

Does the Burch colposuspension still have a place in modern gynaecology?

PF Kruger¹, S Jeffery²

¹Subspec Urogynaecology, University of Toronto, Toronto, Canada

²Subspec Urogynaecology, Department of Urogynaecology, University of Cape Town, Cape Town, South Africa

Abstract

Stress urinary incontinence has a prevalence of up to 50%. The open Burch colposuspension was first described in 1961. This procedure proved to be very effective in the treatment of genuine stress urinary incontinence and it remained the gold standard until the advent of the midurethral sling in 1995. Although the laparoscopic Burch was also introduced in the early 1990's the midurethral sling gained rapid traction due to the minimally invasive nature, ease of use, decreased operating time and excellent short and long term results. With the passage of time several studies have highlighted the potential complications associated with the use of vaginal mesh. The public's perception on the use of vaginal mesh has shifted the attention back to non-mesh options in the treatment of genuine stress incontinence. The aim of this article is to clarify the role of the Burch colposuspension in the era of the midurethral sling. The review will highlight the efficacy of the open versus the laparoscopic Burch, discuss potential complications associated with this technique and also compare the laparoscopic Burch directly with the transvaginal and transobturator midurethral slings. The selection of patients and surgical technique for the laparoscopic Burch are also discussed. The Burch procedure remains an excellent choice for the treatment of genuine stress urinary incontinence in patients who wish to avoid the use of vaginal mesh.

Keywords: Stress urinary incontinence; Burch colposuspension; Midurethral slings

Introduction

In the past 20 years we have seen a rapid evolution in the surgical management of stress urinary incontinence (SUI) in women. For many years the Burch colposuspension was the standard surgical option for women with SUI but it has been replaced by the synthetic slings in almost every part of the world. The Burch operation remains an excellent option that is effective and associated with relatively few complications. While it is technically more difficult to perform, it has the major advantage that it does not make use of a synthetic material. In July 2011 the FDA released a statement warning clinicians about the risks of synthetic mesh products in pelvic organ prolapse surgery.¹ This had a profound impact on the use of these devices in vaginal reconstructive procedures. While this warning was specifically aimed at the issues with mesh in prolapse surgery including pain, exposure and visceral organ damage, it created a media

storm that also impacted on the patients' perceptions of the synthetic sling devices. There remains a plethora of efficacy and safety data supporting the use of mid-urethral slings and most expert pelvic floor surgeons feel that these are now the gold standard. A minority of women, however, have become uncomfortable with mesh products, including the mid-urethral slings.

Urinary incontinence is a common problem and has been shown to have a prevalence of up to 50% among community dwelling women. There is also evidence to show that the majority of this population suffer from stress incontinence.² The International Continence Society defines stress urinary incontinence as the involuntary leakage of urine on effort or exertion, or on sneezing and coughing. Surgical treatment for stress urinary incontinence has been described for over a century and can be divided into 6 main groups:

- 1) Kelly plication sutures
- 2) Needle suspensions
- 3) Retropubic procedures
- 4) Synthetic sling procedures,
- 5) Bulking agents
- 6) Artificial sphincters

Correspondence

Pieter F Kruger

email: pkruger@urogynaecology.co.za

Stephen Jeffery

email: sjeffery@urogynaecology.co.za or stephen.jeffery@uct.ac.za

It is clear from a broad range of studies on these different methods that the first 2 procedures are unsuitable as a primary approach for stress incontinence due to poor long term outcomes.³

The open Burch procedure for SUI was originally described in 1961 and it was a major advance in the treatment of SUI.⁴ For the next 44 years it remained the gold standard. The landscape changed dramatically when the midurethral TVT sling was developed by Ulmsten and Petros and their results were published in 1995. The popularity of this novel technique quickly gained momentum due to the uncomplicated nature of the procedure, shorter operating time, minimal invasiveness and lower morbidity. The retropubic passage of the TVT was however associated with a risk of bladder, bowel and major vessel injury.^{5,6}

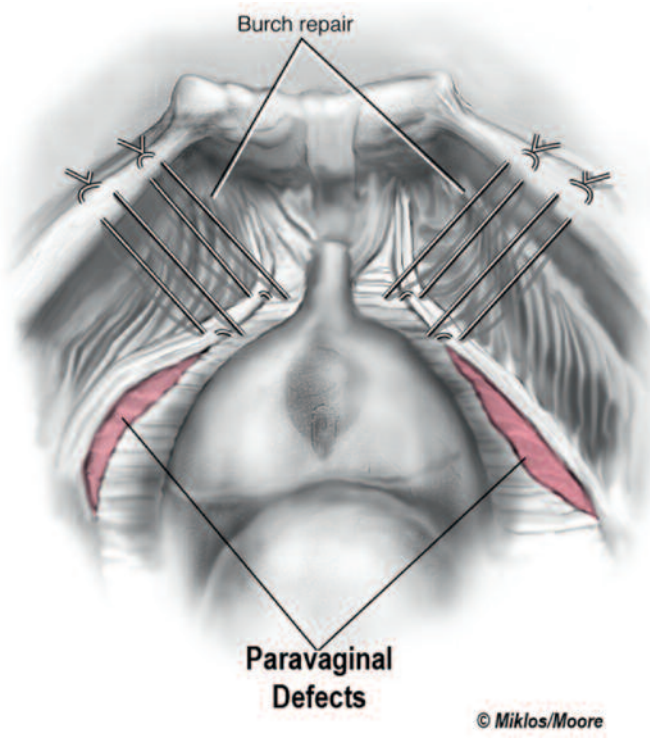
This then led to the introduction of the transobturator tape and mini slings which added to the momentum of the new approach using synthetic tapes.⁷ The popularity of the midurethral slings revolutionized the surgical management of SUI and most authors now agree that the midurethral sling is the gold standard for the treatment of SUI.⁶

This aim of this article is to clarify the role of the Burch colposuspension in modern gynaecology.

Background

J.C. Burch's original publication described the surgical method of suturing the periurethral tissue to Cooper's (Ileopectineal) ligament. (See Figure 1) This modification of the Marshall Marshetti Krantz (MMK) procedure was developed after a specific patient had a lack of retropubic periosteum needed for anchoring of the periurethral tissue.

Figure 1: "Burch for stress urinary incontinence." Miklos and Moore; Web; 25 July 2015
(Reproduced with the authors' permission)



The original paper described the use of three pairs of periurethral sutures anchored to the ipsilateral Cooper's ligament therefore stabilizing the vesicourethral junction in the retropubic space.⁴ Tanagho described his modification where only 2 pairs of periurethral sutures were placed more lateral and with less tension.⁸ He commented that two fingers should be placed between the urethra and pubic symphysis so that the periurethral tissue is not in direct contact with Cooper's ligament, resulting in less tension on the vesico-urethral junction. This variation of the Burch colposuspension is important as patients experience similar successes after this procedure with less chance of voiding dysfunction by avoiding over elevation of the bladder neck and compression of the urethra. When reviewing the literature on Burch colposuspension it is critical to understand the specific technique that was used and the amount of elevation of the anterior vaginal wall.⁹

Overall Efficacy of the Burch Colposuspension

When considering efficacy, there is no doubt that the Burch operation is an excellent option for stress incontinence and this has been extensively shown in a large number of trials. This efficacy also appears to be sustained with long term follow up. A systematic review on the long term effectiveness of the open colposuspension was first published by Lapitan in 2003. The last update on this review in 2012 included 5244 patients in 53 randomized and quasi-randomized trials. The review demonstrated a 1 year cure rate of 85 - 90% and a 5 year cure rate of 70%.¹⁰

Complications

The main issue with the Burch procedure is that it requires an abdominal approach with a retropubic dissection. The complications specific to the Burch colposuspension include urinary tract injury, urinary retention, voiding dysfunction, de novo urgency and pelvic organ prolapse.

The consequences of urinary tract injury can be minimized by routine intra-operative cystoscopy. By doing a cystoscopy at the time of a Burch procedure it is possible to rule out bladder injury and confirm patency of the ureters. The incidence of voiding dysfunction, urinary retention and de novo urgency can be reduced by following the principles of the Tanagho modification and this includes lateralizing and stabilizing the periurethral sutures to Cooper's ligament.

The third and most important principle is not to over tighten the sutures. The suspension sutures should be secured in a bridging fashion with approximately 2 fingerbreadths between Cooper's ligament and the periurethral tissue. There is an increased risk of developing pelvic organ prolapse following a Burch procedure, specifically enterocele formation (3-17%). This finding is not fully understood but some authors suggest that it is due to exposure of the anterior vagina to pressures of the abdominal cavity or an inherent weakness of connective tissue in the specific individual.¹¹

Good quality data suggest that, overall, the Burch colposuspension does not carry an increased surgical complication rate compared to other surgical options for stress urinary incontinence.¹⁰

Laparoscopic vs Open Burch

The first laparoscopic bladder neck suspension was performed by Vancaille and Schuessler in 1991.¹² As with other laparoscopic procedures the benefits include less pain, decreased morbidity, shorter hospital stay and earlier return to daily activities.

A meta-analysis by Tan et al in 2007 on this topic included 16 trials and 1807 patients. Patients were followed over a two year period. Subjective and objective cure rates were similar over a two year follow up with significant reduction in hospital stay and earlier return to work.¹² One of the major reasons the mid-urethral sling overtook the open Burch in the surgical management of stress incontinence was due to minimally invasive nature of this procedure. At that time the laparoscopic Burch was still in its infancy.

Laparoscopic Burch versus the Retropubic tape

The mid-urethral slings have the overwhelming advantage of being less invasive procedures. The laparoscopic approach brought the minimally invasive approach to the Burch colposuspension. The question of whether the retropubic tape or laparoscopic Burch is better was answered in a systematic review by Dean et al. They included 7 trials with 554 patients and showed no statistical difference in subjective cure rate at 18 months. The objective cure rate, however was statistically higher for mid-urethral slings (RR 1.16, 95% CI 1.07 -1.25). It is important to note that there were no significant differences between the two procedures with regard to peri-operative complications, de novo urgency, voiding dysfunction, procedural costs and quality of life scores. The TVT procedure, did however, have shorter operating times and a shorter hospital stay.¹³

Laparoscopic Burch vs Transobturator tape

There is a paucity of good quality research that compares the laparoscopic Burch to the TOT procedure and there are currently no published randomised controlled trials addressing this subject. Ascioglu et al have reported the findings of a retrospective review that included 770 patients and found the 5 year objective cure rates to be comparable in the 2 groups (73.9 vs 77.5%). Operative time and length of stay was significantly higher in the Burch group and there were more complications in the laparoscopic Burch group including more voiding dysfunction and de novo urge.¹⁴

Surgical trends

The efficacy and ease of use of the midurethral slings caused a paradigm shift in the primary surgical treatment of stress urinary incontinence and most authors agree that the midurethral sling became the new gold standard soon after the turn of the millennium.^{6,15} As 5 and 10 year data on these devices have accumulated, a unique set of complications has emerged and these are mostly related to the use of mesh in the vagina. These adverse events included groin pain, dyspareunia, mesh erosion and to a lesser extent infection. These problems are often extremely difficult to manage and this has led to a few highly publicized medico-legal trials. This has, in turn resulted in a negative awareness within the public concerning the use of any type of vaginal mesh, including the mid-urethral slings.¹⁶

Selecting patients

The laparoscopic Burch procedure is best suited for patients with pure stress urinary incontinence.¹⁷ The procedure can be considered in patients with mixed urinary incontinence, although worsening of the urge component may be experienced and thorough pre-operative counseling is of utmost importance.

In our practice we will consider the use of the laparoscopic Burch procedure in two common clinical scenarios: The first is in patients undergoing a primary procedure for pure stress incontinence who are opposed to the use of a synthetic mesh sling device. The number of women who are reluctant to have a synthetic material placed to address their problem is growing and we believe this group of women would benefit substantially from a laparoscopic Burch colposuspension. The second group includes those women who are undergoing a sacrocolpopexy with or without a history of stress incontinence. The performance of a colposuspension in these women was supported by a landmark randomized controlled trial that was published in 2006 by Brubaker et al that demonstrated the benefit of the addition of a Burch colposuspension at the time of an abdominal colposacropexy. None of the women in this study had stress incontinence prior to surgery but the woman randomized to the Burch colposuspension had significantly lower rates of stress incontinence after surgery compared to woman that did not receive this intervention (23.8 vs 44.1%).¹⁸

It is essential to note that women suffering from intrinsic sphincter deficiency are less likely to benefit from a Burch colposuspension.¹⁹ The elevation of the anterior vaginal wall over the urethra is integral in the success of the Burch colposuspension. A scarred vagina from previous surgery or radiation with shortening of the vagina and immobility of the anterior vaginal wall is therefore a major contra-indication to performing this procedure. Patients that demonstrate an immobile bladder neck on valsalva are also not good candidates for a Burch since minimal elevation of the anterior vaginal wall will be achieved with surgery.²⁰

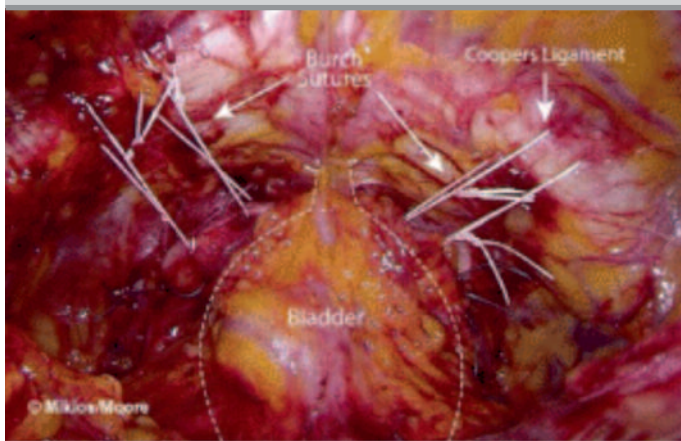
Patients should also be screened for voiding dysfunction, overflow incontinence and detrusor-sphincter-dyssnergia. These conditions are best excluded with careful history, physical and the addition of sophisticated urodynamics. Patients with findings on urodynamics of intrinsic sphincter deficiency, as defined by maximal urethral closure pressure of less than 20cm/H₂O or Valsalva leak point pressure of less than 60 cm/H₂O are better served with retropubic vaginal midurethral slings.²¹

Technical considerations*Surgical technique*

We use two 5/12 mm Versiports in the left and right lower quadrant. The space of Retzius is accessed through the intra-abdominal cavity. The peritoneal incision is made between the two medial umbilical ligaments 6cm above the pubic symphysis. A combination of blunt and sharp dissection is used to develop this space. Important landmarks are utilized to successfully navigate this space. They include the pubic symphysis and bilateral superior

pubic rami, bladder neck, obturator neurovascular bundle, Cooper's ligament and the arcus tendineus fascia pelvis. The vaginal assistant has his finger in the vagina to improve dissection to the level of the pubocervical fascia. Traction is also maintained on the Foley with a 30cc balloon to identify the bladder neck. Two pairs of Prolene 0 sutures on a MO6 needle are utilized. The first suture is placed 2cm lateral to the midurethra in a figure of 8 manner full thickness through the pubocervical fascia and then attached to Cooper's ligament. The second suture is placed 2cm lateral to the bladder neck. The sutures are tied down with extracorporeal Roder's knots. The sutures should be bridging to leave a gap of 2 finger breadths between the pubic symphysis and elevated vagina

Figure II: "Laparoscopic Burch for Stress urinary incontinence."
Miklos and Moore; Web; 25 July 2015
(Reproduced with the author's permission)



Our institution aims for a discharge on post-operative day 1. Due to the high rates of urinary retention in the post-operative period we place a suprapubic Banano catheter at the time of surgery. If patients fail their trial of void in hospital they will be discharged with the catheter in situ to measure their own trial of voids at home. Once the post void residuals are less than 150cc they make an appointment with the clinic to have the catheter removed. It is important to counsel patients in this regard and ensure they are confident about catheter management.

Conclusion

There is little doubt that the data support the mid-urethral slings as the gold standard in the surgical management of stress urinary incontinence. There is, however, a small place for the Burch procedure in modern practice. We live in an era where patients are acutely aware of current controversies surrounding treatment options due to media and the internet. The concept of shared care has come to the forefront over the last decade and the patient's role in the decision making process is essential. The Burch colposuspension remains a safe and effective alternative to the midurethral slings for the treatment of stress urinary incontinence and patients should be made aware of this non-mesh option.

References

1. Menchen LC, Wein AJ, Smith AL. An appraisal of the Food and Drug Administration warning on urogynecologic surgical mesh. *Curr Urol Rep* 2012;13:231-9.
2. Nambiar A, Cody JD, Jeffery ST. Single-incision sling operations for urinary incontinence in women. *Cochrane Database Syst Rev* 2014;6:CD008709.
3. Walters MD, Karram MM. *Urogynecology and reconstructive pelvic surgery*. 3rd ed. Philadelphia, PA: Mosby Elsevier; 2007.
4. Burch JC. Urethrovaginal fixation to Cooper's ligament for correction of stress incontinence, cystocele, and prolapse. *Am J Obstet Gynecol* 1961;81:281-90.
5. Petros PE, Ulmsten U. Urethral and bladder neck closure mechanisms. *Am J Obstet Gynecol* 1995;173:346-8.
6. Wu CJ, Tong YC, Hsiao SM, et al. The surgical trends and time-frame comparison of primary surgery for stress urinary incontinence, 2006-2010 vs 1997-2005: a population-based nation-wide follow-up descriptive study. *Int Urogynecol J* 2014;25:1683-91.
7. Delorme E. [Transobturator urethral suspension: mini-invasive procedure in the treatment of stress urinary incontinence in women]. *Prog Urol* 2001;11:1306-13.
8. Tanagho EA. Colpocystourethropey: the way we do it. *J Urol* 1976;116:751-3.
9. Cornella JL. Management of stress urinary incontinence. *Rev Urol* 2004;6 Suppl 5:S18-25.
10. Lapitan MC, Cody JD. Open retropubic colposuspension for urinary incontinence in women. *Cochrane Database Syst Rev* 2012;6:CD002912.
11. Green J, Herschorn S. The contemporary role of Burch colposuspension. *Curr Opin Urol* 2005;15:250-5.
12. Tan E, Tekkis PP, Comish J, Teoh TG, Darzi AW, Khullar V. Laparoscopic versus open colposuspension for urodynamic stress incontinence. *Neurourol Urodyn* 2007;26:158-69.
13. Dean N, Herbison P, Ellis G, Wilson D. Laparoscopic colposuspension and tension-free vaginal tape: a systematic review. *BJOG* 2006;113:1345-53.
14. Asicioglu O, Gungorduk K, Besimoglu B, et al. A 5-year follow-up study comparing Burch colposuspension and transobturator tape for the surgical treatment of stress urinary incontinence. *Int J Gynaecol Obstet* 2014;125:73-7.
15. Bemelmans BL, Chapple CR. Are slings now the gold standard treatment for the management of female urinary stress incontinence and if so which technique? *Curr Opin Urol* 2003;13:301-7.
16. Brown LK, Fenner DE, Berger MB, et al. Defining patients' knowledge and perceptions of vaginal mesh surgery. *Female Pelvic Med Reconstr Surg* 2013;19:282-7.
17. Burch JC. Cooper's ligament urethrovesical suspension for stress incontinence. Nine years' experience--results, complications, technique. *Am J Obstet Gynecol* 1968;100:764-74.
18. Brubaker L, Cundiff GW, Fine P, et al. Abdominal sacrocolpopexy with Burch colposuspension to reduce urinary stress incontinence. *N Engl J Med* 2006;354:1557-66.
19. Sand PK, Bowen LW, Panganiban R, Ostergard DR. The low pressure urethra as a factor in failed retropubic urethropey. *Obstet Gynecol* 1987;69:399-402.
20. Steel SA, Cox C, Stanton SL. Long-term follow-up of detrusor instability following the colposuspension operation. *Br J Urol* 1986;58:138-42.
21. Lovatsis D, Easton W, Wilkie D, Society of O, Gynaecologists of Canada Urogynaecology C. Guidelines for the evaluation and treatment of recurrent urinary incontinence following pelvic floor surgery. *J Obstet Gynaecol Can* 2010;32:893-904.