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VAGINAL WALL TRANSVERSE FLAP SLING FOR REPAIR OF SEVERE CYSTOCELE AND CYSTOURETHROCELE WITH ASSOCIATED STRESS INCONTINENCE

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ABSTRACT

Objective: Surgical treatment of severe anterior vaginal wall prolapse and associated stress incontinence is controversial. We present our experience with a modification of the vaginal sling combined with anterior colporraphy for severe cystocele and cystourethrocele.

Patients and Methods: Since 1992 we used this technique in 41 consecutive patients suffering stress incontinence and anterior vaginal wall prolapse, with a minimum postoperative follow-up of 1 year. Vaginal wall prolapse was severe in all cases: 19 (46%) grade III and 22 (54%) grade IV cystocele. Stress incontinence was evidenced in all cases, originally consulted in 29 (71%) and revealed by a positive vaginal pack test in the rest (29%). Anterior colporraphy was accomplished by percutaneous suspension of a large vaginal wall transverse flap that was rotated to support the bladder neck and was sutured to the rectus fascia. Vaginal hysterectomy and posterior colporraphy were performed in 14 (34%) and 25 (62%), respectively.

Results: At a mean follow-up of 42 months success rate was 93% (38/41) for cystocele repair and 88% (36/41) for treatment of associated stress incontinence. Significant postoperative detrusor instability was present in 9 (22%), and "de novo" developed in 3 of them. Intermittent catheterization was needed in 22 (54%) and time to resume postoperative voiding was 3.6 weeks, range 1-14. No patient developed permanent urinary retention. No sexually active patient suffered dispareunia six months after surgery. Mean hospital stay was 3.1 days, including cases with hysterectomy.

Conclusions: Anterior colporraphy with buttressed support of the bladder through a vaginal wall transverse flap sling is a safe method for repair of severe cystocele or cystourethrocele and treatment of associated stress incontinence that achieves satisfactory results at a reasonable follow-up. This approach prevents development of stress incontinence after surgery of cystocele in cases with a positive vaginal pack test. Besides, the peculiar orientation of the vaginal mucosa harvested for the sling avoids the potential problems of foreshortening the vaginal vault.

Key words: urinary incontinence; stress; bladder; surgery; cystocele
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INTRODUCTION

Based on novel concepts, the selection of the proper approach to treat stress urinary incontinence must consider both the degree of anterior vaginal wall prolapse and the anatomical origin of incontinence: hypermotility or intrinsic sphincteric deficiency. Anterior vaginal wall prolapse can be graded according to the level of descend of the bladder in relation to vaginal introitus. Most often the bladder base produces the cystocele; but the bladder neck and urethra are often involved, especially when prolapse

is severe. Urethral hypermobility and occult sphincteric deficiency are generally present with moderate and severe cystocele (1).

The classical approach to cystocele was based on the approximation of lax pubocervical fascia and narrowing of the bladder neck (Kelly plication), but failure rate in terms of correcting or preventing incontinence is well-known (2). The abdominal approach of Burch colposuspension successfully achieves continence in many cases but only treats mild-to-moderate cystocele and needs a laparotomy (3). Its recent laparoscopical modification diminishes both morbidity and hospital stay but is still inappropriate to cope with a severe cystocele. In the search of a rational repair of severe cystocele that allows improvement of results and decrease of morbidity, the transvaginal route with combined bladder neck suspension and repair of the defect in the pubocervical fascia was promoted (4,5). In this sense, some authors have described the use of a vaginal tube fixed in the bladder neck or suspended subcutaneously, similarly to the technique of Pereyra (6). Recently, pubovaginal sling (7-9) and even transvaginal placement of a hammock of nonabsorbable mesh (10) have been promoted as first choice therapy for anterior vaginal wall prolapse and associated stress incontinence of any kind.

We report our experience with a modification of Raz procedure for the treatment of severe anterior vaginal wall prolapse that uses the combination of both anterior colporraphy and a transverse long vaginal flap sling to support the bladder neck and effectively treat stress incontinence.

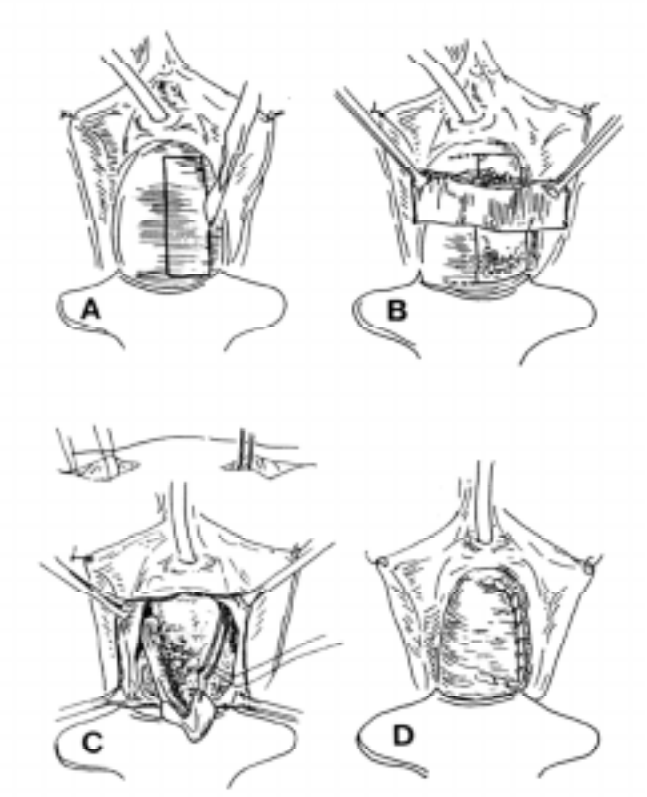

Figure 1 *- A)- The vertical midline incision in the anterior vaginal wall is extended laterally to create a rectangular flap; B)- This vascularized island is transversely rotated to act as a sling; C)- The retropubic space is entered after dissection of the periurethral fascia and urethropelvic ligament, and the vaginal transverse flap sling is passed up to the rectus fascia as in Raz's technique; D)- A second lateral vaginal wall flap is advanced to restore the vagina after anterior colporraphy is performed.*

PATIENTS AND METHODS

Surgical Technique

The patient is placed in the lithotomy position with access to the suprapubic area and a 18F Foley catheter is inserted through the urethra and the bladder emptied. Perioperative intravenous ampicillin and gentamicin are administered, and will be continued until hospital discharge. The vagina is exposed and a vertical midline incision is made in the anterior vaginal wall, from the area of the mid urethra to the posterior edge of the cystocele, and extended laterally to create a rectangular flap measuring 8 to 10 cm long and 3 to 4 cm wide (Figures-1A and B). This island of anterior vaginal wall is dissected with the help of Allis clamps but great care is taken to preserve the vascular supply of the vaginal wall. For this purpose the periurethral fascia is included in the flap. This flap will be transversely rotated to act as a sling and the contralateral side of the vagina is incised and undermined to create a second advance flap that will cover the island at a later step (Figures-1B and D). Lateral dissection is performed along the periurethral fascia to the pubic bone. The urethropelvic ligament is identified and bluntly dissected to perforate the endopelvic fascia and enter the retropubic space. The bladder neck and urethra are easily mobilized. At the level of the bladder base the pubocervical fascia and the edge of levators are dissected from the bladder on each side and separated from the herniated bladder that will be later introduced.

The vaginal transverse flap sling is prepared. No. 1 polypropylene sutures that incorporate the entire vaginal wall and periurethral fascia anchor the four corners of the rectangle and are transferred individually using a double-pronged ligature carrier from the vagina to the suprapubic region up to the rectus fascia as designed by Raz et al. (11) (Figure-1C). The sling is carefully placed at the level of the bladder neck and proximal urethra. The edges of the pubocervical fascia are approximated by 2-0 polyglactic sutures from the bladder neck to the cardinal ligaments. Endoscopic examination is helpful at this point to prevent unnoticed penetration of bladder or urethra. Vaginal hysterectomy and/or posterior colporraphy can be performed at this time if needed. The lateral vaginal wall flap is advanced to restore the integrity of the vagina using a running 2-0 polyglactic suture (Figure-1D). Only after closure of the vaginal wall the 4 sutures are tied independently by the assistant at the small suprapubic incision on each side. Not much tension is needed but urethral motility must no longer be felt by tugging on the Foley catheter while the knot is tied down. The small suprapubic incisions are closed. A vaginal pack is not considered necessary unless significant bleeding persists, and we do not use suprapubic tube either. The Foley catheter is removed on postoperative day 2 and post-void residual is recorded. If patient is

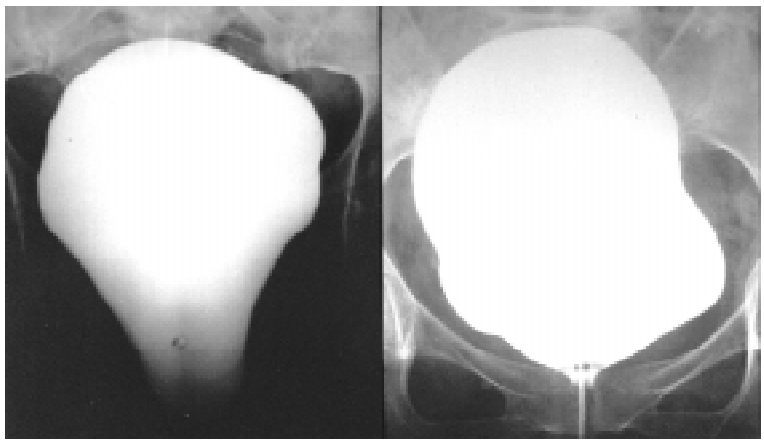

Figure 2 - *Preoperative (left) frontal view of grade IV cystocele (bladder base bellow hymeneal ring at rest) and postoperative (right) orthostatic frontal view during Valsalva maneuver.*

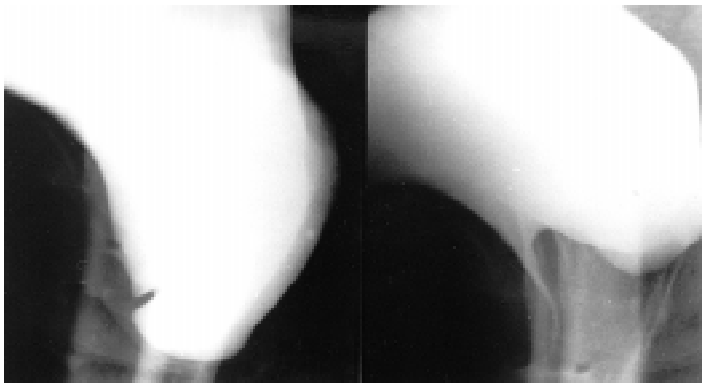

Figure 3 - *Lateral preoperative (left) and postoperative (right) voiding cystourethrogram in the same patient, of Figure 2.*

unable to void, or residual volume is greater than 100 cc, intermittent self-catheterization is started. The patient is taught and supervised in the office, thus allowing early discharge. Intermittent catheterization is continued until residual urine is consistently less than 100 cc. All patients were examined, operated, and controlled by the same surgeon (JCA). To reduce potential examiner bias, a blinded third party (ME) reevaluated all patients postoperatively, independently from surgeon assessment. Follow-up was closed at the time outcome measurements, based on physical examination and physician's interview, were performed. Presence of a significant cystocele, continence status, persistent and de novo urge incontinence, duration of self-catheterization, and the possibility of dyspareunia were recorded.

Patients

Since 1992 we have used this technique in 41 consecutive patients suffering severe cystocele, with a minimun follow-up of at least one year. Inclusion criteria were large (grade III and IV) cystocele (Figure-2), positive vaginal pack test, and absence of previous surgical procedures to correct incontinence. Mean age was 65.4 years (C.I. 62.8-67.9, range 49-76). In 19 patients (46%) the bladder base appeared outside introitus with strain (grade III cystocele) and in 22 (54%) the bladder base was below the hymeneal ring at rest (grade IV cystocele or cystourethrocele). The degree of the cystocele was also documented under fluoroscopic monitoring with the patient in standing position (Figure-3). Vaginal pack test demonstrated stress incontinence in all cases (n = 41). Without insertion of the vaginal pack, stress urinary incontinence was evidenced on physical examination in 29 cases (71%) and the vaginal pack test demonstrated occult incontinence in the remaining 12 (29%). Patients with a large cystocele that remained continent after vaginal pack insertion are not the object of this communication as they received cystocele repair alone without the vaginal sling. Incontinent patients, either at initial examination or after the pack test, were treated as described above by anterior colporraphy and vaginal wall transverse flap sling. Multichannel cystometry was performed before surgery in 22 patients (54%) and approximately 30-60 days after surgery in 8 (20%). Indications for preoperative urodynamic study were associated urgency incontinence and previous surgical procedure (vaginal hysterectomy and failed cystocele repair). Urodynamic study was performed postoperatively when results were unsatisfactory, either due to persistent stress incontinence or de novo urge incontinence. A number of added procedures were needed to complete perineal repair. Vaginal hysterectomy was performed in 14 cases (34%), posterior colporraphy in 25 (62%), and enterocele repair and vaginal vault prolapse in 1 (2.4%) each. Hysterectomy was indicated either for medical reasons (e.g., fibroids, bleeding) or because of the presence of significant uterine prolapse associated with pelvic discomfort and dyspareunia. This procedure had been previously performed in 7 cases (17%), 4 of them with associated failed

colpoperineorraphy. Patients were periodically followed until June 1999, and outcome was assessed from June 1999 to September 1999.

RESULTS

At a mean follow-up of 42 months (C.I. 31.3-52.8, range 12 to 83) 36 of the 41 patients were completely continent for a success rate of 88%. Continence is defined as absent or very rare stress incontinence, without need of pads or any social limitations. Among the cases that were incontinent after surgery, 2 patients worn 2 pads or less a day and 3 patients used at least 3 pads. Abdominal leak point pressure was under 60 cm water in 4 of 5 cases with failure, thus suggesting intrinsic sphincter deficiency. In one case incontinence was demonstrated before surgery only by a positive vaginal pack test, but it was clinically overt after surgery. Therefore, we were able to correct stress incontinence in 25 of 29 patients (86%) with severe cystocele and associated stress incontinence and were able to prevent development of incontinence in 11 of 12 patients (92%) in which incontinence was only revealed by a positive vaginal pack test.

Preoperative Valsalva leak point pressure ranged from 15 to 180 cm H20 (mean 61.3, SE 8.6) in the patients studied. Stress incontinence was accompanied by urgency incontinence at diagnosis in 16 patients (39%) and urodynamic testing demonstrated instability in 13. Postoperative significant detrusor instability (i.e. frequency, urgency and/or urge incontinence in the absence of a positive urine culture) was complained in 9 cases (22%). It appeared de novo in 3 patients (7%) and persisted despite surgery in 6 (15%). In all cases it was effectively controlled with anticholinergic therapy and no patient suffered urge incontinence. Therefore, with the use of this surgical procedure, bladder instability disappeared after cystocele repair in a significant number of cases (10 of 16 patients), and was easily managed medically in the rest.

The success rate for anatomical cystocele repair with the vaginal wall transverse flap sling and colporraphy was 93%. Cured cystocele, considered so when an excellent anterior vaginal wall support or a mild asymptomatic cystocele in the standing position is documented, was achieved in all cases but three. Persistent cystocele was mild but symptomatic, and 2 of them coexisted with stress incontinence. There were no intraoperative complications, such as need for blood transfusion, bladder perforation or fistula formation. Postoperative complications include already mentioned de novo detrusor instability (3 cases); wound infection with formation of a suprapubic abscess (1 case), and enterocele formation (1 case). No patient suffered permanent retention but 22 (54%) suffered it transiently, i.e. needed intermittent catheterization, a week or more. Among them, the mean time to resume voiding with postvoid residual under 100 cc was 3.6 weeks (range 1 to 14 weeks, C.I. 1.8-5.4). No patient complained dyspareunia postoperatively. Mean hospital stay was 3.1 days (C.I. 2.5-3.7, median 3 days), and that included cases with hysterectomy. Mean stay of 27 cases treated with anterior colporraphy and vaginal wall transverse flap sling without hysterectomy was 2.2 days (C.I. 1.6-2.8).

DISCUSSION

We present a simple and secure vaginal procedure for the correction of severe cystocele or cystourethrocele and associated incontinence, either evident or occult. This technique incorporates anterior colporraphy with buttressed support of the bladder neck through a vaginal sling. The peculiar transversely rotated quadrangular flap we describe, later covered by a second contralateral advance flap, allows a very satisfying reconstruction of redundant anterior vaginal wall and is particularly appropriate to repair a large cystocele. The main advantage over the conventional inverted U vaginal flap described by Raz et al. (11) is that no vaginal shortening is to be expected but a reconstructive narrowing is performed instead. Dyspareunia has been investigated and proved absent in every case.

Many patients with severe genital prolapse have underlying incontinence uncovered during urodynamic testing (13). We consider this technique

is specially indicated when severe cystocele is accompanied by a positive vaginal pack test. Under this circumstance a high percentage of patients demonstrates internal sphincteric deficiency and the rest suffer urethral hypermotility (1). Once type III incontinence is identified pubovaginal or vaginal sling, in addition to pelvic floor repair, is recommended (14-16). Results of vaginal and pubovaginal slings appear equally satisfactory on the long-term (17). Besides, increasing evidence exits to expand the indication of sling procedures for treatment of type II stress incontinence, based on its high success rate and affordable low number and severity of complications related to the procedure (i.e., long-term obstruction and de novo detrusor instability). Sling procedures can therefore be the ideal overall treatment for stress incontinence regardless of type, and be indicated as first line treatment for both urethral hypermotility and intrinsic sphincteric deficiency (16,18-20).

We report 93% cure rate for cystocele and 88% cure rate for incontinence with the use of anterior colporraphy with vaginal wall transverse flap sling, at a mean follow-up of more than 3 years. The fact that the vaginal pack test was positive in all cases means a high proportion of patients with complicated type III stress incontinence has been selected and, even though, outcome is encouragingly good. Anterior colporraphy with buttressed support of the bladder through a vaginal wall transverse flap sling, is a safe method to prevent development of iatrogenic incontinence after repair of severe cystocele. It is a minimally invasive vaginal procedure that can easily be combined with vaginal hysterectomy and/or posterior colporraphy. It obviates the morbidity associated with an abdominal procedure and allows early hospital discharge.

Herniation of the bladder outside the introitus, either with strain (grade III cystocele) or at rest (grade IV), implies severe weakness of vesicopelvic fascia both in its lateral aspect (lateral defect) and in the midline (central defect). According to Raz et al., the lateral defect can be repaired by a four corner bladder neck suspension that supports the bladder base anchoring the pubocervical fascia, cardinal ligaments and vaginal wall; and the central defect is repaired by re-approximation of the pubocervical fascia and cardinal ligaments in the midline (2,5). The Burch operation both corrects urethral hypermotility and repairs the cystocele by suspending the vaginal wall and secondarily the urethra and bladder to Cooper's ligament, without urethral obstruction (12). A vaginal wall sling has the advantage to provide both compression and support for the urethra and also resuspend the bladder neck (21). It has proved an excellent option for the treatment of both genuine incontinence and intrinsic sphincteric deficiency (16,22). Therefore, vaginal sling combined with central defect repair by re-approximation of the pubocervical fascia and cardinal ligaments is a logical option for repair of anterior vaginal wall prolapse. The technique we describe is a variation of the pubovaginal sling that uses a flap of anterior vaginal wall, and could behave more like a pubovaginal sling than the vaginal sling described by Raz et al. In this sense, the results we present could be better than those reported for other techniques to treat large cystoceles; however, prospective comparative trials evaluated with validated questionnaires are needed. Other authors have already proposed the association of a sling and formal cystocele repair as a good option within the therapeutic arsenal of large volume cystocele (7-10,23).

The degree of cystocele formation is not totally related to the degree of incontinence. A large cystocele may serve as a pressure-relief system that protects a poor urethral continence mechanism and prevents leakage with exercise. The vaginal pack test is a simple maneuver to identify patients at risk for stress urinary incontinence after repair of a cystocele. If urethral hypermotility or intrinsic sphincteric deficiency is not detected and, therefore, cystocele repair is not completed with any form of urethral support, de novo stress incontinence is very likely to develop. Surgical techniques that do not face the possibility of sphincteric deficiency are at increased risk of failure. Anterior colporraphy with buttressed support of the bladder through a vaginal wall transverse flap sling is a safe method for repair of severe cystocele or cystourethrocele and treatment of associated stress incontinence or prevention of the

novo stress incontinence after a positive vaginal pack test. Anterior colporraphy alone may be effective enough, however, to cure a cystocele with a negative pack test during evaluation. We share the opinion that vaginal pack test makes sophisticated videourodynamics equipment unnecessary for evaluation of large cystourethrocele (24). Abdominal leak point pressure is not valid in the presence of a cystocele and cannot be taken as an accurate indicator to classify type II or III incontinence under this circumstance, neither can it define the appropriate operation. Based on increasingly acceptance of sling procedures for type II incontinence, we have abandoned Raz bladder neck or Burch abdominal suspensions to treat grade III and IV cystocele with a positive vaginal pack test and currently perform a vaginal wall sling in the fashion we describe. It not only suspends the bladder neck, but also elevates the whole trigone centrally and laterally, and reinforces paraurethral and paravesical fascia with a resistant and totally biocompatable tissue. We hope that same as its close relative, fascial pubovaginal sling, this technique withstands the test of time.

In conclusion, we consider vaginal wall transverse flap sling in combination with anterior colporraphy is a reconstructive technique of choice for severe cystocele or cystourethrocele with a positive vaginal pack test. This simple and minimally invasive technique can be easily combined with vaginal hysterectomy or posterior colporraphy. Morbidity is minimal and laparotomy is avoided. Transitory retention requiring intermittent catheterization is frequent but we have not observed permanent retention. De novo detrusor instability develops in a small percentage but can be managed with anticholinergics. Mean hospital stay is short, even when hysterectomy or other associated procedures are performed.

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