

Voiding Dysfunction after Minimally Invasive Surgery (TVT and TOT) for Treatment of Stress Urinary Incontinence

Thesis

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اضطرابات التبول بعد عملية الشريط المهبلي حر
التوتر (TVT) و عملية الشريط المهبلي المار بفتحة
عظمة الحوض (TOT) لعلاج حالات السلس البولي
الإجهادي

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Summary

In MUS (mid urethral sling procedures), the sling provides dynamic kinking of the urethra when abdominal pressures increase, while maintaining stability at the resting phase, consequently preventing urinary incontinence (*Choi and Lee, 2004*)

Urethral obstruction following anti-incontinence surgery often presents as urinary retention or obstructive voiding symptoms (hesitancy, incomplete bladder emptying, weak urinary stream, urinary straining), but many patients present primarily with irritative voiding symptoms (urgency, frequency, nocturia) and urge incontinence. Recurrent urinary tract infections may also point to occult outlet obstruction. Upon further evaluation, these patients usually demonstrate elevated post void residuals (*Goldman et al., 1999*).

Although the surgical procedures to correct SUI (stress urinary incontinence) have been reasonably successful, there are potential complications including persistent stress urinary incontinence, urethral erosion, de novo detrusor instability, and urethral obstruction (*Goldman et al., 1999*).

Tension-free vaginal tape (TVT), which is supposed not to cause obstruction because it ideally is placed tension free, is not immune from inducing iatrogenic urethral obstruction requiring tape division (*Romanzi and Blaivas, 2000; Choe, 2001*).

The obstruction then leads to obstructive and/or irritative voiding symptoms or urge incontinence. These symptoms can be very distressing to the patient, as she has now traded stress urinary incontinence for what many consider more problematic and unpredictable-urge incontinence. Thus, the patient should be informed preoperatively about the possible post-operative complications and the plan to treat them if the complications arise (*Goldman et al., 1999*).

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List of Abbreviations

ALPP	<i>Abdominal leak point pressure</i>
BMI	<i>Body mass index</i>
BMIs	<i>Body mass indices</i>
BOO	<i>Bladder outlet obstruction</i>
Cc	<i>Cubic centimeter</i>
Cm	<i>Centimeter</i>
DO	<i>Detrusal over activity</i>
DM	<i>Diabetes mellitus</i>
FL	<i>Functional length</i>
Fr	<i>French</i>
GSI	<i>Genuine strss incontinence)</i>
H	<i>Hour</i>
IEF	<i>Incontinence episode frequency</i>
ISD	<i>Intrinsic sphincteric deficiency</i>
ISO	<i>Intrinsic sphincter over activity</i>
LUTS	<i>Lomer urinary tract symptoms</i>
MCC	<i>Maximum cystometric capacity</i>
MCP	<i>Maximum closure pressure</i>
MFR	<i>Maximum flow rate</i>
MI	<i>Mixed incontinence</i>
ml/s	<i>Millileter/second</i>
Mucp	<i>Maximum urethral closure pressure</i>
MUI	<i>Mixed urinary incontinence</i>
MUS	<i>Mid urethral sling procedures</i>
Pdet	<i>Detrusal pressure</i>
PFR	<i>Peak flow rate</i>
PRAFAB	<i>Protection, Amount, Frequency, Adjustment and Body (or self) image) questionnaire</i>
PTR	<i>pressure transmission ratio</i>
PVR	<i>postvoid residual</i>

List of Abbreviations (Cont.)

Qmax	<i>Maximum flow rate</i>
RV	<i>Residual volume</i>
SPSS	<i>Statistical Package of Social Sciences</i>
SUI	<i>Stress urinary incontinence</i>
TOT	<i>Transe obturator tape</i>
TVT	<i>Tension free vaginal tape</i>
TVT-O	<i>Tension free vaginal tape obturator</i>
UD	<i>Urodynamic</i>
UI	<i>Urinary incontinence</i>
UPP	<i>Urethral pressure profilometry</i>
US	<i>United state</i>
UTIs	<i>Urinary tract infection</i>
UUI	<i>Urge urinary incontinence</i>
VLPP	<i>Valsalval leak point pressure</i>
Vs	<i>Versus</i>
Yr	<i>Year</i>

Introduction

Urinary incontinence is a health problem with a great impact on people's quality of life (*Torres-Zambrano et al., 2007*).

Urinary incontinence is defined by the International Continence Society (ICS) as any involuntary leakage of urine during increased abdominal pressure in the absence of detrusor contraction or an overdistended bladder (*Bulent Tiras et al., 2004*).

Treatment options include continence devices, fluid management, behavioural therapy, pessaries, pharmacotherapy, and surgery (*Brubaker, 2004*).

With advances in surgical techniques and in the safety of anaesthesia, women are more inclined to have surgical management of their stress urinary incontinence. (*Brubaker, 2004*).

There have been described many techniques for its treatment since Kelly and Dumm reported the results of urethra placcation in 1914 (*Tennstedt, 2005; Bai et al., 2005*), and urethral suspension such as the Burch colposuspension which was described by Burch in 1961 is the standard for managing stress incontinence (*Artibani, 2006 and Albright et al., 2006; Brubaker, 2004*).

However, such as slings, TVT and TOT are increasingly accepted due to their successful results and associated safety (*Morey et al., 2006*).

The new techniques for the surgical correction of stress urinary incontinence were developed according to the theory proposed by DeLancy in 1994, stating that an increase of the abdominal pressure lead to compression of the urethra against its natural anatomical supports ("hammock theory"), and the

position of pubo-urethral ligaments which presents like a kink in the mid-urethral position (the urethral knee) (*Mcguire and Lytton, 1978; delancey,1994*).

The TVT procedure was described in 1996, as an ambulatory procedure under local anesthesia and sedation, involving insertion of a polypropylene tape suburethrally (*ulmesten et al., 1996*).

The wide use of retro-pubic TVT has been associated with various peri-and post-operative complications including bladder perforation temporary or persistent retention, pain, urinary infection, and denovo instability (*Boustead, 2002*).

To avoid these complications, alternate approaches with transobturator passage of the tape has been introduced (*Delorme, 2001*).

Transobturator tape (TOT) is similar to TVT, but a different technique is used to insert the tape. It can be inserted under local, regional or general anaesthesia. A vaginal incision at the level of mid urethra and some paraurethral dissection is carried out, and then the tape is inserted through the obturator foramina: outside in or inside out. The tape is positioned without tension beneath the mid urethra (*De Leval J, 2003*).

Another minimally invasive procedure was introduced by Petros is the intra-vaginal slingoplasty (IVS) in the treatment of female urinary stress incontinence (*Biertho et al., 2004*).

There are significant factors determine the efficacy of the pubovaginal sling procedures (*Chan et al., 2000*), as the use of artificial materials have a high risk for developing urethral erosion (*Kassardijan, 2004*), and improper sling adjustment intra operative can result in post operative voiding dysfunction such as outflow obstruction and subsequent urinary retention, or detrusor instability and persistent urinary incontinence (*Ezzat, 2003*).

Aim of the Study

The aim of this study :

Is to evaluate the incidence of voiding dysfunction such as urgency, frequency, outflow obstruction, over active bladder, and non obstructive urinary retention and what are the causative and risk factors associated with its incidence? After two minimally invasive surgical procedures (TVT and TOT) used for treatment of stress urinary incontinence.

Chapter (1)

Female Urinary Incontinence

Urinary incontinence categorized as stress urinary incontinence (SUI), urge urinary incontinence (UUI) or mixed urinary incontinence (MUI) (*Abrams et al., 2003*).

It is highly prevalent chronic medical condition which has a known negative impact on quality of life in women. It can impact significantly on physical activities, confidence and self-perception and social activities (*Fultz et al., 2003*).

A large, population-based survey of American women aged 30-90 years reported that the prevalence of urinary incontinence was 45% overall, ranging from 28% among 30- to 39-year-olds to 55% among 80- 90 year olds (*Melville et al., 2005*).

Stress urinary incontinence (SUI) is defined as involuntary urine leakage on effort or exertion without rise in detrusor pressure (*Abrams et al., 2002*).

In a report; SUI is estimated to affect 78% of incontinent women with 29% complaining of SUI in combination with urge incontinence, and 49% complaining of pure SUI. Despite the prevalence of stress urinary incontinence and the significant impact that it can have on all domains of quality of life and personal relationships, it is estimated that only a third of women ever seek medical advice concerning their incontinence (*Hunskaar et al., 2004*).

Reasons for this reticence are varied and include embarrassment, lack of knowledge of available treatment options and the belief that incontinence is an inevitable consequence of childbirth or ageing. Unfortunately lack of awareness also exists amongst primary care physicians, with management often being

based purely on containment products. This has considerable economic considerations, with one study estimating pad costs in women with incontinence at US\$750 per woman per year (*Subak et al., 2006*).

Approximately 25% of premenopausal women and 40% of postmenopausal women report leakage of urine. Not all leakage is bothersome to patients; however, 10% of middle-aged women report daily incontinence, and one third report weekly incontinence (*Nygaard and Heit, 2004*).

Table (1): Types of Urinary Incontinence:

Stress	Involuntary leakage on effort or exertion, or on sneezing or coughing
Urge	Involuntary leakage accompanied by or immediately preceded by urgency
Mixed	Involuntary leakage associated with urgency and also with exertion, effort, sneezing, or coughing
Functional	Untimely urination because of physical disability, external obstacles, or problems in thinking or communicating that prevent a person from reaching a toilet
Overflow	Unexpected leakage of small amounts of urine because of an overfilled bladder
Transient	Leakage that occurs temporarily because of a condition or situation that will pass (eg, infection, medication)
Deformity	Fistula or developmental abnormality

(Abrams et al., 2005).

Risk factors of urinary incontinence:

After adjusting for the length of the second stage of delivery, episiotomy, vacuum extraction, fetal weight, and sphincter rupture, the risk of having stress incontinence 5 years postpartum was increased in women who developed stress incontinence during the first pregnancy and in women who developed stress incontinence during the first 6 weeks postpartum (*Viktrup and Lose, 2001*).

Increased parity also appears to be independently associated with increased risk of urinary incontinence (*Sampselle et al., 2002; Rortveit et al., 2001*).

Mode of delivery is associated with development of urinary incontinence (*Rortveit et al., 2003*). Age-adjusted analysis found that both cesarean sections and vaginal deliveries, compared with no deliveries, were associated with higher rates of stress incontinence and mixed incontinence. After adjustment for age, parity, years since last delivery, and body mass index, the risk of stress incontinence was higher with vaginal delivery than with cesarean delivery (*Rortveit et al., 2003*).

There was no difference in the rates of mixed incontinence between vaginal delivery and cesarean section, or in the risk of urge incontinence among nulliparous women, women who had cesarean delivery, and women who had vaginal delivery. This association between vaginal delivery and urinary incontinence has been supported by other trials (*Foldspang et al., 1999*).

The association between vaginal delivery and stress urinary incontinence was present regardless of the age of the patient at the time of childbirth. (*Kuh et al., 1999*).

Forceps delivery was associated with a higher risk of stress incontinence compared with spontaneous vaginal delivery (*Arya et al., 2001*).

Possible explanations for this relationship lie in pelvic floor denervation due to compression during pregnancy and delivery and stretching or tearing of pelvic floor connective tissue and musculature during pregnancy and delivery (*Farrell et al., 2001*).

A systematic review found that hysterectomy was associated with developing urinary incontinence in women aged 60 years or older but not in women younger than 60 years (*Brown et al., 2000*).

Recurrent urinary tract infection appears to be independently associated with urinary incontinence (*Van Oyen, 2002*). In another study, recurrent urinary tract infection was associated with urge incontinence and mixed incontinence but not with stress incontinence (*Brown et al., 1999*).

Urinary incontinence is independently associated with fecal incontinence (*Nelson et al., 2001*), which may be because both can be caused by the same process. Constipation and other bowel problems were also independently associated with urinary incontinence (*Nelson et al., 2001*). The relationship between constipation and urinary incontinence may also be bidirectional, and may be associated with pelvic organ prolapse (*Nelson et al., 2001*).

Several medications have been independently associated with urinary incontinence in women including: diuretics, estrogen (*Samuelsson et al., 2000*), benzodiazepines (*Landi et al., 2002*), tranquilizers, antidepressants, hypnotics, laxatives and antibiotics (*Finkelstein, 2002*).

A current or an ex-smoker may be independently associated with urinary incontinence (*Fultz et al., 1999*).