

SURGICAL MANAGEMENT OF STRESS URINARY INCONTINENCE: BURCH COLPOSUSPENSION, MODIFIED PEREYRA AND STAMEY BLADDER NECK SUSPENSION, AND COLLAGEN INJECTION – TOA PAYOH HOSPITAL EXPERIENCE

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ABSTRACT

A retrospective analysis was performed on 34 female patients who underwent corrective surgery for stress urinary incontinence over a 4-year period at the Toa Payoh Hospital. These patients were offered surgery only after an adequate trial of medical therapy, pelvic floor exercises and weight reduction.

Bladder neck suspension operations were performed via the Burch, Stamey and modified Pereyra techniques. Towards the later part of this study, endoscopic injection of Collagen was performed as a salvage procedure in 2 patients. The Burch colposuspension gave uniformly good results, with all patients being completely dry. Seventy percent and sixty percent complete continence were achieved via the modified Pereyra and Stamey techniques respectively. Three patients required additional surgical procedures.

Using these techniques, the overall results showed that 27 patients (79.4%) had complete urinary continence following surgery, while the remaining 7 patients (20.6%) experienced significant improvement of symptoms.

Keywords: stress incontinence, colposuspension, bladder neck suspension, Burch, Stamey, Pereyra

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INTRODUCTION

Many corrective surgical operations have been performed for the treatment of stress urinary incontinence. Bladder neck suspension can be done via various techniques viz Burch, Stamey and Pereyra⁽¹⁻⁴⁾. There is also a trend towards performing the currently available endoscopic needle suspension operations. One of the latest innovations is the use of endoscopic injection of Collagen at the site of the external urinary sphincter without the need for bladder neck suspension in the appropriate case.

This paper is intended to review the presentation, the pre-operative evaluation, the various operative techniques, and the results of surgery with respect to success and complications.

PATIENTS & METHOD

Between September 1988 and June 1992, 34 female patients underwent corrective surgery for primary stress urinary incontinence at the Toa Payoh Hospital. These patients were only offered surgery after an adequate trial of medical therapy, pelvic floor exercises, and weight reduction.

Their ages ranged from 25 to 67 years, with a mean age

of 46.1 years. Thirty-one patients had 2 or more children. Their weights ranged from 47 to 75 kg, with a mean of 58.5 kg. Our patients were symptomatic between 1 to 20 years, with a mean period of suffering of 4.6 years. The presence of a cystocele was noted in 17 patients, and a rectocele in another 3 patients. Pre-operative urinary tract infection was demonstrated in 2 patients who were subsequently treated with antibiotics.

Twenty-five patients had symptoms of stress incontinence alone; another 3 patients had associated urgency, while a further 6 patients had associated frequency. Stress incontinence was demonstrated clinically in all our patients. Seventeen patients had cystometric studies to exclude bladder instability.

The operations were performed by two consultant urologists. One consultant urologist performed solely the modified Pereyra bladder neck suspension. The second consultant urologist performed both the Stamey bladder neck suspension, as well as the Burch colposuspension, reserving the latter operation for patients with stress urinary incontinence associated with large cystoceles.

All patients were given ampicillin and gentamicin as peri-operative prophylactic antibiotics for a period of 24 hours. The period of follow-up ranged from 15 to 31 months, with a mean of 19.5 months (Table I).

Table I - Period of follow-up

Operation	Duration	Mean	Patients
Burch	17 to 28 months	18.5 months	9
Stamey	15 to 31 months	21.7 months	15
Pereyra	15 to 25 months	17.1 months	10

RESULTS

Operative Time

The operative time ranged from 25 to 140 minutes, with a

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mean of 73.8 minutes. The Burch colposuspension operations took an average of 97.8 minutes to complete, while the Stamey operations were usually completed in 76.9 minutes. The mean operating time for the modified Pereyra bladder neck suspension operations was 53.8 minutes (Table II).

Table II - Operation vs operative time

Operation	Operative Time	Mean	Patients
Burch	70 to 140 min	97.8 min	9
Stamey	55 to 120 min	76.9 min	15
Pereyra	25 to 80 min	53.8 min	10

Period of catheterisation

Following surgery, all patients had an indwelling 2-way Foley's 12F urethral catheter. The period of catheterisation ranged from 1 to 17 days, with a mean of 6 days. Catheters were removed slightly earlier following the Pereyra bladder neck suspension (average of 2-5 days), as compared with bladder neck suspensions done via the Burch and Stamey techniques (average of 6-10 days) (Table III).

Table III - Operation vs period of urethral catheterisation

Operation	Period of Catheterisation in days					Patients
	1	2 to 5	6 to 10	11 to 15	>15	
Burch	1	3	5	0	0	9
Stamey	2	3	8	2	0	15
Pereyra	0	7	1	1	1	10

Period of hospitalisation

The period of hospitalisation closely mimicked the period of catheterisation. The hospital stay ranged from 3 to 17 days, with a mean of 8 days (Table IV).

Table IV - Operation vs period of hospitalisation

Operation	Period of Hospitalisation in days				Patients
	2 to 5	6 to 10	11 to 15	>15	
Burch	0	6	3	0	9
Stamey	2	8	5	0	15
Pereyra	1	6	2	1	10

Complications

No major complications were encountered in this series.

Post-operative urinary tract infection was noted in five patients. Three of these occurred following Burch colposuspension operations, while one each occurred after bladder neck suspensions done via the Stamey and modified Pereyra techniques. All the patients responded to oral antibiotics. Wound infection occurred in two patients; one followed a Burch colposuspension, while the other after a Stamey operation.

A prolonged period of catheterisation was required in two patients following the modified Pereyra bladder neck suspension.

Recurrence of stress incontinence was noted in two patients following Stamey bladder neck suspension operations, and one patient following a modified Pereyra procedure.

Symptoms of bladder instability were experienced by 6 patients (17.6%) in the post-operative period. This occurred in one patient (11.1%) following the Burch colposuspension, 3 patients (20.0%) following the Stamey bladder neck

suspension, and 2 patients (20.0%) following the modified Pereyra operation. Five of these patients had cystometric studies which excluded detrusor instability pre-operatively. Post-operative urodynamic assessments were not performed on these patients. They were treated empirically with anticholinergic drugs, with resolution of symptoms in 3 to 6 months after their operations.

Operation vs results

Improvement following surgery was assessed subjectively and objectively. All patients were asked whether they were continent following surgery. In addition, they were instructed to return to the clinic with semi-distended bladders on the review days. The presence or absence of stress urinary incontinence was assessed clinically with the labia parted and the patient coughing. Urodynamic assessment was not performed post-operatively.

Nine patients with stress incontinence associated with large cystoceles underwent the Burch colposuspension. All the patients were completely continent following surgery (Table V).

Fifteen patients had bladder neck suspension performed via the Stamey technique. Nine patients (60%) were completely continent, while 4 patients (26.7%) reported significant improvement of symptoms. Two patients reported no improvement (Table V).

The modified Pereyra bladder neck suspension was done on 10 patients. Seven patients (70%) were completely continent, while 2 patients (20%) reported significant improvement of symptoms. One patient did not experience any improvement following surgery (Table V).

Table V - Operation vs results

Operation	Initial Results			Patients
	Success	Improved	Failure	
Burch	9	0	0	9
Stamey	9	4	2	15
Pereyra	7	2	1	10

Results vs age, parity & weight

There was no correlation between the results of surgery and the ages of the patients, with the failures being distributed evenly in the age groups (Table VI). In addition, operative results were not influenced by the patient's parity (Table VII). Weight may have some influence on the results, as our failures were mainly in the heavier weight categories (Table VIII).

Table VI - Results vs age

Results	Age in years					Patients
	21to30	31to40	41to50	51to60	>60	
Success	1	5	8	9	2	25
Improved	0	0	5	1	0	6
Failure	1	0	1	1	0	3

Additional procedures

A total of three patients required additional surgery. Two patients reported no improvement of symptoms following Stamey bladder neck suspension. One of these patients underwent urethral reconstruction and Pereyra bladder neck suspension, and subsequently reported significant improvement of symptoms with a 7-month follow-up period. The other patient had endoscopic injection of Collagen, and was completely dry for 8 months following the procedure.

Table VII - Results vs parity

Results	Number of Children							Patients
	0	1	2	3	4	5	>5	
Success	2	1	12	5	2	1	2	25
Improved	0	0	4	2	0	0	0	6
Failure	1	0	1	1	0	0	0	3

Table VIII - Results vs weight

Results	Weight in kg						Patients
	46-50	51-55	56-60	61-65	66-70	>70	
Success	4	7	5	4	3	2	25
Improved	0	2	3	1	0	0	6
Failure	0	0	1	1	0	1	3

One patient who underwent the modified Pereyra bladder neck suspension reported no improvement of symptoms. She underwent 2 sessions of endoscopic injection of Collagen, and was subsequently completely continent, with a follow-up period of 6 months following the second injection.

Final results following additional procedures

We report 27 patients (79.4%) with complete urinary continence following surgery, and the remaining 7 patients (20.6%) experiencing significant improvement of symptoms (Table IX).

Table IX - Final results following additional procedures

Results	Patients	Percentage
Success	27	79.4
Improved	7	20.6
Failures	0	0

DISCUSSION

Urinary incontinence is a world-wide problem, with millions of people throughout the world suffering from this inability to control the passing of urine. Of the four different types of urinary incontinence, stress urinary incontinence is considered to be the most common of all. With stress urinary incontinence, the urinary sphincters have become weakened, resulting in leakage of urine associated with physical exertion like coughing, sneezing, laughing, lifting and exercising.

Stress incontinence was demonstrated clinically in all our patients. An important aid to obtaining this physical sign was to instruct the patient to come well hydrated to the clinic, and to "hold their water" till seen. The presence or absence of stress urinary incontinence was assessed clinically with the labia parted and the patient coughing. This clinical test was repeated following surgery to assess the results of the surgery.

In our series, urodynamic assessments were performed pre-operatively in doubtful cases to rule out detrusor instability. Where stress incontinence was the sole complaint in the clinical presentation, we did not perform urodynamic studies.

De-Muylder and colleagues reported on a prospective series of 408 patients comparing clinical and urodynamic findings⁽⁵⁾. The symptoms of stress incontinence was a sensitive detector of genuine stress incontinence (94% sensitivity), but was not very specific (65%). The symptoms of urgency and urge incontinence had limited sensitivity (62%) and specificity (47%) in the detection of detrusor instability. Even patients with isolated complaints of stress

incontinence have a 52% incidence of detrusor instability, while 76% of patients with a history of isolated urgency and urge incontinence had detrusor instability. The general consensus is that urodynamic evaluation is essential for patients who are being considered for surgery for stress incontinence.

In our series, the Burch colposuspension was performed via a Pfannenstiel incision. The bladder neck and urethra were dissected free. Three prolene 20 sutures were placed on either side of the urethra after taking single bites of the paravaginal tissue. Careful placement of the sutures was essential to avoid bow stringing of the sutures after they were tied. The sutures were suspended to the ileopectineal (Cooper's) ligament to elevate the bladder neck and the accompanying cystocele.

The Burch colposuspension was introduced by Burch in 1961 and 1968^(1,2). Eriksen et al reported on 86 women who underwent the Burch colposuspension with a 5-year follow-up⁽⁶⁾. They noted that stress urinary incontinence was cured in 71% of the women with a stable bladder pre-operatively, as compared to 57% of women with stress incontinence associated with bladder instability. At the end of 5 years, only 52% were completely dry, and 30% required further incontinence therapy. Lim and colleagues analysed 113 patients with genuine stress incontinence treated by Burch colposuspension⁽⁷⁾. The overall subjective success rate was 80%, with another 12% improved at 2 years. A 5-year long term questionnaire follow-up did not demonstrate marked changes in these figures.

The modified Pereyra and Stamey procedures are technically simpler operations, with needle suspension of the bladder neck. For the Stamey operation, we used a 15 degrees angled Stamey needle to place the sutures in the correct position. The original Dacron buttress as described by Stamey is not available in Singapore. In its place, we used a cut segment of a double-J stent, through which a prolene 1 suture was threaded. Earlier in the series, cystoscopy was performed after each needle passage to ensure that we avoided accidental puncture of the bladder. However, we found this was unnecessary, and our subsequent practice was to do a cystoscopy at the end of the procedure. Adequate elevation and closure of the bladder neck during suture tying over the rectus sheath was determined by the absence of incontinence during manual supra-pubic compression, with the bladder partially distended with water.

Kirby and Whiteway reported on 48 women who underwent endoscopic Stamey bladder neck suspension, with 75% of the women being completely cured⁽⁸⁾. Recurrent incontinence was experienced by 12 patients (25%). Jones and colleagues reported on 76 patients who underwent the Stamey operation with a mean follow-up period of 18.3 months⁽⁹⁾. Complete resolution of symptoms or a marked improvement in symptoms was noted in 86%. Patients with no history of previous pelvic surgery were all either cured or improved. All the failures (20%) occurred in the group of patients with previous pelvic surgery. Peattie reported poor results with the Stamey operation⁽¹⁰⁾. In his series of 44 elderly women, 27 patients still had objective symptoms of stress incontinence, and 15 patients had evidence of detrusor instability.

The original Pereyra operation was introduced in 1959, where wire sutures were used⁽⁴⁾. The technique underwent several modifications by Pereyra himself^(11,12), and subsequently Raz⁽¹³⁾. The modified Pereyra operation was largely similar to the Stamey procedure. The hallmark of this operation was the blunt dissection of the endopelvic fascia. The passage of the needle was guided by the presence of a

finger in the paraurethral space, thereby avoiding the bladder. A prolene 1 suture was used, and a helical stitch was placed onto the paraurethral fascia for anchorage. Adequate suspension was determined as in the Stamey procedure.

Kelly et al reported on 145 women who underwent the modified Pereyra bladder neck suspension, with a median follow-up period of 3.5 years⁽¹⁴⁾. Fifty-one percent of their patients reported no stress incontinence, while 76% reported that their sense of urinary control was better or much better. Karram and colleagues reviewed the outcome of 93 women who were treated by the modified Pereyra bladder neck suspension⁽¹⁵⁾. Overall, 82% of their patients were subjectively cured, while only 63% were objectively cured.

Mundy reported a trial comparing the Stamey bladder neck suspension with the Burch colposuspension in 51 women with genuine stress incontinence⁽¹⁶⁾. After one year, the subjective and objective cure rates were 89% and 73% respectively following the Burch colposuspension. This contrasted with 76% and 40% respectively for women who underwent the Stamey operation. Bergman and colleagues reported on 289 women who were randomised to three different operations - Burch colposuspension, modified Pereyra operation, and anterior colporrhaphy⁽¹⁷⁾. At 3 months, the cure rate was not statistically different between the three operations. However, at 12 months, the cure rates were 87%, 70% and 69% respectively ($p < 0.01$).

Weil and co-workers performed urodynamic assessments on 86 patients who underwent the Burch colposuspension, modified Pereyra operation and anterior colporrhaphy⁽¹⁸⁾. Their success rates were 91%, 50% and 57% respectively. Success was noted to be related to an increase in the pressure transmission ratio to the proximal urethra. Bhatia et al reported on 64 women who underwent the Burch colposuspension and the modified Pereyra operation⁽¹⁹⁾. They noted that the Burch procedure was superior in terms of improving pressure transmission to the proximal two-thirds of the urethra. The objective cure rate at 1 year was 98% versus 85%.

In our series, the Burch colposuspension gave uniformly good results, with all the patients being completely dry. It is indeed a tried and tested method which gives a good long-term success rate. Slightly better results were obtained with the Pereyra bladder neck suspension as opposed to the Stamey technique, with 70% of patients being completely dry, as compared with 60% via the Stamey operation. However, because of the small numbers in this series, the results were not statistically significant ($p = 0.32$, chi-square test).

A new treatment modality employed in the later part of this series was the use of endoscopic injection of Collagen. We used the Contigen Bard Collagen implant in 2 of our patients. The Collagen implant contains purified bovine dermal collagen fibres. This is injected via a urethroscope into the tissues around the external urinary sphincter.

Urinary continence is achieved by an increase in the resistance to urine flow. In 2 to 3 months, the bovine collagen is replaced by the body's natural collagen. In selected patients, endoscopic injection of Collagen appeared promising, and may be used as a salvage procedure should open surgery fail.

Kieswetter and colleagues reported the use of transurethral implantation of GAX collagen in 16 women and 2 men with stress incontinence⁽²⁰⁾. Fifteen women had several continence operations done previously. After 3 months, 8 patients were cured, 7 patients had improved, and 3 patients failed to respond. At 9 months, 7 patients were still continent, 8 had improved and 3 remained unchanged. One patient in the improved group had a reinjection at 18 months, and has been

continent since. Stricker and Haylen reviewed 50 women, with type 3 genuine stress incontinence and an average of 1.8 previous incontinence surgery, who were treated with cystoscopically controlled paraurethral (71%) and transurethral (29%) injection of Contigen collagen⁽²¹⁾. Top-up injections were used as required. After a mean follow-up period of 11 months, 42% were no longer incontinent, 40% improved and desired no further treatment, and 14% did not respond to treatment. Two patients were awaiting top-up injections. On the other hand, Beckingham et al reviewed the long-term follow-up of women who were treated with paraurethral Teflon injections for stress incontinence⁽²²⁾. Improvement of symptoms fell from 80% immediately after operation to 27% at 3 years. Because of the disappointing results they have abandoned this procedure for treatment of stress incontinence.

In a study on 145 women who underwent the modified Pereyra procedure, Kelly and co-workers noted that age, weight, parity and a history of previous anti-incontinence surgery had no significant impact on success rate⁽¹⁴⁾. Peattie and Stanton reported poor results with the Stamey operation in 44 elderly women, and do not recommend this operation in the elderly⁽¹⁰⁾. Lim and colleagues noted that previous incontinence surgery and higher parity produced statistically a greater number of failures among their 113 patients who underwent Burch colposuspension operations⁽⁷⁾. In our series there was no correlation between the results of surgery, and the age, parity and weight of our patients, although our failures were mainly in the heavier weight categories.

CONCLUSION

The various modalities of bladder neck suspension are tried and tested. The Burch colposuspension is still the "gold standard" operation for genuine stress incontinence. This has been demonstrated in comparative trials in various centres. The modified Pereyra and Stamey bladder neck suspension operations are technically simpler procedures, and gave us a success rate of 70% and 60% respectively. Due to less extensive surgery than the Burch colposuspension and a low complication rate, the modified Pereyra and Stamey operations are good alternative procedures. Endoscopic injection of Collagen is a new treatment modality, and our preliminary experience with this is encouraging. The only reservation is the high cost of the Collagen. The durability of this modality of treatment awaits further follow-up, as the success rate for any incontinence procedure is usually inversely proportional to the duration of follow-up.

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