to the hymen. The patient demonstrated poor pelvic floor contractility. She wanted surgical management for this condition and entered a randomised trial of conventional versus robotic-assisted laparoscopic sacral colpopexy. Preoperative urodynamic studies were performed with reduction of her prolapse. The patient demonstrated no urodynamic stress incontinence, stable cystometrogram, normal compliance and adequate flow rates.

Operative Technique: The patient underwent robotic-assisted laparoscopic sacral colpopexy with lysis of intestinal

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Laparoscopic myomectomy has been one of the more challenging minimally invasive procedures. In our armamentarium for more than 20 years, its practice has been limited by instrumentation and by the surgeon's ability to suture multiple layers securely to prevent dehiscence if the patient were to achieve pregnancy.

The introduction of the da Vinci[®] robotic surgical system has greatly enhanced our ability to remove subserosal, intramural and submucosal fibroids with minimal blood loss and accurate re-approximation of all tissue layers. The three-dimensional magnification, lack of tremor and suture control make even multiple myomectomies feasible, with excellent results. The robot requires a learning curve that is markedly shortened for those with laparoscopic experience. Just as operative times and complications dramatically improved over a few years for laparoscopic supracervical hysterectomy and total laparoscopic hysterectomy, continued experience with the robot will allow the vast majority of gynecologic procedures to be done minimally invasively. This will only enhance the comfort and security of our patients. In the preceding case, involving large fibroids, the robot provided a minimally invasive solution for what would have been an open procedure. The lack of pain, and shortened hospital stay and recovery offset the increased O.R. time.



and pelvic adhesions using the da Vinci® three-armed robotic system. Two pieces of 15 x 4-cm, large-pore polypropylene mesh were sutured to the endopelvic fascia of the anterior and posterior vaginal walls. They were subsequently secured without tension to the anterior longitudinal ligament of the sacrum. The surgery, which lasted approximately two and one-half hours, was uncomplicated, with an estimated blood loss of 100 mL. The patient was discharged on the first post-operative day from the short-stay unit.

CASE REPORT: ENDOMETRIAL CARCINOMA

Minimally invasive surgery is well-established in the care of women with benign gynecologic conditions. Preliminary data from a national randomised controlled trial in endometrial cancer patients shows similar lymph node yield and morbidity for laparoscopic hysterectomy as for total abdominal hysterectomy with bilateral salpingo-oophorectomy, plus lymph node dissection (TAH/BSO + LND). Surgical times were longer, but hospital stay was significantly shorter in the laparoscopy group.

We currently perform robotic-assisted total laparoscopic hysterectomy (TLH/BSO + LND) for endometrial cancer, and robotic-assisted radical hysterectomy and LND for early-stage cervical cancer. We find that robotic assistance decreases blood loss, complications and hospital stays and speeds recovery. In addition, as this case illustrates, complete surgical staging by laparoscopy prevents unnecessary pelvic radiation.

History and Diagnosis: A 60-year-old gravida 4, para 2 female, presented to Cleveland Clinic gynaecologic oncologists for a second opinion. With post-menopausal bleeding off and on for two years and a negative endometrial biopsy, she underwent an operative hysteroscopy and D&C at another institution. A large polyp containing a grade 1 endometrial carcinoma was identified. The patient was offered TAH/BSO with general surgery stand-by for possible lymph node biopsy. When she presented to us, she was found to have a 7 x 5 x 4-cm uterus, no adnexal masses and normal CA-125.

Operative Technique: We offered the patient robotic-assisted TLH/BSO with laparoscopic pelvic and para-aortic LND. Intraoperative frozen section revealed a grade 1 adenocarcinoma with more than 50 percent myometrial invasion. The total procedure lasted three hours. The patient

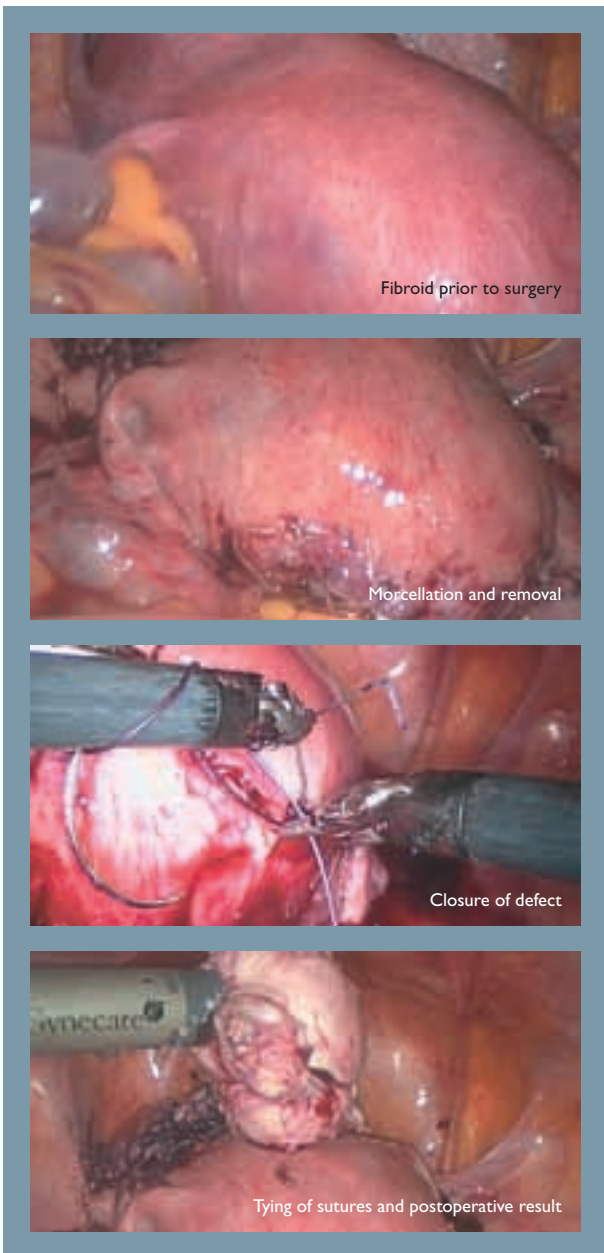
had 250 mL blood loss and was discharged home on the second postoperative day without complications. She returned to work three weeks after surgery.

Pathology and Follow-Up: The tumour had invaded the outer one-third of the uterine wall, but pelvic washings and all lymph nodes were negative (stage IC, grade 1). The patient received vaginal cuff radiation only and remains well nearly 14 months after treatment.

CASE REPORT: LARGE FIBROIDS

History and Diagnosis: A 30-year-old female was admitted for menorrhagia, pain and increasing abdominal girth. The uterus was noted to be 16 weeks in size, and ultrasound showed five leiomyomas, three in the subserosal position (the largest measuring 3.5 cm) and two in the intramural position, fundal and anterior (8 cm and 6 cm respectively).

Operative Technique: Three arms of the robot were used, with the 10/12 trocar for the telescope placed 3 cm above the umbilicus secondary to uterine size, and the two 8-mm robotic instrument ports placed 10 cm lateral to the umbilicus on the left and right side. A second 10/12 trocar was placed between the left 8-mm trocar and the telescope port for assistance. Dilute Pitressin® (vasopressin) was injected into each of the fibroids and the monopolar spatula was used to excise the three subserosal fibroids. Following this, the two large intramural fibroids were dissected out using the harmonic laparoscopic coagulation shears attachment and the monopolar spatula. Minimal bleeding was encountered and the endometrial cavity was avoided. The two large incisions were then closed in three layers, using 0 Vicryl in running fashion for each layer and 2-0 Vicryl in baseball-stitch fashion to close the serosa. The three smaller incisions were closed in two layers with 0 Vicryl and 2-0 Vicryl on the serosa in baseball-stitch fashion. The fibroids were then morcellated and removed. They weighed 347 gm. Injection of methylene blue through an intrauterine catheter showed prompt flow of dye from both tubes. With good haemostasis, the uterus was wrapped with a postoperative adhesion barrier made of oxidised, regenerated cellulose (Intercede®) to cover the suture lines. Operative time was three hours. The patient had minimal pain, and was discharged after a 12-hour observation. ■



Fibroid prior to surgery

Morcellation and removal

Closure of defect

Tying of sutures and postoperative result