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SHORT COMMUNICATION

Triple compartment prolapse: sacrocolpopexy with anterior and posterior mesh extensions

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Post-hysterectomy vault prolapse may be accompanied by anterior (cystocele) and posterior (rectocele) pelvic compartment prolapse. We describe our results with sacrocolpopexy with anterior and posterior polytetrafluoroethylene mesh (SCAPM) extensions. A prospective on-going study is presented of 12 consecutive, complicated patients referred to our tertiary referral unit with a median age of 60 years (range 39–69) who underwent SCAPM between April 1997 and June 1999. All patients had a history and physical examination, International Continence Society Prolapse Staging (ICS) and pre-operative multichannel urodynamics testing with their prolapse reduced. All patients had an ICS grade 2, triple compartment prolapse or worse for inclusion into this study. The operative results were assessed with a 10-point visual analogue scale (VAS) for personal satisfaction and the (non-validated) St George's Hospital symptom questionnaire assessing urgency, urge incontinence, stress incontinence, splinting, digitation, sexual activity and function. All patients were reviewed during February 2002 by an independent observer (B.G. gynaecologist) no longer associated with the Department of Urogynaecology. All patients were followed post-operatively for a median of 39 months (range 32–58). One patient had a recurrent grade 1 cystocele and another a grade 1 rectocele. The median VAS score for personal satisfaction with the operative results was 8 (range 6–10). There was one patient with *de novo* urgency and one with *de novo* stress incontinence. Four of the five patients who needed to splint or digitate to empty the rectum no longer required these measures post-operatively. There were no reports of *de novo* dyspareunia, and two patients had improved vaginal lubrication. Two patients, each with more than five prior vaginal procedures, had a total of three episodes of mesh erosion through the posterior vaginal wall. The SCAPM is an effective treatment for triple compartment prolapse and incomplete rectal emptying. Patient satisfaction is good.

Introduction

Hysterectomy is the most common major gynaecological operation performed in the UK and North America. The incidence of post-hysterectomy vaginal vault prolapse is approximately 11.6% when assessed at surgery for prolapse and 1.8% for other benign diseases[1,2]. These facts, coupled with increased life expectancy, imply a considerable increase in the incidence of vault prolapse going into the 21st century[3].

Vault prolapse results from the lack of suspensory support from the pelvic sidewalls and the uterosacral cardinal ligament complex (Fig. 1A). This support can be weakened by childbirth (neuromuscular damage or direct trauma) or by global pelvic connective tissue remodelling from increased elastase or collagenase activity[4]. With straining, the weakened support can result in the vault descending to within 1 cm or less proximal or distal to the plane of the hymen (i.e. an International Continence Society [ICS] grade 2 vault prolapse Fig. 1B)[5].

Vault prolapse is often not an isolated change. Sixty-seven percent of patients have concomitant cystocele (Fig. 1C; anterior compartment prolapse, 7%), rectocele (Fig. 1D; posterior compartment prolapse, 30%) or both (Fig. 1E; triple compartment prolapse, 30%) component[6]. The cystocele central defect is primarily a result of attenuated pubocervical fascia and a lateral defect from an injury of the fascial attachment to the arcus tendineus fascia pelvis. A rectocele may result from diminished rectovaginal fascial support, while an enterocele from both pubocervical and rectovaginal fascial defects.

If all three pelvic compartments are prolapsed, they could be reinforced with synthetic mesh, autologous or allogenic fascia (Fig. 1F). We now present our use of polytetrafluoroethylene mesh (C.R. Bard, Murray Hill, New Jersey, USA) for sacrocolpopexy with anterior and posterior mesh extensions for the treatment of triple compartment prolapse.

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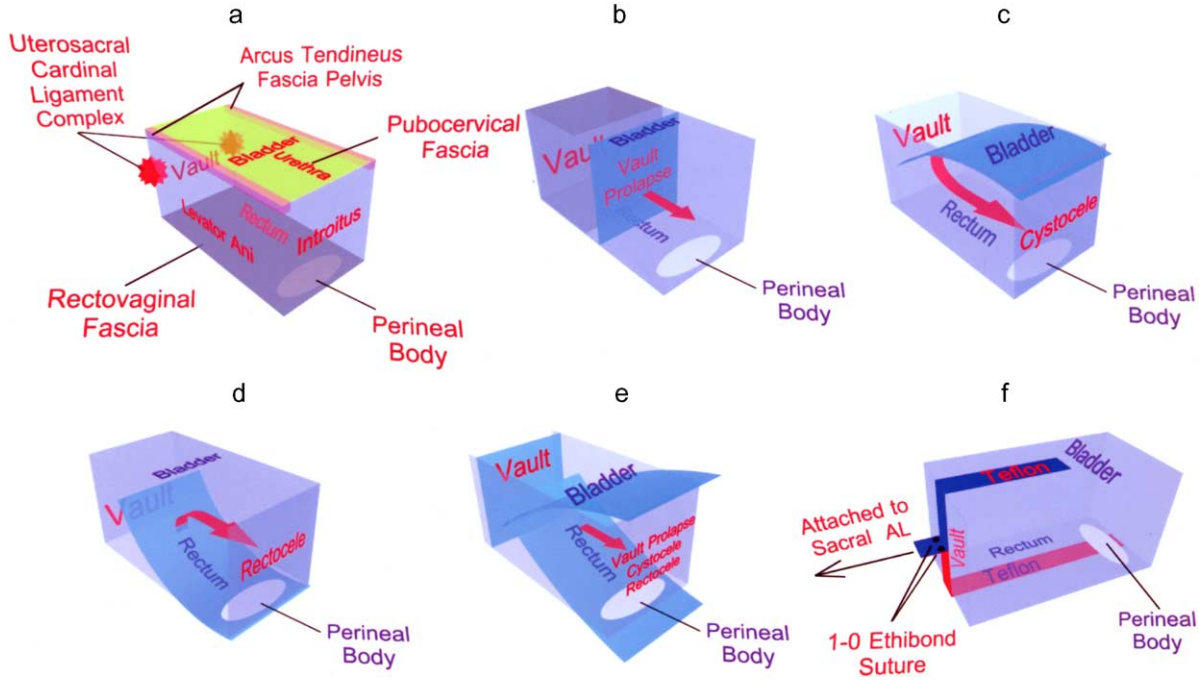

Fig. 1. (**a**) Normal support anatomy of the vagina; (**b**) vault prolapse; (**c**) cystocele; (**d**) rectocele; (**e**) triple compartment prolapse; (**f**) anterior and posterior mesh extensions to the sacral anterior longitudinal ligament.

Methods

We present the records of 12 patients (median age 60 years, range 39–69) who underwent sacrocolpopexy with anterior and posterior mesh extensions (three with concomitant Burch colposuspension for stress incontinence but no concomitant posterior colporrhaphy) between April 1997 and June 1999.

All patients underwent a history and physical examination and a modified ICS Prolapse Staging[5]. Multichannel urodynamic studies were performed with the prolapse digitally reduced. Postoperatively, visual analogue scale (VAS) testing was used to determine patient satisfaction with the operative results (0 = *poor*; 10 = *excellent*). A non-validated St George's Hospital voiding questionnaire was used to assess urgency, urge incontinence, stress incontinence, need for splinting or digitation and sexual activity and function. All patients presented with at least a grade 2 prolapse (Table 1).

All patients were followed post-operatively for a median of 39 months (range 32–58) with interval examinations at 6 weeks, 6, 12, 18 and 24 months. Last physical examinations were performed during the first three weeks of February 2002.

Table 1. Pre-operative summarised ICS prolapse stages per pelvic compartment. Values given are the number of patients.

ICS prolapse	Anterior	Middle	Posterior
Stage 2	8	5	5
Stage 3	4	7	7

The patient receives a pre-operative enema and perioperatively prophylactic cephradine 1 g and metronidazole 500 mg. She is placed in a modified lithotomy position. Pfannenstiel incision is performed, and the abdomen is packed to expose the vault, rectum, bladder and sacral peritoneum. The vault is outlined with a large Hegar dilator (Fig. 2A). The rectum is carefully dissected off the posterior vaginal wall down to the perineal body. It is important to palpate the perineal body abdominally with the dominant hand while simultaneously palpating the perineum vaginally with the other hand: this will confirm that the dissection of the rectum has been carried distally to the perineal body. A stitch of 1-0 Ethibond (Ethicon, Piscataway, New Jersey, USA) is placed in the posterior vaginal wall at the perineal body on both sides of the posterior vaginal wall. Polytetrafluoroethylene mesh measuring 4 × 20 cm is anchored to the first pair of perineal body stitches, and additional stitches are placed bilaterally: one pair midway to the vault and the other pair at the vault. All are fixed to the mesh. The posterior mesh is now completed (Fig. 2B). The bladder is mobilised for 6–8 cm from the vault and anterior vaginal wall, taking care not to perform a cystotomy, vaginotomy or injure the ureters. If a cystotomy or vaginotomy occurs, close it with a running, non-locking 2-0 Vieryl. Another mesh is then similarly sutured to the anterior vaginal wall. The meshes are not sutured to each other in case narrowing of the vagina might lead to dyspareunia.

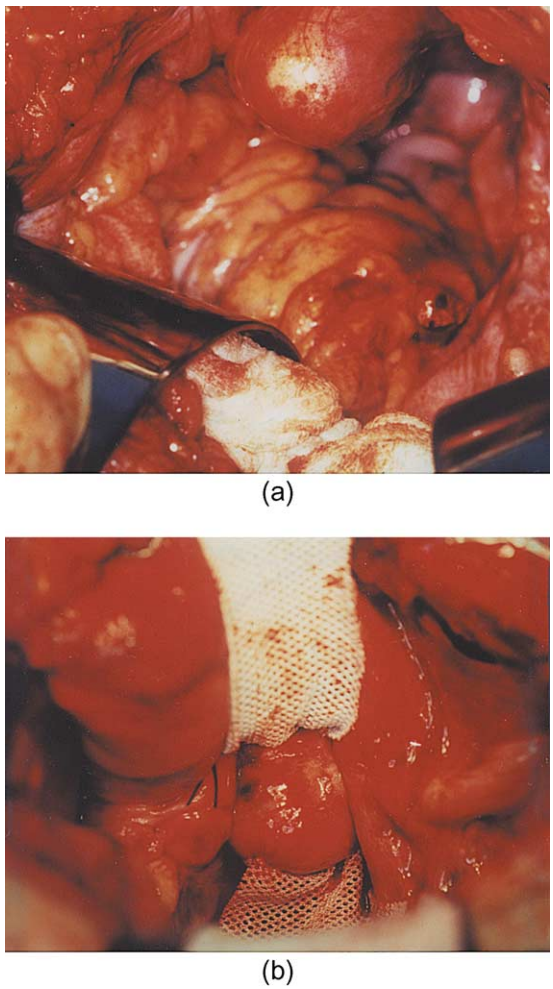

Fig. 2. (**a**) Abdominal side of the vaginal vault outlined with a large Hegar dilator in the vagina; (**b**) the posterior mesh extension (bottom mesh) is complete and the anterior mesh is being sized for fit in the anterior vaginal wall.

The sacral peritoneum over S_1 and S_2 is incised. It is important to remain in the midline and to mobilise these peritoneal flaps well so that closure of the sacral peritoneum over the entire mesh will be tension free. At the most cephalad extent of the sacral peritoneal incision, the anterior longitudinal ligament at S_1-S_2 is identified and two stitches of 1-0 Ethibond are inserted into the anterior longitudinal ligament.

The two meshes, with the Hegar dilator in the vagina, are directed onto the sacrum to estimate without any tension the length of the mesh required. As the mesh can contract as much as 20% with time, it should not be under any tension because this might lead to mesh disjunction from the sacrum and alteration of anterior vaginal wall anatomy with resultant stress incontinence[7]. The mesh is allowed to lie loosely in the curve of the sacrum. The anterior longitudinal ligament stitches are then secured to both meshes in the midline and tied. The sacral peritoneal flaps are secured over both meshes in their entirety. A Redivac drain is placed in the retropubic space. A 14 French Foley catheter is left in place and removed once the patient is ambulatory.

Results

The median hospital stay was 5 days (range 4–10). The median estimated blood loss was 250 mL (range 50–1150).

The median VAS score for personal satisfaction with the operative results was 8 (range 6–10). There was one patient with increased urinary urgency, two patients with detrusor instability in which their urgency and urge incontinence remained unchanged. No patients reported *de novo* urgency or urge incontinence but one developed urodynamically proven stress incontinence, 15 months after surgery.

Four of the five of patients using splinting or digitation pre-operatively no longer required this post-operatively. The other patient had a 75% reduction in the frequency of digitation. No patients reported *de novo* incomplete emptying of the rectum.

Only 7 of the 12 patients were sexually active and none complained of new-onset dyspareunia. Two of these seven patients had pre-operative dyspareunia, which was completely relieved post-operatively. Four of the seven patients had a 25% improvement in vaginal lubrication, while the other three noted no change. The ability to reach orgasm remained unchanged for all seven sexually active patients. The five patients who were sexually inactive had been inactive at least one year prior to surgery and did not have partners. All felt their surgery would not be a hindrance to resuming sexual activity if desired. There have been no cases of recurrent vault prolapse. One patient had a recurrent grade 1 cystocele (observed at six month follow up) and another a grade 1 rectocele (at 12 month follow up).

One patient had two episodes of 1 cm mesh erosion on the mid-posterior vaginal wall that was partially excised and covered by vaginal skin. This patient had undergone two prior anterior/posterior repairs and had a maximum vaginal length of only 4 cm. Her vaginal length remained unchanged post-operatively. Fifteen months after her second repair, she is erosion free. Another patient had an asymptomatic 1-cm mid-posterior vaginal wall mesh erosion treated similarly, and 13 months post-operatively, she is also erosion free. This patient had a history of one posterior and five anterior repairs. Seven of the 10 patients who did not have erosion had a median of one prior prolapse procedure (no patient had had more than two), whereas the two patients with erosion had had multiple prolapse procedures.

Discussion

Because pelvic prolapse is a global phenomenon related to childbirth, all pelvic floor compartments can be affected.

Falk in 1961[8] developed the sacrocolpopexy by directly attaching the vault to the sacrum. Later, several different materials were interposed between the vagina and sacrum with various technical modifications. In 1973, Birnbaum[9] used polytetrafluoroethylene mesh, attaching it to the sacral promontory, thereby ensuring a normal vaginal axis and maximal vaginal depth. The latter is particularly important for those patients who have undergone prior vaginal shortening procedures and for all patients who wish to remain sexually active. Compared with the three vaginal approaches to vault prolapse (iliococcygeal hitch, uterosacral ligament plication, sacrospinous fixation), sacrocolpopexy may better preserve maximum vaginal length and sexual function. Using a synthetic mesh enables the anterior longitudinal ligament to support the vault without undue tension. In 1993, Addison and Timmons[10] published on this technique, following patients for as long as 20 years. They found that sacrocolpopexy provided the best long term outcome for vault prolapse. Cundiff *et al.*[11] reviewed their experience with sacrocolpopexy with perineal descent in 19 patients with a mean follow up of 11 weeks. Eight of 12 women had complete resolution of their symptoms of incomplete rectal emptying, while no subjects had greater than a recurrent ICS grade 2 prolapse. One patient incurred mesh erosion.

Our study with the use of both an anterior and posterior mesh extension to treat vault prolapse for concomitant cystocele and rectocele/enterocele is smaller than Cundiff *et al.*[11] but has much longer follow up and demonstrates equally impressive results. With a median follow up of 39 months, there was no recurrent vault prolapse and only two patients with a grade 1 cystocele and rectocele, respectively. The median VAS for operative satisfaction was 8 of 10. Eighty percent of our patients who had needed to splint or digitate to empty their bowels had complete resolution of this problem and the other patients had a 75% reduction in the need to digitate. In both studies, bowel symptoms resolved in more than 66% of the women.

Mesh erosion is a serious complication of sacrocolpopexy. However, erosion into the bladder, urethra or rectum was fortunately not encountered. Our two patients with posterior vaginal wall mesh erosions (one patient having two episodes) were a problem. Both patients were among the first five to undergo this procedure and had had multiple vaginal operations, which can reduce vaginal epithelial blood flow and regenerative capacity secondarily to scarring. Despite the erosions, these patients were pleased with their operative results, with VAS scores of 8 for both. To these cases, our operative approach is to excise all mesh above the level of the posterior vaginal wall, undermine the posterior vaginal wall circumferentially for 2 cm from the erosion edge and to close the posterior vaginal wall over the mesh without tension. Should tension become evident then, we undo the closure and proceed with a larger circumferential area of undermining (e.g. 3 or 3.5 cm). Because of these two mesh erosions, we have changed our mesh material from polytetrafluoroethylene to polypropylene (Prolene, Gynecare, Johnson & Johnson New Brunswick, New Jersey, USA), which has a larger pore size and is less likely to cause erosion.

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