ABSTRACT

Objective: To report our first cases of laparoscopic sacrocolpopexy and assess the feasibility and short-term complications.

Methods: We retrospectively studied 77 laparoscopic sacral colpopexies performed from June 1996 to May 1998. Suspension was reinforced with 2 strips of synthetic mesh. Five patients had previously undergone hysterectomy, and 4 others had experienced failure of surgery for prolapse of the uterus.

Results: Laparoscopy was performed in 83 women with symptomatic prolapse of the uterus. Six cases required conversion to laparotomy because of technical difficulties. All of the remaining 77 patients underwent laparoscopic sacrocolpopexy that included anterior and posterior mesh reinforcement. Subtotal laparoscopic hysterectomy was performed in 60 cases, laparoscopic Burch colposuspension in 74, and levator myorrhaphy via a vaginal approach in 55. Operative time decreased from 292 to 180 minutes as experience was gained. The main operative complications were 1 rectal and 2 bladder injuries. Three patients required reoperations for hematoma or hemorrhage. One patient complained of chronic inflammation of the cervix, and another experienced rejection of the posterior mesh 6 months after the operation. Mean follow-up was 343 days. Three other patients required reoperation, 1 for a third-degree cystocele and 2 for recurrent stress incontinence.

Conclusion: Laparoscopic sacrocolpopexy is feasible. Operative time and postoperative complications are related to the surgeon’s experience but remain comparable to those noted in laparotomy. Long-term assessment is required to confirm the results of this procedure.

INTRODUCTION

Prolapse of the uterus can disturb patient lifestyle, interfering with bladder, bowel, and sexual function.1-5 Both abdominal and vaginal surgical techniques have been used to correct this problem.4,5 An abdominal approach may however result in longer-lasting restoration of pelvic anatomy and sexual function.6-8

Recent developments in laparoscopic surgery have prompted some authors to use this technique to treat prolapse of the uterus.4 We report our experience with laparoscopic sacral colpopexy reinforced with 2 strips of permanent synthetic mesh.

MATERIALS AND METHODS

Seventy-seven procedures were performed over a 2 year period between June 1996 and June 1998. Patients with symptomatic genital prolapse were selected for laparoscopic reconstructive surgery when under 60 years of age and/or previous vaginal reconstruction for prolapse of the uterus had failed.

The first author performed all procedures. Patients who underwent laparoscopic sacral colpopexy had a mean age of 47 years (range 28 to 66) and an average parity of 3.5 (range 0 to 6). Of the 5 postmenopausal patients, 4 were receiving hormone replacement. One patient had a history of vaginal hysterectomy, and 4 had abdominal hysterectomy for benign uterine pathologies. Surgery for prolapse of the uterus had failed in 4 patients, among whom 2 had undergone a Manchester-Shirodkar procedure, one had undergone vaginal sacrospinous colposuspension, and one had a abdominal Burch colposuspension with paravaginal repair. None of the patients experienced preoperative fecal incontinence, but 15 complained of constipation, and 5 required splinting of the rectocele to achieve defecation.
Patients all presented with symptomatic prolapse of the uterus (at least 1 pelvic organ extended beyond the hymen) associated with stress incontinence for some. The clinical grading of prolapse of the uterus (according to the description of Baden and Walker) is listed in Table 1.

Sixty-seven patients reported associated stress incontinence, among which 34 complained of severe permanent grade III incontinence, 22 had grade II incontinence, and the remaining 11 had grade I incontinence.

**Surgical Technique**

With the patient in lithotomy position, a CO₂ pneumoperitoneum was established utilizing a Veress needle. A 10-mm transumbilical trocar was used for the laparoscope, and 2 reusable 5-mm trocars were inserted lateral to the umbilicus and epigastric vessels on either side. Finally, a 10-mm trocar was placed in the suprapubic position. Associated procedures, such as subtotal hysterectomy with or without adnexectomy, were performed first, using bipolar coagulation and scissors. The cervix was sectioned with monopolar scissors. After subtotal hysterectomy, the uterus was morcellated using a Storz morcellator. We dissected the vaginal fornices by mobilizing the bladder anteriorly and the rectum and sigmoid posteriorly. Anterior and posterior lengths of Mersilene (Ethicon) mesh were sutured to the vaginal wall while the surgeon’s finger was maintained in the vagina to determine whether the mesh suspension was inferior enough and to avoid transfixing the vagina. The strips of mesh were approximately 2- to 3-cm wide and 4- to 5-cm long. When conservation of the uterus was required, the anterior strip was Y-shaped, its 2 arms going through the broad ligament before reaching the sacral promontory. While digitally elevating the vagina, strips were sutured with Ethibond (Ethicon) O permanent sutures at 1/2-cm intervals. A Halban culdoplasty was then performed with peritoneum overlying the sacrum was opened, and the areolar tissue was gently dissected to expose the anterior longitudinal sacral ligament. Two permanent O sutures were placed in the anterior longitudinal sacral ligament to suspend the mesh. Tension was applied via extraabdominal knots and checked by the surgeon. The mesh was then trimmed and buried by closing the peritoneum with a Vicryl 2/0 (Ethicon) continuous nonlocking running suture. When necessary, a Burch colposuspension was performed. The retropubic space was dissected transperitoneally after opening the peritoneum. The ureterovaginal junction and Cooper’s ligament were exposed. One nonresorbable Ethibond suture was placed on either side of the urethra in the vaginal wall, taking care not to transfix the vagina, and suspended on Cooper’s ligament. The peritoneum was then closed with resorbable 2/0 Vicryl using a running suture.

The procedure was completed by vaginal myorrhaphy of the levator muscles. A 4-cm longitudinal incision of the vaginal mucosa was made over the posterior fourchette. The edges of the incision were held with Allis clamps and the peri-rectal fascia was dissected, revealing the margins of the levator ani. A heavy number 1 absorbable synthetic suture was passed through the levator ani near the posterior fourchette. The posterior vaginal wall was closed with an absorbable running suture.

We performed sacrocolpopexy using Mersuture mesh and culdoplasty in every patient. Hysterectomy was proposed every time a benign uterine pathology was found. Burch colposuspension was performed except in cases of previous surgery for incontinence without recurrence. Myorrhaphy of the levator muscles was performed when clinically indicated. An indwelling Foley catheter was placed in patients who required Burch colposuspension (74 cases) for the first 24 hours after the operation.

**RESULTS**

Six patients (7.2%) required conversion to an open procedure due to technical problems in a total of 83 patients. In 2 patients, subtotal hysterectomy was impossible because of the size of the uterus. In another patient, perioperative hypercapnia compelled us to end laparoscopy. Major postoperative adhesions in 1 patient with a history of abdominal hysterectomy led to another conversion, and finally technical problems and a reduced operative field forced us to convert to laparotomy in 2 other cases.

Names of associated procedures in 77 patients with successful laparoscopy are listed in Table 2. The average length of the procedure was 276 minutes (range 120 to 360 minutes), and the average length of hospitalization was 3.5 days (range 2 to 7 days). The length of the procedure did not differ when subtotal hysterectomy was performed (257 versus 250 minutes). When myorrhaphy of the levator muscles was not performed, hospital stay was reduced to a mean of 2 days.

Surgical experience decreased operating time ($P < 0.0001$): the average operating time of the first 10 proce-
The main complications were 2 bladder injuries, one of which occurred during the dissection of the anterior vaginal fornix before placing the anterior prosthetic strip, the other while opening the peritoneum in a transperitoneal colposuspension procedure. Their outcome proved satisfactory after laparoscopic repair, and no postoperative complications occurred. The rectum was injured during 1 rectovaginal dissection (before myorrhaphy) and was sutured immediately using the same route, again causing no postoperative complications.

Perioperative and postoperative complications are summarized in Tables 3 and 4. No cases of urinary retention occurred. Nine cases of postoperative urinary tract infection were noted, and 9 other patients experienced unexplained fever for over 24 hours. Other complications included postoperative phlebitis requiring anticoagulant therapy (1 patient), an infected hematoma of the retropubic space after Burch colposuspension requiring reoperation 5 days later (1 patient), and a case of postoperative hemorrhage in an epigastric vessel requiring reoperation 5 hours later. A perineal hematoma occurred in 1 patient after vaginal myorrhaphy and was evacuated vaginally on day 7. Three patients complained of pelvic pain lasting over 10 days due to myorrhaphy of the levator muscles but subsequently reported that the pain had subsided. One patient still complained of metrorrhagia and pelvic pain 6 months after sacroproxy with subtotal hysterectomy. Her symptoms were related to chronic inflammation of the cervix and disappeared after vaginal resection of the proximal cervix 1 year after sacroproxy. In 1 patient, the posterior mesh was rejected 6 months after the operation. The prosthetic material was removed vaginally at a one-year follow-up examination. The suspension showed no failure.

The condition of the patients was systematically assessed 3 months after surgery. A speculum was inserted and patients were asked to strain as much as possible. Anatomic condition was graded as previously defined. Results were satisfactory except for 1 first-degree hernia of the bladder. Patients were then asked to return for a 6-month and one-year follow-up examination. Sixty-five patients were examined with a mean follow-up of 343 days. One first-degree cystocele and 1 first-degree hysterocoele were noted. The first-degree cystocele 3 months

| Table 1. Grading of Prolapse* |
|-----------------------------|
| 1st Degree | 2nd Degree | 3rd Degree |
| Cystocele | 9 | 34 | 40 |
| Hysterocele | 5 | 27 | 31 |
| Enterocele | - | 8 | 5 |
| Rectocele | 12 | 29 | 22 |

*N = 83

| Table 2. Associated Procedures in 77 Patients |
|-----------------------------|
| N Procedure |
| 77 Sacrocolpopexy with anterior and posterior strips, culdoplasty |
| 74 Burch colposuspension |
| 60 Subtotal hysterectomy |
| 10 Preservation of the uterus, including 9 tubal ligations |
| 7 Repair of vaginal vault after post hysterectomy prolapse |
| 55 Levator myorrhaphy |

| Table 3. Peri-operative Complications* |
|--------------------------------------|
| Conversion to laparotomy 6 (7.2%) among 83 patients |
| Bladder injury | 2 |
| Rectal injury | 1 |
| Peri-operative hemorrhage over 500 mL | 1 |

*N = 77

| Table 4. Postoperative Complications |
|--------------------------------------|
| Unexplained fever for over 24 h | 9 |
| Lower urinary tract infection | 9 |
| Postoperative phlebitis | 1 |
| Reoperation | 3 |
| Retropubic hematoma | 1 |
| Perineal hematoma | 1 |
| Hemorrhage | 1 |
after surgery became symptomatic after 1 year of follow-up with a third-degree hernia. The patient is scheduled for reoperation. The remaining 62 patients showed satisfactory results (94%) with no evidence of clinical prolapse.

The 67 patients with preoperative stress incontinence responded to a questionnaire: 47 had no symptoms after surgery, but 20 complained of persistent stress incontinence, although 7 reported it had improved. Two patients complained of major recurrent stress incontinence appearing 12 months and 18 months after surgery. Both of these patients demonstrated perfect anatomical results and successfully received a suburethral sling while under epidural anesthesia.

DISCUSSION

Our surgical procedure consists of suspending the pelvic organs indirectly with 2 strips of mesh sutured to the vagina to maintain the bladder anteriorly and the rectum posteriorly. The mesh strips are sutured to the prevertebral ligament at the level of the promontory of the sacrum, suspending the isthmus of the uterus (when present) and the upper third of the vagina. Modern sacropexy includes several procedures, among which only hysterectomy and tubal ligation are optional.4 Classically the rectouterine pouch is closed by excision during the same operation. Many surgeons also systematically combine Burch colposuspension4,9 and myorrhaphy of the levator muscles. Although laparoscopic management of uterine prolapse was described several years ago, it has yet to become common.10 The length of the operation and the in-depth training required has led some surgeons to bypass associated procedures, such as colposuspension and myorrhaphy of the levator muscles.

Many publications have reported the feasibility of partial techniques, such as closure of the rectouterine pouch alone, insertion of a single mesh, suspension to the abdominal wall,11,12 or uterine suture.13,14 A complete review of the literature on laparoscopic cure of uterine prolapse is somewhat disappointing because of the variety of techniques described and typically small series. Obviously, laparoscopic cure of prolapse of the uterus has yet to demonstrate its utility. It is difficult to assess its short- and longer-term results as reported in the current literature. Reported series usually do not separate sacrocolpopexy from other procedures.15,16 In another publication, Lyons and Winer17 describe 20 fixations to the promontory of the sacrum with posterior mesh, among which only 16 were cured after a one-year follow-up. Ross18 reported a series of 20 patients operated on for prolapse of the vagina after hysterectomy; he proceeded with laparoscopic fixation to the promontory, excision of the rectouterine pouch and Burch colposuspension. Ross’ reported results include a 93% success rate for treating stress incontinence and a 100% rate of cure from the anatomic point of view, even though 2 patients demonstrated first-degree bladder hernia, first-degree rectal hernia, and 2 second-degree rectal hernias. Long-term results or complication rates can not be assessed due to the small numbers reported.

Our experience confirms the feasibility of laparoscopic sacrocolpopexy using the same procedure as in an abdominal approach. Typical complications (hemorrhage or hematoma due to the middle sacral vessels, section, or lesion of the ureter) did not occur. Initially long operative time gradually decreased as the surgeon acquired more experience. The postoperative complication rate was no higher than that for laparotomy1,3-5 and was clearly related to the surgeon’s experience. For instance, no conversion to laparotomy was required for the last 40 patients. The same was true of bladder injury, rectal injury, and reoperation (with the exception of a retroperitoneal hematoma reoperated after a transperitoneal Burch procedure). Shorter hospital stays counterbalance the higher cost of laparoscopy due to disposable equipment. Nevertheless, longer-term evaluation is required to confirm the results of this procedure. A 5-year anatomic and functional postoperative follow-up is the minimum requirement before any comparison can be made with other surgical procedures.

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