Long Term Efficacy Of Trans-Obturator Tape (TOT) For Treatment of Stress Urinary Incontinence

Thesis

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SUMMARY

Urinary incontinence is a common problem through the world, although it is not life threatening, it is very disturbing to the lives of the individuals and can have devastating effects, both socially and psychologically.In the UK. Alone, it has been estimated that there are more than 3.5 million sufferers ***(Abrams et al., 2002).***

According to the International continence society, Urinary incontinence defined "A condition in which involuntary loss of urine is a social or hygienic problem and objectively demonstrable" ***(Ranee et al., 2000, Abrams et al., 2003)***.

Stress urinary incontinence (SUI) has an observedprevalence of between 4% and 35% ***(Karl et al., 2004)***.

In genuine stress incontinence, the assumption is that the intrinsic structuresphincter itself is intact and normal. However, it loses efficiency because of excessive mobilityand loss of support. Thus the anatomic feature of genuine SUI is consistently that ofhypermobility or lowering of the position of the vesicourethral segment or a combination of twofactors. Numerous risk factors for SUI have been identified. Aging, obesity, and smoking appearto have consistent causal relationships with the condition, whereas the roles of pregnancy andchildbirth remain controversial ***(Karl et al., 2004).***

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consistent causal relationships with the condition, whereas the roles of pregnancy and childbirth remain controversial. Post menopausal atrophy also causes stress incontinence and urethral syndrome ***(Karl et al., 2004)***.

Although few young women report daily leakage, 10% of middle-aged women report daily or severe incontinence and one third report leakage at least weekly. In epidemiologic studies, incontinence peaks in old age. In women with incontinence, the rate of stress incontinence peaks between 45 and 49 years at about 65% and then slowly drifts downward ***(Hannestad et al., 2000)***.

It is not clear whether this is related to lower activity levels in older women or whether the increased rate of urge incontinence in older women makes stress incontinence symptoms harder to isolate. Approximately 1 in 4 women with urinary incontinence consult a health care professional for this condition; not surprisingly, as incontinence becomes more severe, women are more likely to seek advice ***(Hannestad et al., 2000).***

Treatment of SUI consists of conservative, pelvic floor muscle training (PFMT), pharmacologic treatment (Imipramine, Duloxetine, Estrogens). The principal treatment of SUI is proper suspension and support of the vesico-urethral segment in a normal position. There were

numerous approaches in the past to restore the normal position and providing adequate support, some vaginal and some supra-pubic. Then can tension free vaginal tape (TVT) in mid to late 1990s. But TVT was associated with vascular injuries and bowel perforations ***(Delorime et al., 2001)***.

In ***2001, Delorime et al.*** advocated the use of the trans-obturator route in order to avoid the complications associated with the retropubic route ***(Delorime et al., 2001)*** Insertion through the obturator and puborectalis muscles reproduces the natural suspension fascia of the urethra while preserving the retropubic space.

This approach has a theoretical advantage of less obstruction and postoperative voiding dysfunction, as well as avoiding some of the complications, such as bladder perforation and bowel perforation. Subsequently, deTayrac reported a 1-year cure rate of 84% with the TOT procedure ***(deTayrac et al., 2004)***.

Reports indicate that TOT provides high short-term cure rates, similar to those achieved with TVT ***(Delorime et al., 2004)***.

There were few post operative complications following TOT including de novo or worsening of

preexisting urgencies, perineal pain, de novo dyspareunia, and vaginal erosion ***(Isabelle et al., 2009).***

A recent review revealed the total reported complication rates ranging from 4.3% to 75.1% for TVT and from 10.5% to 31.3% for TOT ***(Daneshgari et al., 2008)***.

A study published by International Journal of Health Sciences stated that TOT Sling procedure is currently the Gold Standard for management of female SUI ***(Farhat et al., 2008)*** and many studies are being held to asses.

The TOT thus scores heavily over the TVT in avoiding these major issues.

AIM OF THE WORK

The aim of this study was to assess the long term efficacy and complications of Trans-Obturator Tape (TOT) for treatment of Stress Urinary Incontinence.

FUNCTIONAL ANATOMY OF THE LOWER URINARY TRACT

Introduction

The functional anatomy of the urinary organs encompasses:

- the urethra, which conducts urine from the bladder to the exterior
- the bladder, which temporarily stores and expels urine
- the ureters, which convey urine from the kidneys.

The endopelvic fascia, ligaments, and the pelvic muscles support the pelvic organs and play an important role in the maintenance of continence and the prevention of prolapse. An understanding of the normal anatomy and function of these structures is integral in the diagnosis and management of disorders of the urinary tract and pelvic floor ***(De Souza and Dwyer, 2007)***.

Urethra

The female urethra is a fibromuscular tube that is approximately 4 cm long and 6 mm in diameter, with its axis parallel to the vagina (Figure 1). The vagina supports the urethra posteriorly and is fused with it at the distal third. The external urethral orifice is an anteroposterior slit that is located in the vestibule of the vagina and approximately2 cm below the glans clitoris. The internal urethral orifice isfound at the junction of the urethra and the bladder and

lies approximately opposite the middle of the symphysis pubis ***(Dyson, 2008)***.

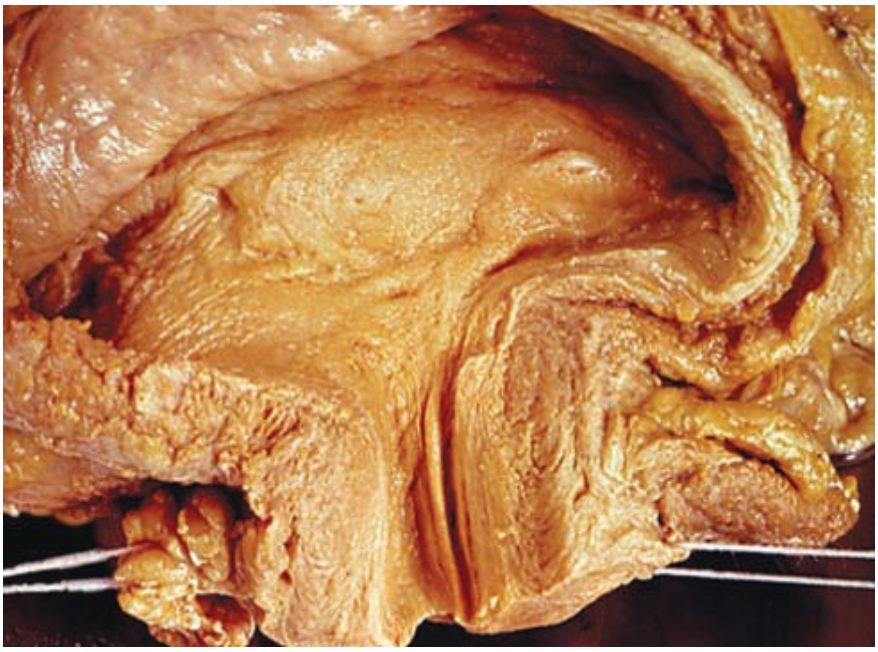

Figure 1: Female urethra and bladder opened anteriorly to demonstrate the posterior urethra and urethral crest, and the trigone ***(Gosling et al., 1983)***.

The pubourethral ligaments extend from the inferoposterior aspect of the symphysis pubis to the junction of the middle and upper third of the urethra and firmly support it anteriorly. These ligaments contain fibers of the bladder detrusor muscle and assist in maintaining the urethra's stability during micturition when the detrusor contracts. The most medial fibers of the pubococcygeus muscle support the urethra laterally. These muscle fibers do not attach to the urethra but insert into the lateral walls of the vagina and are known as the sphincter vaginae. These fibers increase urethral resistance, thereby contributing to continence ***(Zacharin, 1998)***.

The wall of the urethra consists of an inner mucous membrane and an outer muscle layer. The epithelium at the external urethral meatus is keratinized stratified squamous epithelium and is continuous with the skin of the vestibule. Passage through the urethra reveals the longitudinal folds of mucous membrane lining, which are non- keratinized stratified squamous epithelium and its supporting lamina propria (Figure 2). As one moves proximally, the urothelium changes from stratified squamous (Figure 3) to transitional in the urethra (Figure 4), although the stratified squamous epithelium may extend onto the trigone of the bladder ***(Zacharin, 1998)***.

The muscular wall of the urethra is made up of an outer striated muscle, which forms the urogenital sphincter muscle, and an inner smooth muscle layer. The striated urethral sphincter muscle has two components: namely, acircular proximal layer, which is sometimes deficient posteriorly (urethral sphincter), and a distal portion of two overarching circular striated muscles which lies next to the perineal membrane and is called the compressor urethra and the urethrovaginal sphincter. The external sphincter muscle fibers are all slow twitch, and can exert tone over prolonged periods. The muscular fibers of the urogenital sphincter muscles are anatomically separate from the adjacent pubococcygeus muscle which assists with urethral support ***(Oelrich, 2003)***.

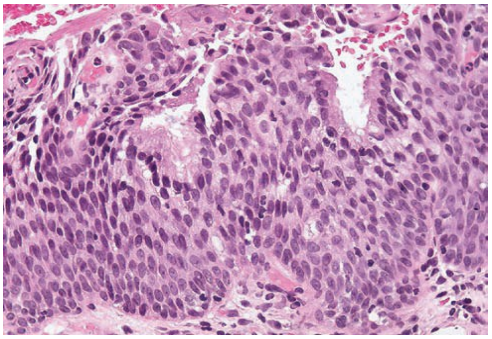

Figure 2:
Pseudostratified mucosa seen overlying urethral glands in the distal urethra.

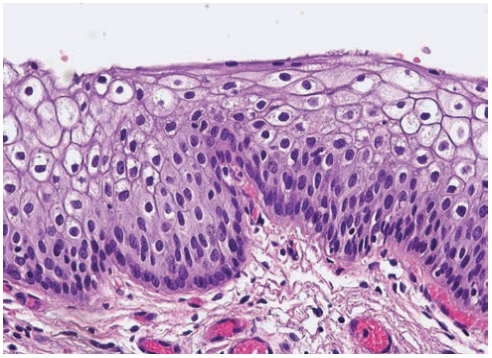

Figure 3:
Histology of normal squamous mucosa frequently found in bladder trigone, urethra, vestibule, vagina and cervix.

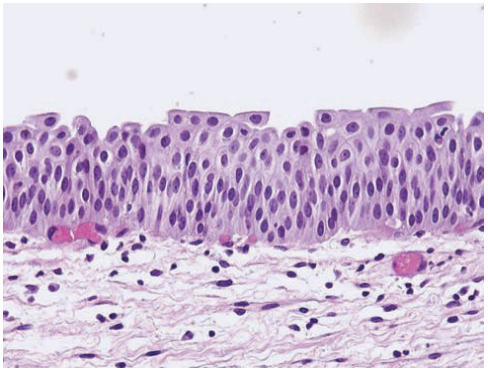

Figure 4:
Normal transitional mucosa (present in renal pelvis, ureter, bladder, and urethra), with lamina propria containing numerous thin-walled veins.

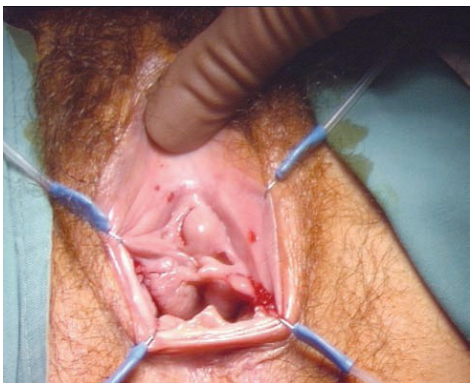

Figure 5:
Paraurethral Skene's abscess.

Nerve supply of the urethra and the pelvic floor

The urethra obtains its nerve supply from both the autonomic and somatic nervous systems. The parasympathetic system is dominant during urine storage and the sympathetic system during urine evacuation ***(Dwyer, 2007)***.

The external urethral sphincter (outer striated muscle) has motor cell bodies which lie in the intermediolateral columns of S2, S3 and S4 of the spinal cord. Parasympathetic fibers travelling from these motor cell bodies via the pelvic splanchnic nerves stimulate sphincter contraction resulting in urethral occlusion. Additional somatic motor fibers from the perineal branch of the pudendal nerve (S4) provide supply to the sphincter urethrae ***(Sinnatanby, 2006)***.

The nerve supply to the smooth muscle of the urethra is divided into proximal and distal. The smaller proximal region is supplied by the sacral sympathetic trunks via the superior and inferior hypogastric plexuses. This motor nerve supply is continuous with the smooth muscle of the bladder neck and fibers of the superficial trigonal muscle. The remaining majority of the smooth muscle of the urethra is innervated by the parasympathetic nerves which also supply the detrusor muscle ***(Sinnatanby, 2006)***.

The dorsal nerve of the clitoris is the terminal branch of the pudendal nerve which crosses the infrapubic canal and supplies the sensory innervation to the clitoral area ***(Schraffordt et al., 2004)***.

Figure 6: Left hemipelvis.

Bladder Anatomy

The bladder is a reservoir for urine and therefore varies in size, shape, and location according to its capacity and that of the nearby structures. When empty, the bladder is located in the lesser pelvis lying posterosuperiorly to the pubic bones and separated from them by the retropubic space. The bladder is mobile in the extraperitoneal subcutaneous fatty tissue, except the bladder neck, which is held in place by the pubovesical ligaments. The pubovesical ligaments are the superior portions of the pubourethral ligaments and, along with the levator ani and the vagina, are the main supports of the bladder ***(Dyson, 2008)***.

As distention with urine occurs, the bladder extends anterosuperiorly into the greater pelvis and abdominal cavity. The bladder is tetrahedral in shape, with an apex, base, and neck, and has a superior and two inferolateral surfaces. The apex of the bladder is the anterior end, and