

# Endoscopic Bladder Repair During Total Modified Laparoscopic Hysterectomy

## A Case Report

Adam Ostrzenski, M.D., Ph.D.

*Endoscopic repair was performed on a bladder laceration during total modified laparoscopic hysterectomy, with the vaginal cuff sutured to the cardinal and uterosacral ligaments. The patient underwent the hysterectomy for chronic pelvic pain. The endoscopic bladder laceration was repaired via laparoscopy, and the patient was discharged from the hospital on the second postoperative day with a catheter connected to a leg bag for drainage. Intravenous pyelogram with full bladder distention, which was performed two weeks after surgery, revealed no abnormality. The patient returned to her daily activities, including sex, within three weeks.*

### Introduction

Bladder lacerations during laparoscopy occur most often in patients who have had previous pelvic surgery, cautery of endometriosis in the bladder or a bladder not emptied prior to the laparoscopic procedure.<sup>3</sup> With the increasingly more complex endoscopic gynecologic procedures currently being performed, surgical complications affecting adjacent pelvic organs are of concern. It is essential to exercise the same sterile surgical practice as in conventional laparotomy.

The advantages of endoscopy are numerous. They include elimination of large abdominal incisions, a decrease in postoperative pain and a reduction in the length of the hospital stay,<sup>2</sup> minimizing tissue damage, expediting recovery, allowing the patient to resume work in one week (on average),<sup>2</sup> producing fewer postoperative adhesions when compared to laparotomy and creating a more favorable patient response to gynecologic surgery.

### Case Report

A 22-year-old, white woman, gravida 2, para 2, presented with severe and persistent chronic pelvic pain, severe dyspareunia and dysmenorrhea, and frequent, painful urination in small amounts. These symptoms began in 1989, shortly after her second cesarean section, which had occurred three years after the first. Conservative management of the symptoms, including oral contraceptives and non-steroidal antiinflammatory medication, failed to resolve the symptoms. In 1990 diagnostic laparoscopy with lysis of some adhesions was performed by the patient's physician. The initial clinical evaluation revealed the only abnormality to be a retroverted, retroflexed uterus fixed in the true pelvis, with limited mobility and much tenderness. Manual examination documented suprapubic tenderness on deep palpation but no abnormality in the periurethral area.

The laboratory data appeared to be within normal limits (chemistry 24, CBC count and differential, WBC count, erythrocyte sedimentation rate, quantitative  $\beta$ -human chorionic gonadotropin negative, urinalysis and urine culture negative). Multiple cervical cultures (*Chlamydia trachomatis*, *Neisseria gonorrhoeae*, aerobic and anaerobic bacteria, *Ureaplasma urealyticum* and *Trichomonas*) were all negative. Endometrial biopsy ruled out chronic endometritis. Transabdominal and transvaginal ultrasound examination demonstrated extended varicose veins in a parametrial area and a retroverted, retroflexed uterus.

Placing of a Smith-Hodge pessary was attempted,

From the Institute of Video Endoscopy, Premier Surgical Center of Washington, and the Gynecology-Reproductive Endocrinology-Infertility Center, Washington, D.C.

Address reprint requests to: Adam Ostrzenski, M.D., Ph.D., Gynecology-Reproductive Endocrinology-Infertility Center, 1002 22nd Street, NW, Washington DC 20037.

but the patient could not tolerate the discomfort, and the pessary was removed. On March 12, 1991, she underwent advanced operative CO<sub>2</sub> laser pelviscopy with lysis of extensive fibrotic vascular adhesions (documented by histopathology), hysteropexy by plication of uterosacral ligaments and round ligaments with the CO<sub>2</sub> laser and varicose vein ligation. The patient's response to this mode of therapy was poor; her dyspareunia and dysmenorrhea decreased in intensity but were still present. Her backache subsided substantially, but pelvic pain and urinary tract symptoms remained. Three consultant gynecologists agreed upon hysterectomy.

Since the patient had a history of previous multiple abdominal operations, including pelviscopic hysteropexy, and pathologically documented fibrotic adhesions ("mesothelial-lined fibrous connective tissue"), vaginal hysterectomy was relatively contraindicated. She was presented with the option of laparotomy or endoscopic surgery and chose the latter. After the patient was fully advised of the risks and benefits of such surgery, written consent for the procedure was obtained.

The surgical technique for pelviscopic hysterectomy was adopted from Reich et al<sup>4</sup> and modified by the author by means of complete excision of the uterus from the supporting structure via laparoscopy followed by laparoscopic vaginal cuff suturing to the ligaments.

During the process of dividing the vesicouterine plica, severe fibrotic vascular adhesions were noted, and the upper anterior bladder part was firmly fused with the isthmocervical area. The bladder fusion itself measured 0.5 cm in depth and 3.0 cm in width adjacent to the uterine muscle scar from the previous cesarean sections.

Fusion of the upper bladder to the isthmocervical area caused bladder disfigurement and decreased bladder capacity. This abnormality could be observed only with the vesicouterine plica divided and the bladder inflated with 150 mL of sterile normal saline. Since the bladder was fused to adjacent structures, it was necessary to image the ureters. The right ureter was identified at the level of the common iliac bifurcation, and the peritoneum was divided above the right ureter and traced down. This ureter was trapped in fibrotic adhesions at the level of its attachment to the bladder. The left ureter was found outside these adhesions. Lysis of adhesions along the right ureter was performed, and the ureter was removed from this critical area. Since this abnormality was noted after the uteroovarian ligaments, fallopian

tubes and round ligaments had been desiccated and divided, the decision was made to skeletonize the uterine arteries with laparoscopic scissors. Bipolar Kleppinger forceps were utilized to obliterate the arteries bilaterally in order to decrease bleeding from the uterus during the process of dissecting the bladder from the isthmocervical area.

Laparoscopic microscissors were applied from left to right to dissect the bladder from the isthmocervical adhesions. Fibrotic adhesions covered the entire isthmocervical area. During the process of removing the bladder from the scarred uterine muscles, the bladder was incised for approximately 3 cm. The atraumatic grasper was introduced and placed on the edge of the bladder incision to identify the bladder mucosa. Retrograde injection of diluted indigo carmine was applied for better visualization of the bladder mucosa.

The first layer was sutured (interrupted sutures), closing the bladder mucosa. The muscular layer of the bladder was identified, and continuous suture was placed. Finally, the edge of the serosa was approximated with interrupted sutures. A 0000 polydioxanone (PDS) intracorporeal type of suture was used. Retrograde injection of indigo carmine was administered through a Foley catheter again to ensure that no leakage could be observed. The bladder was mobilized until the anterior wall of the vaginal fornix was identified.

The cardinal ligament on the left side was desiccated with bipolar Kleppinger forceps, divided with laparoscopic scissors and secured with 00 PDS endoloop. The same procedure was done on the right side, with the endoloop suture cut a little longer than on the round ligament for future identification. Modification of the Reich<sup>4</sup> procedure started with endoscopic desiccation of the cardinal and uterosacral ligaments with bipolar Kleppinger forceps and their division with laparoscopic scissors. The rectovaginal space was opened until the posterior vaginal fornix was identified.

A no. 30 Foley catheter was introduced into the vaginal pool and inflated with sterile normal saline to stop CO<sub>2</sub> from escaping from the peritoneal chamber. The posterior vaginal fornix was opened with hook laparoscopic scissors. The closely viewed laparoscopic image with magnification allowed the surgeon to accurately dissect the uterus from the fornices at the junction without compromising either the length, width or shape of the upper part of the vagina. After the catheter was deflated and the uterus removed via the vaginal pool, the Foley catheter

ter was reinserted and reinflated, and the intraabdominal surgery was completed.

The vaginal cuff was sutured to the cardinal and uterosacral ligaments before it was closed so that the shape and adequate angle of the upper vagina parallel to the rectum could be retained. Small, corresponding notches on the vaginal wall were made before excision of the cardinal and uterosacral ligaments, just a few millimeters lower than where the uterosacral ligaments had been attached originally to the posterior cervix. The lateral vaginal fornix was sutured to the cardinal ligaments bilaterally to prevent the vaginal apex from prolapse.

Intracorporeal sutures were used (0000 PDS), two at each attachment (totaling eight sutures). The vaginal cuff was then closed with interrupted 0000 PDS intracorporeal sutures. The round ligaments were not attached to the vaginal cuff, thus avoiding elevating the vaginal cuff and changing the parallel alignment of the vagina previously obtained. Reperitonealization was performed with the same intracorporeal, interrupted sutures.

## Discussion

Hysterectomy among women of reproductive age is one of the most commonly performed operations; 28% are performed vaginally and 72% abdominally.<sup>1</sup> Due to its anatomic location, the bladder is the most vulnerable and most frequently injured organ in the lower urinary tract during pelvic surgery<sup>5</sup> such as hysterectomy. Endoscopic bladder repair is a superior technique as compared with laparotomy for these problems. Laparoscopic magnification allows the surgeon to visualize three different layers of the bladder (mucosa, muscular and serosa) and to suture them separately, layer by layer. The mucosa should be sutured with an absorbable interrupted suture, the muscular layer with a continuous nonlocking or interrupted type of suture, and the serosa with an interrupted type of suture. Peribladder tissue must

be sufficiently mobilized to allow approximation without tension. Intravenous pyelogram or cystogram after surgery must be performed when the catheter is removed. Two days before removal, the patient should be instructed to clamp and unclamp the Foley catheter for two hours on and two hours off.

Modified laparoscopic hysterectomy is designed to complete the process of excision of the uterus via endoscopy in contrast to endoscopically assisted vaginal hysterectomy. This modification differs from the technique of Reich et al<sup>4</sup> in that uterosacral and cardinal ligaments are divided and secured through laparoscopy and the uterus is excised completely and precisely at the attachment to the vaginal fornices. By doing so the shape, length and width of the vagina are preserved absolutely, and anatomic and functional capabilities are achieved.

The modified endoscopic hysterectomy described above does not eliminate laparoscopically assisted vaginal hysterectomy<sup>4</sup> but provides, instead, a technique that removes the uterus completely through laparoscopy along with securing the vaginal cuff and adequate vaginal alignment in order to preserve the functional anatomy of the vagina.

## References

1. Dicker RC, Scally MJ, Greenspan JE, et al: Hysterectomy among women of reproductive age: Trends in the United States. *JAMA* 248:323, 1982
2. Hunt R: Therapeutic laparoscopy. *In* Manual of Endoscopy. Edited by DC Martin. Baltimore, Port City Press, 1990, pp 89-96
3. Levinson CJ, Wattiez A: Complication and safety of laparoscopy. *In* Manual of Endoscopy. Edited by DC Martin. Baltimore, Port City Press, 1990, pp 35-41
4. Reich H, De Caprio V, McGlynn F: Laparoscopic hysterectomy. *J Gynecol Surg* 5:213, 1989
5. Te Linde W: Operative Gynecology. Sixth edition. Philadelphia, JB Lippincott, 1985, pp 552-560