

The benefit of early mobilisation of tension-free vaginal tape in the treatment of post-operative voiding dysfunction

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Abstract

Introduction and hypothesis The aim of this study was to assess the outcome of early mobilisation of tension-free vaginal tape (TVT) in cases of post-operative voiding dysfunction.

Methods Thirty-three consecutive cases of early mobilisation of TVT to treat post-operative voiding dysfunction were analysed retrospectively. In each case, the TVT was mobilised and loosened without dividing it, under general anaesthesia, within 2 weeks after the original procedure.

Results Voiding function subsequently returned to normal in 29 out of 33 women with no recurrence of original stress incontinence. The four remaining women had the tape divided.

Conclusions The study shows that early mobilisation of the TVT allows rapid resolution of post-operative voiding dysfunction without compromising the outcome of the original continence procedure.

Keywords Tension-free vaginal tape · TVT division · Urethral dilatation · Urethrotomy · Urodynamic stress incontinence · Voiding dysfunction

Introduction

Management of urinary stress incontinence has been revolutionised by the introduction of the tension-free vaginal tape (TVT) in 1996. This has now replaced the Burch colposuspension as the “gold standard” treatment because it achieves the same long-term outcome with fewer complications and a much quicker recovery time [1–3].

The most frequent complication seen with TVT is post-operative voiding dysfunction. This presents either as complete urinary retention or as poor voiding with high residual volumes. The incidence of voiding dysfunction following TVT insertion is difficult to determine and varies according to definition; it has been reported as occurring in 1.6% to 26% of cases [4–7]. The literature contains no standard definition for post-operative voiding dysfunction, which probably explains the substantial variation in reported rates.

The problem is managed conservatively by draining the bladder, either with an indwelling urethral or suprapubic catheter or by clean intermittent self-catheterisation (ISC). Early studies have shown that a substantial proportion of women (up to 8%) still needed to perform ISC on a daily basis 6 months after surgery [7]. In this group of patients, the subsequent options are either tape division or long-term ISC. However, after division of the TVT tape, stress incontinence has been reported to return in up to 50% of patients [8, 9].

We report the results of a substantial case series describing the clinical experience of early mobilisation and loosening of the TVT, without division of the tape, in cases of post-operative voiding dysfunction.

Methods

A retrospective analysis of consecutive cases of early mobilisation of TVT (Ethicon) for treatment of post-

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operative voiding dysfunction was performed. The study was conducted on patients treated at two sites, the John Radcliffe Hospital in Oxford and Stoke Mandeville Hospital during 2004–2008. The cases were identified from the electronic records of theatre procedures, looking for the total number of TVT procedures performed and the number of TVT mobilisations over the same period. The medical records of all women who had mobilisation of TVT were reviewed.

All the women had preoperative urodynamic testing, revealing stress incontinence in 27 cases and mixed stress incontinence/detrusor overactivity in six. The mean flow-rate on voiding cystometry was 22 ml/s (range 5–35 ml/s). On uroflowmetry, out of the 33 women studied, eight had reduced maximum flow rates of less than 15 ml/s with prolonged voiding time.

Most of the TVT procedures were undertaken as day cases. In Stoke Mandeville, insertion of the TVT was performed under local anaesthesia with sedation, and a “cough test” was used to determine the optimal tape tension. The tension in the tape was adjusted to allow a small amount of urine to escape with coughing, in the belief that further tape tightening occurs post-operatively. In Oxford, all procedures were performed under general anaesthesia and the tape was deliberately left loose with a gap of about 5 mm between the tape and the urethra, as it was not intended to produce continence on the operating table. The Foley catheter was removed before the patient left the theatre, unless bladder perforation had occurred, in which case it was left in overnight. Once spontaneous voiding occurred, a bladder scanner was used to measure the post-void residual urine volume after the first and second voids. Residual urine volumes below 150 ml were considered to be normal and the women were allowed to go home. If the residual volumes were between 150 and 300 ml, we continued monitoring until they were below 150 ml. If they were over 300 ml, the women were given the choice of learning ISC or having an indwelling catheter placed overnight and then undergoing a trial without the catheter the next day, going on to ISC if this failed. Those choosing ISC were taught to perform clean intermittent self catheterisations between one and four times per day, depending on the severity of the problem, until their residual urine volumes were less than 100 ml. Women who went home performing ISC were followed up by telephone by a urogynaecology clinical nurse-specialist.

Women still requiring catheterisation by day 7 after surgery were offered mobilisation of the tape. This was carried out under general anaesthesia. The sub-urethral vaginal incision was re-opened, and the tape was identified. The tape was then pulled downwards by inserting McIndoe’s scissors between the tape and urethra, releasing it from the tissues and leaving a space of approximately 5 mm

between the tape and urethra. The incision was then closed and the patient managed post-operatively in the same manner as after a primary TVT procedure. The post-operative bladder care was as described above.

Results

In total, 921 women underwent insertion of a TVT for treatment of urinary stress incontinence (763 women in John Radcliffe Hospital Oxford from January 2004 to July 2008 and 158 women in Stoke Mandeville Hospital from January 2004 to December 2005). Thirty-three women out of the 921 (3.5%) developed voiding dysfunction still requiring catheterisation after 7 days and underwent TVT mobilisation. These women formed the study group.

The rate of voiding dysfunction was 5.7% (nine out of 158) in the Stoke Mandeville group, where the “cough test” was used during TVT insertion to determine the optimal tape tension, and 3.1% (24 out of 763) in the Oxford group, where the tape was left loose under the urethra. The difference between the two groups in rate of post-operative voiding dysfunction is not significant statistically, due to small sample size. The median time from initial surgery to mobilisation of the TVT was 7.7 days. One woman went into complete urinary retention following surgery and requested early mobilisation on day 3. During the mobilisation procedure, it was found in all cases that the tape had retracted around the urethra and was causing an obvious obstruction.

There were no intra- or post-operative complications during the TVT mobilisations and voiding immediately returned to normal in 29 out of the 33 women with no recurrence of the original stress incontinence. The four women, in whom voiding function did not return to normal, had no discernable characteristics in common and went on to have their tape divided 4 to 8 months later. In all four women, voiding returned to normal after division of the tape but one developed recurrent stress incontinence and subsequently had a transobturator tape (TVT-O, Ethicon) procedure.

Discussion

Voiding dysfunction due to bladder outlet obstruction is the commonest complication of incontinence surgery and represents a major problem for the affected women with significant impact on the quality of their lives [10]. Chronic bladder outlet obstruction can cause detrusor overactivity with frequency, urgency, urge incontinence and possibly irreversible detrusor hypertrophy [11]. De novo detrusor over-activity has been reported in up to 18.5% of women having Burch colposuspension, which is thought to be due

to the obstructive nature of this procedure [12]. The TVT procedure is designed to be tension free. It creates a dynamic kinking at the level of the mid-urethra without compressing the urethra at rest, thereby diminishing the obstructive nature of the sling procedure [13]. However, as with all slings, surgical correction of stress incontinence can be associated with persistent voiding dysfunction.

In Oxford, a modified technique for TVT insertion is used. Instead of employing a “cough test” to determine the optimal tape tension, as originally described by Ulmsten et al., the tape is left deliberately loose under the urethra with a gap of about 5 mm between the tape and the urethra. This modified technique allows true tension-free placement of the tape and thereby decreases the rate of post-operative voiding dysfunction, while at the same time maintaining an excellent cure rate [14]. Nevertheless, even when tape was left deliberately loose, voiding problems occurred in 3.1% (24/763, Oxford group). In all the women in this study who underwent mobilisation and loosening of the TVT, the tape was found to be tight around the urethra and was causing an obvious obstruction. This could have been caused by inadvertently leaving the tape too tight in a small proportion of TVT operations; alternatively, it could have resulted from post-operative retraction and shrinkage of the tape, as experimental studies have shown that polypropylene mesh can shrink by up to 20% *in vivo* [15].

The management of post-operative voiding dysfunction is highly variable in the gynecologic community. Indwelling urethral or suprapubic catheters are often used for bladder draining. However, prolonged catheterisation is associated with an increased incidence of urinary tract infection. The risk of acquiring bacteruria is directly related to the duration of catheterisation and ranges from 4% to 7.5% per day over the first 10 days of catheterisation [16]. Early clean ISC is associated with a lower degree of infectious morbidity. However, not all patients wish, or are able, to master this technique.

Urethral dilatation and urethrotomy have been reported to be effective in patients with voiding difficulty caused by urethral narrowing following continence procedures [4, 8]. In one study [17], 14 of 274 patients (5%) underwent one or more urethral dilatations between 2 days and 1 month after the TVT operation because of voiding dysfunction; four patients subsequently required tape division. Urethral dilatation was offered in early TVT experience by Walters and Barber [18] but was abandoned because of poor results. We are concerned that the technique of urethral dilatation, downward traction on the urethra and urethrotomy risk traumatising the urethra and producing scarring, which could exacerbate the obstruction. Furthermore, urethral trauma can predispose to subsequent urethral tape erosion.

Loosening the tape, by applying gentle downward traction with McIndoe’s scissors inserted between the tape and

urethra, is possible in the initial post-operative phase. Although pulling down on the tape inevitably causes some slight stretching of the sub-urethral portion of the tape, this also provides mobilisation and releases the tape from the surrounding tissues. Subsequently, fibroblasts invade the TVT mesh preventing later mobilisation [15]. In our experience, mobilisation becomes impossible after 2 weeks. The only option then is tape division which, although usually successful in resolving bladder outlet obstruction, can cause stress incontinence to recur in up to 50% of women [8, 9].

The technique of early tape mobilisation is not novel. However, few cases have previously been reported. Glavind et al. performed mobilisation of the tape within the first 3 weeks of insertion in five patients. All five patients were cured when the tape was pulled down and remained dry. The same paper describes division of the tape for treatment of prolonged voiding dysfunction, which cured the voiding difficulties but unfortunately lead to recurrent stress incontinence [19]. Our present study provides the first analysis of a substantial series of cases to assess the outcome of early mobilisation of tension-free vaginal tape for treatment of post-operative voiding dysfunction.

The main limitation of this study is that it is retrospective and observational in nature. However, it would be difficult to conduct a randomised controlled trial comparing different techniques in the management of post-operative voiding dysfunction, as the incidence of this problem is limited and a large number of subjects (possibly 300–400) would be required.

Conclusions

If chronic bladder-outlet obstruction is to be avoided, it is vital to manage post-operative voiding dysfunction proactively. When obstruction after TVT is clinically evident, early mobilisation and loosening of the tape within 2 weeks of its original insertion allows rapid resolution of voiding problems and, therefore, avoidance of long-term catheterisation. This is a simple and effective way of treating post-operative voiding dysfunction that does not appear to compromise the outcome of the original continence procedure.

Conflicts of interest None.

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