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A NEW METHOD FOR LAPAROSCOPIC ACCESS TO THE SPACE OF RETZIUS DURING RETROPUBIC CYSTOURETHROPEXY

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ABSTRACT

Purpose: We assessed the feasibility of a new technique for laparoscopic dissection of the space of Retzius.

Materials and Methods: In 10 women 40 to 70 years old (median age 45) undergoing laparoscopic retropubic cystourethropexy for stress urinary incontinence hydrodissection was used to create a pneumo-subperitoneal space. A suction irrigator probe was inserted into a mid peritoneal incision created with a 5 mm. trocar above the symphysis pubis between the 2 umbilical ligaments. The subperitoneal space was developed and insufflated with carbon dioxide without incising the peritoneum.

Results: All procedures were completed laparoscopically without intraoperative or postoperative complications. Operative time for cystourethropexy ranged from 30 to 70 minutes (median 40). Estimated blood loss ranged from less than 50 to 300 ml. (median 100). Patients were discharged from the hospital within 24 to 48 hours. All patients reported satisfactory relief of symptoms at 3 to 6 months of followup.

Conclusions: The new technique is not difficult and may minimize tissue injury. Pneumo-subperitoneal pressure provides clear exposure of the space of Retzius with minimal bleeding.

KEY WORDS: laparoscopy; urinary incontinence, stress

Retropubic urethropexy for the treatment of urinary incontinence via the Burch or Marshall-Marchetti-Krantz procedure is considered to have a good outcome and a low complication rate.^{1,2} Recently, a laparoscopic approach has been adopted for both of these procedures, with benefits including improved visibility in the operative field, better bladder mobilization, minimal intraoperative blood loss, decreased perioperative and postoperative morbidity, shortened hospitalization and more rapid recovery.³⁻⁵ Although long-term results of laparoscopic retropubic cystourethropexy are not yet available, the procedures are similar to those described previously except for the method of access to the space of Retzius.^{6,7}

Two methods described to enter the space of Retzius during laparoscopic cystourethropexy are transperitoneal dissection and balloon dissection.^{4,5} Transperitoneal dissection requires extension of the peritoneal incision and repair. Possible complications include bowel herniation and adhesion formation, surgical trauma to the thin-walled venous plexus and injury to the muscles of the ureterovesical junction. Alternatively, the balloon dissection device is inserted through an infraumbilical incision and inflated with saline. Risks include insertion into an incorrect plane and a forced dissection that is less dependent on patient anatomical planes. Another drawback is the cost of this device. We present a modification of the laparoscopic transperitoneal technique for dissection of the space of Retzius that eliminates enlargement of the peritoneal incision.

MATERIALS AND METHODS

Ten women 40 to 70 years old (median age 45) presented with stress urinary incontinence diagnosed after a detailed history was obtained, and physical examination, negative

urine cultures, cotton swab test and urodynamic investigation were performed. Preoperatively, genuine stress urinary incontinence was diagnosed by a positive clinical stress test and decreased abdomino-urethral transmission rate as determined by 2-channel urethroprofilometry. The possibilities of an unstable bladder and bladder outlet obstruction were excluded by a 2-channel cystometrogram and 3-channel pressure flow study.

Laparoscopy is performed with the patient under general endotracheal anesthesia and in the Trendelenburg position. A Foley catheter is placed in the bladder and a rigid intrauterine manipulator is inserted if the uterus is present. After direct infraumbilical insertion of a 10 mm. trocar a pneumoperitoneum is induced.^{5,8} Three 5 mm. trocars are introduced with the middle trocar placed 5 to 6 cm. above the symphysis pubis, and the other 2 placed 7 to 8 cm. above the symphysis pubis and approximately 3 to 4 cm. lateral to the umbilical ligaments on each side. A suction irrigator probe, grasping forceps and bipolar forceps or needle holder are introduced. The peritoneal cavity is thoroughly evaluated and other procedures, such as lysis of adhesions or hysterectomy, are completed.⁵

A Moschowitz procedure is performed in all women with a deep pelvic well to obliterate the cul-de-sac.⁵ A laparoscopic pursestring suture of 1-zero polybutylate coated polyester is used beginning at the bottom of the cul-de-sac with care exercised to incorporate the posterior wall of the vagina, only peritoneum laterally at the left and right pararectal areas, and only shallow bites of serosa over the anterior rectosigmoid colon. In patients who have undergone previous hysterectomy any remnant of uterosacral ligaments is included in the suture. Closure of the cul-de-sac should leave no defect that could result in bowel entrapment.

To begin dissection of the space of Retzius the mid suprapubic cannula is withdrawn into the preperitoneal area. A 16

gauge laparoscopic needle is inserted through the mid suprapubic cannula. Approximately 30 to 50 ml. dilute vasopressin (10 units in 200 ml. Ringer's lactate solution) are injected subperitoneally in the lower anterior abdominal wall above the bladder to decrease oozing. The needle is replaced with a suction irrigator probe. Hydrodissection is performed with the suction irrigator probe by injecting 300 to 500 ml. lactated Ringer's solution or normal saline at a pressure of 300 mm. Hg to form a subperitoneal space in the anterior abdominal wall.

The video laparoscope is retracted from the abdominal cavity and directed towards the newly created subperitoneal space. A long hydrodissection probe is inserted through the operating channel of the laparoscope into the subperitoneal space under direct observation and the space is expanded further using hydrodissection. The video laparoscope is advanced into this space, which is insufflated with carbon dioxide. The lateral suprapubic trocars are retracted to the pneumo-subperitoneal space. Blunt or occasionally sharp dissection may be required to lyse adhesions that remain following hydrodissection. At this point the symphysis pubis and Cooper's ligaments can be seen. The patient may be placed in the deep Trendelenburg position and rotated to the left to facilitate left-handed suture placement. Fibrofatty tissue in the exposed space of Retzius is meticulously excised and removed from the pubic bone in the form of liposuction using the suction irrigator probe.

The paravaginal fascia is identified. Using an atraumatic grasping forceps a bite of the paravaginal fascia is elevated and a 1-zero polybutylate covered polyester endoscopic suture on a tapered 2.2 cm. straight needle is placed at the level of the urethrovaginal junction, approximately 1 to 1.5 cm. from the urethra. The assistant's finger is used as a guide, which is facilitated by placing the bulb of the Foley catheter under gentle traction. The suture is placed perpendicular to the vaginal axis to include approximately 1 to 2 cm. of tissue (the complete vaginal fascia) but not the vaginal mucosa, and it is fixed to Cooper's ligament. The sutures are tied intracorporeally or extracorporeally with help from an assistant, who lifts the vagina upward and forward. Direct visualization allows the surgeon to gauge the tension in the vaginal wall while tying the sutures. The urethra is observed to ensure that it is not compressed against the pubic bone. Suturing is repeated on the opposite side to create a platform on which the bladder neck rests, while avoiding cinching. If the suspension is judged inadequate by visual inspection, manual elevation or cystoscopy, a second set of sutures may be placed cephalad along the base of the bladder.

Cystoscopy is performed to ensure that no suture material is in the bladder, and to assess the urethrovaginal junction angle and urethral patency. Pneumo-subperitoneal pressure is decreased and the retroperitoneal space is thoroughly evaluated. Bleeding is controlled with the bipolar electrocoagulator. The laparoscope is withdrawn from the abdomen and the procedure is completed.

The Foley catheter is discontinued the following day. Post-void residual volume is evaluated and if it exceeds 100 ml. the patient is instructed in self-catheterization, which is performed until the volume is less than 100 ml. Intraoperatively, all women receive prophylactic, intravenous second generation cephalosporin. Women who require self-catheterization take oral antibiotics until catheterization is discontinued.

RESULTS

Morbidity ranged from 1 to 5 (median 3) and parity from 1 (median 2). Nine patients had undergone previous laparotomy and 7 had undergone total hysterectomy. Operative time for laparoscopic retroperitoneal urethropexy ranged from 30 to 70 minutes (median 40), calculated from the beginning of the dissection of the peritoneum until completion of the ret-

roperitoneal procedures. Access to the space of Retzius and development of a pneumo-subperitoneal space required 2 to 5 minutes because of differences in the amount of adipose tissue dissected from the space of Retzius and the number of sutures placed. Total hospital cost of the procedures ranged from \$8,000 to \$10,000.

Additional laparoscopic surgery was performed in all women, including lysis of adhesions in 8, a Moschcowitz procedure in 9, oophorectomy in 4 and hysterectomy in 1. Estimated blood loss ranged from less than 50 to 300 ml. (median 100). However, during urethropexy no patient lost more than 50 ml. blood. There were no bladder perforations and all procedures were completed laparoscopically. No postoperative febrile morbidity was noted and no patient required retroperitoneal drainage. All women were started on liquids and oral analgesics as soon as they recovered from anesthesia and could tolerate oral intake, usually 3 to 4 hours postoperatively. There were no postoperative complications and patients were discharged from the hospital within 23 to 48 hours. At 3 to 6 months of followup all patients reported satisfactory relief of symptoms, with a decrease in activity associated urinary leakage and in the number of sanitary pads required. No patient has had enterocele, cystocele or rectocele.

DISCUSSION

Our new technique has several advantages over transperitoneal and balloon dissection.^{4,5} Transperitoneal dissection requires a transverse intraperitoneal incision with the carbon dioxide laser, unipolar electrocoagulation or scissors cephalad to the mid suprapubic cannula. The retroperitoneal space is exposed and developed by blunt dissection with the suction irrigator probe, and sharp dissection with scissors or the carbon dioxide laser. For balloon dissection the device is inserted through an infraumbilical incision and inflated with saline. The expanding balloon bluntly dissects the connective tissues and is removed through the incision. The space developed is insufflated with carbon dioxide and dissected further. With our method extension of the peritoneal incision is avoided, eliminating repair, and minimizing the risks of bowel herniation and adhesion formation. The danger of surgical trauma to the thin-walled venous plexus in this extremely vascular area during blunt or sharp dissection is minimized. The chance of injuring the muscles of the urethrovaginal junction is also decreased.

While the balloon dissector is an effective alternative to manual dissection of the space of Retzius,⁴ it is more costly to use. Furthermore, the balloon, which should be inserted between the rectus muscle and anterior surface of the posterior rectus sheath, may be inadvertently advanced into an incorrect plane. The predefined shape of the balloon and its non-elastomeric material may force dissection that is less dependent on patient anatomical planes.

Only a randomized trial with a large patient population and long-term followup will conclusively prove the merits of the 3 intraperitoneal methods. Nevertheless, we found that our technique is not difficult and may minimize tissue injury, including that to the obturator nerve and vessels. The pneumo-subperitoneal pressure provides clear exposure of the space of Retzius with almost no bleeding. The widened space of Retzius allows adequate access for instruments without hindrance from intestinal loops and the free border of the bladder.¹⁰

The transperitoneal dissection technique for opening the pelvic peritoneum high on the rear aspect of the pubis is reported in most series.^{2,11} Extraperitoneal approaches allow direct access to and expansion of the normally "potential" retroperitoneal space using blunt dissection with an index finger and a water-inflated balloon¹² or surgical glove.^{13,14} A relatively bloodless space of Retzius is created. Whether this

method has any significant advantages is yet to be determined.

We strongly advocate performing the Moschowitz "culdoplasty" as a complementary procedure to the Burch colposuspension in view of the high risk of genital prolapse.¹⁵ This procedure is believed to decrease the risk of enterocele formation and flattening of the posterior urethrovesical angle significantly, thus negating the benefits of bladder suspension.

CONCLUSIONS

Laparoscopic retropubic colposuspension may be performed easily with our modified technique to develop the retropubic space. An additional challenge is the need for laparoscopic suturing in the confined space of Retzius. Recently, titanium hernia staples and polypropylene mesh have been suggested as alternatives to traditional suture material.¹⁶ We used these materials successfully for other indications¹⁷ but are concerned about the potential problems and adequacy of bladder neck suspension when conventional suturing is replaced. Randomized controlled trials are necessary to make this determination.

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