Original Article

The Effectiveness of Transvaginal Anterior Colporrhaphy Reinforced with Polypropylene Mesh in the Treatment of Severe Cystoceles

Christopher CM Ng,[1] *FRANZCOG (Aust-NZ), MMed (O&G) (S'pore), FAMS (O&G)*, Christopher YL Chong,[1] *MRCOG (UK), MRANZCOG (Aust-NZ), MMed (O&G) (S'pore)*

Abstract

Introduction: Grade 4 cystoceles are among the most challenging to achieve a successful repair for gynaecologists. The high rate of recurrence of severe prolapse encouraged surgeons to use meshes. Only recently have meshes been used transvaginally for pelvic organ prolapse. The aim of our pilot study was therefore to determine the effectiveness of transvaginal anterior colporrhaphy reinforced with prolene mesh in the treatment of severe or recurrent cystoceles by looking at their primary surgical outcomes as well as their complications. Materials and Methods: This was a retrospective study conducted by the urogynaecology unit at KK Women's and Children's Hospital (KKWCH) in Singapore based on operations performed from April 2002 to December 2003. The inclusion criterion was that women had to have at least a grade 4 or recurrent grade 3 cystocele and had undergone a vaginal anterior colporrhaphy reinforced with prolene mesh. The women were further subdivided into 3 groups depending on whether vaginal hysterectomies were performed or not as well as the absence or presence of the uterus. Results: Thirty-seven patients with severe cystoceles underwent this procedure. The 3 mean follow-up times for the 3 groups ranged from 14.4 to 19.2 months (range, 2 to 32). Overall for the 3 groups, 75.7% were cured with no or grade 1 cystocele, 18.9% had asymptomatic grade 2 cystocele while 5.4% developed grade 3 or 4 cystocele. There were no mesh erosions. Conclusion: Transvaginal anterior colporrhaphy reinforced with a tension-free prolene mesh in the treatment of severe or recurrent cystoceles is simple, safe, easily performed and is associated with a low failure rate and morbidity.

Ann Acad Med Singapore 2006;35:875-81

Key words: Morbidity, Prolapse, Retrospective study, Surgical mesh

Introduction

Using the Baden-Walker halfway system,[1] Grade 4 cystoceles are defined as extrusions of the bladder base beyond the vaginal introitus with patient straining maximally and represent the extremes of anterior vaginal wall prolapse (Table 1). They result from increased laxity and weakness of the urethrovesical supporting system comprising the cardinal ligaments, periurethral and vesicopelvic fasciae.[2] Clinically, grade 4 cystoceles may be identified in patients presenting with stress urinary incontinence or simply be a physical finding by the physician or the patient.

Unlike less severe cystoceles which can be repaired relatively easily, grade 4 cystoceles are among the most challenging to achieve a successful repair for gynaecologists. It requires careful preoperative evaluation and a strong understanding of the pelvic anatomy. Many techniques exist[3-5] but few offer a safe and reliable anchoring site as well as a durable structure on which to fix the prolapsed vesical base and neck at a high retropubic site. Moreover, grade 4 cystoceles commonly occur concurrently with other pelvic prolapses (rectocele, enterocoele, uterine and vaginal vault descent) which can complicate the surgery further.[6]

The surgical challenge for grade 4 cystocele repair lies in the reconstruction and restoration of the significant bladder and vaginal vault prolapse which often coexists with urethral hypermobility. Burch colposuspension, paravaginal repairs and Marshall-Marchetti-Krantz urethropexy have been unsuccessful in correcting grade 4 cystoceles so far because they do not provide an adequate mechanism for repair of lateral or central cystocele defects.[7] Furthermore, the most common surgical procedure for cystocele repair, anterior colporrhaphy with Kelly plication, only repairs the central bladder defects and not the lateral defects or urethral

[1] Urogynaecology Unit, KK Women's and Children's Hospital, Singapore
Address for Reprints: Dr Christopher Ng Chee Mun, Urogynaecology Unit, KK Women's and Children's Hospital, 100 Bukit Timah Road, Singapore 229899.
Email: drchrisng@hotmail.com

hypermobility that accompany grade 4 cystoceles.

A recent study[8] reported that 29.2% of women required repeat surgery for recurrence after having undergone initial surgery for severe pelvic organ prolapse or urinary incontinence. This high rate of recurrence of prolapse encouraged surgeons to use meshes. Only recently have meshes been used transvaginally for severe, recurrent pelvic organ prolapse.[9] Cystocele repairs account for 70% of all repair procedures[10] and de Tayrac[11] recommended that a mesh be used for patients with a high cystocele recurrence risk: cystocele of grade 3 to 4 or previous reparative failure. The Prolene™ polypropylene mesh (manufactured by Ethicon, St-Stevens-Woluwe, Belgium, Johnson & Johnson) is a knitted non-absorbable synthetic mesh used in the repair of hernias and other fascial deficiencies and is the most frequently used material to date.[12] Prolene is also the most adapted mesh allowing free tension between the bladder and the anterior vaginal wall.[10]

The principles of pelvic floor reconstructive surgery are to correct pelvic support defects in order to restore normal pelvic anatomy and maintain function. The aim of our study was therefore to determine the effectiveness of transvaginal anterior colporrhaphy reinforced with prolene mesh in the treatment of severe or recurrent cystoceles by looking at their primary surgical outcomes as well as their complications.

Materials and Methods

This is a retrospective study conducted by the urogynaecology unit at KK Women's and Children's Hospital (KKWCH) in Singapore based on operations performed from April 2002 to December 2003. The classification of cystoceles is based on the Baden-Walker halfway system[1] as shown in Table 1. The inclusion criterion was that women must have at least a grade 4 or recurrent grade 3 cystocele and had undergone a vaginal anterior colporrhaphy reinforced with prolene mesh during the study period in KKWCH. The diagnosis was made clinically with the woman in the supine and Sim's position while performing a Valsalva manoeuvre at maximum strain in the outpatient clinic as well as intraoperatively under anaesthesia.

The operations were performed with the patients under spinal or general anaesthesia and they were placed in the dorsal lithotomy position and the lower abdomen and vagina were prepared and draped in a sterile manner. Patients were given antibiotics intra- and postoperatively. Vasopressin or normal saline was injected onto the incision site. A vertical midline incision was made on the anterior vaginal wall from 1 cm below the urethra and extended posteriorly down the cystocele till the cardinal ligaments. The bladder was dissected off the vagina by sharp dissection

with a pair of fine scissors. Using blunt dissection with the index finger, a narrow channel 1 cm in diameter was created laterally from just above the mid-point of the cystocele to the fascia of the ileococcygeus muscle on either side. The peri-vesical fascia was then plicated in the midline, from the anterior to the posterior part of the cystocele, with a gap of at least 1 cm between the sutures, using 2-0 PDS™ II (polydioxanone monofilament absorbable suture manufactured by Ethicon, Johnson & Johnson) in a continuous manner. On reaching the cardinal ligaments, suturing was performed in the opposite direction with the stitches placed as laterally on either side as possible. A prolene mesh is cut to an appropriate size to cover the whole cystocele centrally as illustrated in Figure 1. The wings of the mesh were cut 1 cm wide. The two ends of the mesh were then placed onto the fascia of the ileococcygeus muscle with an artery forceps. The positions were checked without shifting the positions of the mesh. The central portion of the mesh was then sutured with 2-0 vicryl™ (polyglactin 910 braided absorbable suture manufactured by Ethicon, Johnson & Johnson) at the 4 corners onto the peri-vesical tissues for anchoring purposes. Haemostasis was reassessed. Minimal trimming of the vaginal skin was performed and the skin was sutured with continuous 2-0 vicryl™ rapide (polyglactin 910 braided absorbable suture manufactured by Ethicon, Johnson & Johnson). A vaginal pack was routinely placed to encourage the mesh to stay in position and the patient was catheterised. The vaginal pack and urethral catheter were removed on the first and second postoperative day respectively. Residual urines were then measured later in the day and patients with residual urines of <150 mL were sent home. Patients who failed this were catheterised and given a second chance the following day. With further failure, the patients were given the choice of being discharged with the catheter and
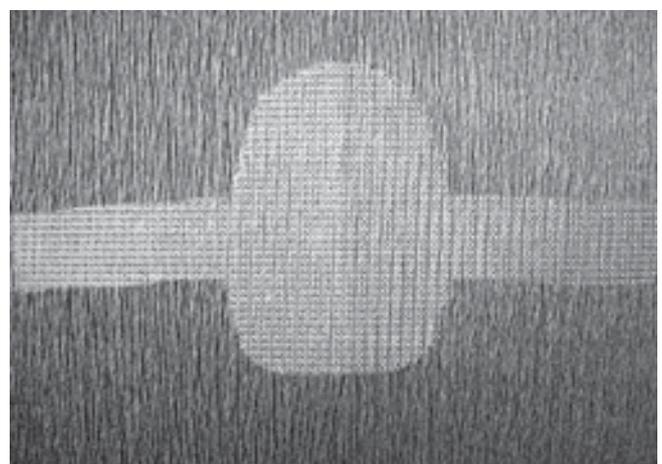

Fig. 1. A prolene mesh cut to an appropriate size to cover the whole cystocele centrally.

Table 1. Baden-Walker Halfway System for Grading Prolapse[1]

Grade 0: Normal position for each respective site
Grade 1: Descent halfway to the hymen
Grade 2: Descent to the hymen
Grade 3: Descent halfway past the hymen
Grade 4: Maximum possible descent for each site

Notes for using the grading system:

1. Prolapse is graded at each site (cystocele, uterine prolapse, vault prolapse, rectocele, and enterocele) with patient straining maximally. The upright position may also be used.

2. When choosing between 2 grades, choose the higher grade.

Table 2A. Characteristics of the Women (n = 37)

Characteristics		Value
Age (y)	Mean	66.8
	(range)	(43 to 86)
BMI (kg/m²)	Mean	25.5
	(range)	(18.7 to 30.7)
Mean number of children (range)		4 (1 to 9)
Women with previous vaginal delivery		36 (97.3%)
Women with previous forceps/vacuum delivery		1* (2.7%)
Women with previous LSCS		0 (0%)
No. of menopausal women		33 (89.2%)
No. of women on HRT		2 (5.4%)
No. of women with previous cystocele repair		6† (16.2%)
No. of women with other previous operations		3‡ (8.1%)

* Forceps delivery
† 3 VHPFR, 1 VHPFR TVT, 1 Ant Repair, 1 THBSO + Ant Repair
‡ 3 THBSO
Ant Repair: anterior repair; BMI: body mass index; HRT: hormone replacement therapy; LSCS: lower segment caesarean section; THBSO: total abdominal hysterectomy bilateral salpingoophorectomy; TVT: tension free vaginal taping; VHPFR: vaginal hysterectomy, pelvic floor repair

Table 2B. Characteristics of the Women (n = 37)

Characteristics		Value
Cystocoele:	Grade 3	1 (2.7%)
	Grade 4	36 (97.3%)
Rectocoele:	None	2 (5.4%)
	Grade 1	12 (32.4%)
	Grade 2	16 (43.2%)
	Grade 3	2 (5.4%)
	Grade 4	5 (13.5%)
Enterocele		2 (5.4%)
No vault prolapse		3 (8.1%)
Uterovaginal prolapse:	Grade 1	5 (13.5%)
	Grade 2	15 (40.5%)
	Grade 3	8 (21.6%)
	Grade 4	1 (2.7%)
Vault prolapse:	Grade 2	4 (10.8%)
	Grade 3	1 (2.7%)
Genuine stress incontinence		11 (29.7%)
Detrusor instability		5 (13.5%)
Occult stress urinary incontinence		1 (2.7%)

Table 3. Operations Performed on the Women (n = 37)

Operations performed	No. (%)
Anterior repair with mesh	37 (100.0)
Posterior repair	23 (62.2)
Vaginal hysterectomy	24 (64.9)
Tension free vaginal taping	12 (32.4)
Vaginal sacrospinous ligament fixation	11 (29.7)
Other operations	6* (16.2)

* 6 posterior mesh colpopexy

reviewed 1 week later for trail-off catheter or to retry again 2 days later.

Any significant co-existing rectocoeles, uterovaginal or vault prolapses present were repaired at the time of surgery. Genuine stress incontinence (frank or occult) and detrusor instability were diagnosed by standard urodynamic studies (dual channel subtraction cystometry, erect stress test, uroflowmetry and urinalysis). Tension-free vaginal taping (TVT) was the surgical treatment of choice for genuine stress incontinence. Detrusor instability, if persistent, was treated with anti-cholinergic medication pre- and postoperatively.

The surgeries, along with the pre- and postoperative assessments, were performed or supervised by the same urogynaecologist so as to reduce inter-operator errors in the study. Postoperatively, patients were reviewed initially at 1 month and then at 6 months followed by annual reviews. The follow-up examinations were carried out with the woman in the supine and Sim's position performing a maximum Valsalva strain manoeuvre. All women were reassessed at the 6-month follow-up visit with a filling and voiding cystometry to exclude genuine stress incontinence and detrusor instability. Defaulters or those classified as lost to follow up were regarded as those that failed to attend their scheduled postoperative visits at the time of data collection.

The primary surgical outcome measures with regard to the repair of cystoceles were classified as cured, improved or failure according to our own unit's definition at their last recorded visit. The surgery was considered a success in women who were asymptomatic with no or grade 1 cystocele (descent halfway to the hymen). An improved outcome

Table 4. Intraoperative Outcomes (n = 37)

Intraoperative outcomes	Women with mesh + VH (n = 24)	Women with mesh + previous VH/TH (n = 8)	Women with mesh + no VH/TH (n = 5)
Mean blood loss (range)*	225 mL (50 to 500)	200 mL (10 to 500)	220 mL (10 to 450)
Requiring blood transfusion	2	0	0
Organ injury	0	1†	0
Mean operating time (range)	86 min (47 to 156)	83 min (51 to 160)	59 min (23 to 140)

TH: total abdominal hysterectomy; VH: vaginal hysterectomy
* Based on 14 women (23 women with no data)
† 1 bladder perforation from tension free vaginal taping

Table 5. Postoperative Complications (n = 37)

Postoperative complications	Women with mesh + VH (n = 24)	Women with mesh + previous VH/TH (n = 8)	Women with mesh + no VH/TH (n = 5)
Pyrexia, temperature >37.5°C	11 (46%)	1 (13%)	1 (20%)
Wound infection	0	0	0
Urinary tract infection	3	1	0
Haematuria	1	0	0
Mesh erosion	0	0	0
Denovo genuine stress incontinence	0	0	0
Denovo detrusor instability (asymptomatic)	1	1	0
Postoperative urgency symptoms (pre-existed before surgery)	3	2	0
Other complications (1 vault haematoma, 1 pelvic abscess)	2	0	0
Number of patients with catheter duration >2 days	6 (25%)	2 (25%)	2 (40%)
Number of patients who stayed >2 days postoperatively	17 (71%)	4 (50%)	2 (40%)

TH: total abdominal hysterectomy; VH: vaginal hysterectomy

applied to women who remained asymptomatic with a grade 2 cystocele (descent to the hymen). The surgery was considered a failure in women who were symptomatic or with a grade 3 or 4 cystocele (descent halfway past the hymen or maximum possible descent respectively) on follow-up.

Results

The characteristics of the 37 women who were included in the study are summarised in Tables 2A and 2B. The majority of the women were menopausal (89.2%) and were not on hormone replacement therapy (94.6%). Their mean body mass index (BMI) of 25.3 kg/m² placed them within the overweight category. There were 6 women with a history of previously failed cystocele repairs and all the women had grade 4 cystoceles except for 1, which had a recurrent grade 3 cystocele. Twenty-nine women had

uterovaginal prolapse, 5 had vault prolapse and 3 had no vault prolapse. Eleven women had concurrent genuine stress incontinence, 1 had occult stress urinary incontinence and 5 had detrusor instability.

The various surgeries performed are illustrated in Table 3. As most women had concurrent operations performed on them, the authors would like to highlight that some of intra- and postoperative complications shown in Tables 4 and 5 may not be a direct result of anterior colporrhaphy reinforced with prolene mesh surgery as mentioned below. All 37 women had transvaginal anterior colporrhaphy reinforced with prolene mesh surgery performed on them. Almost one third of the women required TVT procedures for concurrent urinary incontinence.

The women were further subdivided into 3 groups depending on whether vaginal hysterectomies were performed or not as well as the absence or presence of the

Table 6. Primary Outcome Measures of Transvaginal Anterior Colporrhaphy Reinforced with Prolene Mesh at the Last Recorded Visit (n = 37)

Primary outcome measures at the last recorded visit	Women with mesh + VH (n = 24)	Women with mesh + previous VH/TH (n = 8)	Women with mesh + no VH/TH (n = 5)
Cured, asymptomatic with no or grade 1 cystocele	19 (79.2%)	4 (50.0%)	5 (100.0%)
Improved, asymptomatic with a grade 2 cystocele	4 (16.7%)	3 (37.5%)	0 (0%)
Failure, symptomatic or with a grade 3 or 4 cystocele	1 (4.2%)	1 (12.5%)	0 (0%)
Mean time of follow up (range)	17.4 months (8 to 32)	14.4 months (2 to 25)	19.2 months (8 to 27)
Women on follow-up at 6 months	4	4	1
Women on follow-up at 12 months	10	2	1
Women on follow-up at 18 months	4	1	0
Women on follow-up at 24 months	6	1	3

TH: total abdominal hysterectomy; VH: vaginal hysterectomy

Table 7. Classification of Meshes[9]

Type	Pore size	Fibre type	Component	Trade name
I	Macro	Monofilament	Polypropylene	Prolene Marlex Atrium
		Mono/multifilament	Polypropylene/ Polyglactin 910	Vipro
		Multifilament	Polyglactin 910	Vicryl
II	Micro	Multifilament	Expanded PTFE	Gore-Tex
III	Micro/macro	Multifilament	Polyethylene	Mersilene
IV	Submicro	Monofilament	Polypropylene sheet	Cellgard (not used in gynaecological surgery)

PTFE: polytetrafluoroethylene
Micro >75 µm
Micro <75 µm

uterus (Tables 4, 5 and 6). There were 24 women that had anterior colporrhaphy with mesh and concurrent vaginal hysterectomies. Eight women had anterior colporrhaphy with mesh and a previous history of vaginal or abdominal hysterectomies while 5 women had anterior colporrhaphy with mesh but without concurrent vaginal hysterectomies as their uterovaginal prolapses (grade 1) were not severe enough to warrant one. Intraoperatively, the mean blood loss was 200 to 225 mL across the 3 groups (Table 4). These were based on only 14 women, as non-significant blood loss was usually not routinely recorded at the end of the operations. Only 2 patients required blood transfusion postoperatively and they were transfused 2 pints of packed cell each. Both were from the concurrent vaginal hysterectomy group. There was a bladder perforation as a result of the TVT procedure and was not a direct consequence of the anterior colporrhaphy. This did not require further management or prolonged catheterisation. All but 1 woman had concurrent operations in addition to their anterior colporrhaphy and the mean operating time

ranged from 59 to 86 min across the 3 groups. For the solitary woman who had only anterior colporrhaphy reinforced with prolene mesh performed on her, the operating time was 28 min.

Postoperative complications were low (Table 5) with 13 women developing pyrexia only for 1 day postoperatively, the majority of which had concurrent vaginal hysterectomies. Four women had urinary tract infections, 1 woman had haematuria and vault haematoma (concurrent vaginal hysterectomy) and 1 woman had a pelvic abscess (concurrent vaginal hysterectomy, posterior repair and TVT). Both cases of denovo detrusor instability remained asymptomatic and were only detected on routine postoperative urodynamic studies. All 5 cases of postoperative urgency had pre-existing urgency before their surgery. None of the women developed mesh erosion postoperatively.

It is the routine practice in our unit to remove the urinary catheter only on the second postoperative day as mentioned earlier. However, there were 10 women who were unable to do so because 8 failed their trail-off catheter, 1 developed

a urinary tract infection and another developed a vault haematoma. The duration of their catheter insertion in these cases ranged from 3 to 30 days. Similarly, we routinely discharge our patients 2 days after their surgery if they do not encounter any difficulties in passing urine. There were 14 women who were discharged on their second postoperative day. The main reasons for the remaining 23 women to stay longer than 2 days (range, 3 to 7) were because of delayed catheter removal resulting from high residual urine (8 women) and requests from patients to be discharged later (9 women). Other reasons for prolonged hospitalisation include postoperative pyrexia (3 women), vault haematoma and diarrhoea (1 woman each respectively). A proportionately larger number of women with delayed discharge were from the group with concurrent vaginal hysterectomies.

Using our definition for determining success (Table 6), the overall failure rate across the 3 groups was 5.4% (2 women) as shown in Table 6 and the central grade 3 cystoceles occurred after 2.1 and 26.9 months. Although the 2 failures occurred in women with concurrent vaginal hysterectomies and in women with previous vaginal or abdominal hysterectomies, the number of women in each group is too small to draw any meaningful conclusion from this. Of the 35 women who had successful cystocele repairs, 28 were cured (asymptomatic with no or grade 1 cystocele) and 7 had improved outcomes (asymptomatic with a grade 2 cystocele). Two women (5.4%) defaulted on their follow-up visits and remained uncontactable while 1 (2.7%) died of a myocardial infarct approximately 10 months after surgery. The mean follow-up times for all 3 groups ranged from 14.4 to 19.2 months (2 to 32). A life table of analysis with the number of women reaching 6 months of review each will provide a more informative picture.

Discussion

Risk factors for the occurrence of severe cystoceles include multiparity,[13] pelvic floor denervation consequent to vaginal delivery,[14] direct pelvic floor myopathic stretch injury[15] and postmenopausal qualitative and quantitative collagen changes.[16] Patients who have undergone partially successful attempts at pelvic reconstruction with insufficient fascia left for adequate support of the bladder and urethra are also at risk.[7] This is evident in our study population with their high parity and accompanying pelvic prolapses.

The gold standard and most common repair for cystoceles by the vaginal route has been anterior repair or Kelly plication.[3] It involves plicating the vesicopelvic fasciae and bladder neck thereby closing the central defect. Paravaginal[4,5] and Burch colposuspension[17] have been employed for the abdominal repair of severe cystoceles.

They provide support to the urethra and lateral bladder wall but they fail to correct the central herniation of the bladder. However, they bear the disadvantages of a laparotomy with its increased hospitalisation and morbidity. The advantages of the vaginal approach (shorter hospital stay, minimal morbidity and an opportunity to correct synchronous pelvic prolapses at the same operation) in the repair of significant cystoceles have been described by Raz et al.[6]

The ideal method of reconstruction of severe cystoceles should be repair of bladder herniation, correction of coincident stress urinary incontinence without causing obstruction and retention or improvement of vaginal depth and axis. However, bladder base repositioning may lead to weakening of the posterior and lateral pelvic supports. Pubocervical fasciae and other ligaments may be damaged by previous surgery, complicated labour or progressive connective tissue disease or may be inherently weak. Attempts to rely on these anatomical tissues for surgical support may result in recurrence or occurrence of new herniation. The use of mesh is appealing because it avoids the major risk of reliance on ligaments and fasciae that were responsible for the previous prolapse due to intrinsic or acquired deficiency. A mesh not tightly placed but resting against the bladder wall supports the viscera only during increased intraabdominal pressure and has been said to provide a safe, long-standing and consistent plane of support to the bladder base, neck and lateral bladder wall.[18]

The use of meshes is not without its problems and reviews of various synthetic meshes reported delayed scar formation and erosions in about 6% of cases.[10,12] In rare cases, complete removal of the mesh was necessary. Other complications reported are pain, infection, fistula and sinus tract formation, seroma, shrinkage, folding and crimpling. Gibson et al[19] defined the criteria for the ideal prosthesis which require the mesh to be chemically inert, not be physically modified by tissue fluids, not induce an inflammatory or allergic reaction, not be carcinogenic, be able to resist mechanical stress, be able to be manufactured into the required shaped and be sterilised. A variety of meshes have been developed to satisfy as many of the criteria of the ideal prosthesis as possible and are classified into types I-IV according to the type of material, pore size and whether they are mono- or multifilament as highlighted in Table 7.[8] Pore size influences the flexibility of the prosthesis, fibroblast infiltration, leukocyte passage and mechanical anchorage. There has been emphasis upon employment of meshes with greater than 75 µm, in order to facilitate the migration of macrophages and leukocytes thus reducing any infective risk. The mean diameter of both leukocytes and macrophages are 9 to 15 µm and 16 to 20 µm, respectively, and smaller pore sizes should still allow them to pass through adequately. The interstices

between multifilament grafts are also important because interstices of less than 10 µm may allow the passage of small bacteria (<1 µm) but not the leukocytes, hence increasing the risk of sepsis. Based on this classification, type I monofilament and macro meshes are favoured and prolene polypropylene mesh is the most frequently used material for pelvic floor reconstruction and continence surgeries because of its strength and elasticity.[12] Julian[9] and Sand et al[20] showed that the use of synthetic meshes in the transvaginal repair of cystoceles significantly prevented their recurrence compared to repairs without meshes.

The narrow channel created in our technique on either side of the cystocele to the fascia of the ileococcygeus muscle prevents the upward and downward movement of the mesh after placement. Our technique has the added advantage of creating 2 layers of absorbable mesh which further enhances the cystocele repair by plicating the peri-vesical fascia in the midline, from the anterior to the posterior part of the cystocele in a continuous manner and suturing in the opposite direction on reaching the level of the cardinal ligaments with the stitches placed as laterally on either side as possible. Urethral hypermobility and central cystocele defects were corrected by the anterior repair with the prolene mesh providing additional enhanced support to the central and lateral cystocele defect by acting as a scaffold. Our success rate is comparable to other studies using polypropylene mesh.[7,18,21] We are encouraged by our early success in our pilot study and realise that a prospective randomised controlled trial with a longer follow-up is necessary in order to obtain more durable results.

Conclusion

Transvaginal anterior colporrhaphy reinforced with a tension-free polypropylene prolene mesh in the treatment of severe or recurrent cystoceles appears to be a good approach. The technique is simple, safe, easily performed and is associated with a low failure rate and morbidity.

REFERENCES

1. Baden WF, Walker T. Fundamentals, symptoms, and classification. In: Baden WF, Walker T, editors. Surgical Repair of Vaginal Defects. Lippincott, 1992:9-23.
2. Klutke C, Golomb J, Barbaric Z, Raz S. The anatomy of stress incontinence: magnetic resonance imaging of the female bladder neck and urethra. J Urol 1990;143:563-6.
3. Kelly HA, Dumm WM. Urinary incontinence in women, without manifest injury to the bladder. 1914. Int Urogynecol J Pelvic Floor Dysfunct 1998;9:158-64.
4. Richardson AC, Edmonds PB, Williams NL. Treatment of stress urinary incontinence due to paravaginal fascia defect. Obstet Gynecol 1981;57:357-62.
5. Shull BL, Baden WF. A six-year experience with paravaginal defect repair for stress urinary incontinence. Am J Obstet Gynecol 1989;160:1432-9.
6. Raz S, Little NA, Juma S, Sussman EM. Repair of severe anterior wall prolapse (grade IV cystourethrocele). J Urol 1991;146:988-92.
7. Safir MH, Gousse AE, Rovner ES, Ginsberg DA, Raz S. 4-defect repair of grade 4 cystocele. J Urol 1999;161:587-94.
8. Olsen AL, Smith VJ, Bergstrom JO, Colling JC, Clark AL. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. Obstet Gynecol 1997;89:501-6.
9. Julian TM. The efficacy of Marlex mesh in the repair of severe, recurrent vaginal prolapse of the anterior midvaginal wall. Am J Obstet Gynecol 1996;175:1472-5.
10. Debodinance P, Delporte P, Engrand JB, Boulogne M. Development of better tolerated prosthetic materials: applications in gynecological surgery. J Gynecol Obstet Biol Reprod (Paris) 2002;31:527-40.
11. de Tayrac R, Fernandez H. Surgical repair of cystocele with mesh by the vaginal route. Am J Obstet Gynecol 2002;186:852.
12. Cosson M, Debodinance P, Boukerrou M, Chauvet MP, Lobry P, Crépin G, et al. Mechanical properties of synthetic implants used in the repair of prolapse and urinary incontinence in women: which is the ideal material? Int Urogynecol J Pelvic Floor Dysfunct 2003;14:169-78.
13. Nichols DH, Randall CL, editors. Reduction of Maternal Injuries. In: Vaginal Surgery. 3rd ed. Baltimore: Williams & Wilkins 1989:46-63.
14. Allen RE, Hosker GL, Smith AR, Warrell DW. Pelvic floor damage and childbirth: a neurophysiological study. Br J Obstet Gynaecol 1990;97:770-9.
15. Gilpin SA, Gosling JA, Smith AR, Warrell DW. The pathogenesis of genitourinary prolapse and stress incontinence of urine. A histological and histochemical study. Br J Obstet Gynaecol 1989;96:15-23.
16. Falconer C, Ekman G, Malmstrom A, Ulmsten U. Decreased collagen synthesis in stress-incontinent women. J Obstet Gynecol 1994;84:583-6.
17. Burch JC. Urethrovaginal fixation to Cooper's ligament for correction of stress incontinence, cystocele and prolapse. Am J Obstet Gynecol 1961;81:281-90.
18. Migliari R, Usai E. Treatment results using a mixed fiber mesh in patients with grade IV cystocele. J Urol 1999;161:1255-8.
19. Gibson LD, Stafford CE. Synthetic mesh repair of abdominal wall defects: follow up and reappraisal. Am Surg 1964;30:481-6.
20. Sand PK, Koduri S, Lobel RW, Winkler HA, Tomezsko J, Culligan PJ, et al. Prospective randomized trial of polyglactin 910 mesh to prevent recurrence of cystoceles and rectoceles. Am J Obstet Gynecol. 2001;184:1357-62.
21. de Tayrac R, Gervaise A, Fernandez H. Cystocele repair by the vaginal route with a tension-free sub-bladder prosthesis. J Gynecol Obstet Biol Reprod (Paris) 2002;31:597-9.