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CASE REPORT

Tension-free vaginal tape for stress incontinence in women with detrusor overactivity

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Abstract In this case report, we discuss two cases of the successful use of the tension-free vaginal tape (TVT) to treat women with detrusor overactivity (DO) but no evidence of urodynamic stress incontinence (USI). The use of the TVT for the treatment of DO has been evaluated in a small number of studies of women with mixed incontinence. There is no data in the literature concerning its use in women with DO only. Here, we briefly review the literature including the postulated mechanism by which stress leakage due to DO is cured by the TVT.

Keywords Tension-free vaginal tape · Detrusor overactivity · Urodynamics

Introduction

The TVT was first reported in 1996 as a minimally invasive treatment for USI [1]. Long-term studies showed an objective cure rate for USI of 90% [2]. Although there were studies examining the use of TVT in patients with mixed incontinence, there were no reports of its use in patients with urodynamic evidence of DO only. In the United Kingdom, the Royal College of Obstetrics and Gynaecologists (RCOG) recommend that all women have urodynamic studies before continence surgery [3]. On reviewing a database of 900 women undergoing the TVT operation at three hospitals, two women were identified as having a TVT with the only indication being DO. Here, we report these cases and briefly review the current literature.

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Case reports

Case 1

A 40 year old P1 (emergency Caesarean section for labour dystocia) nursery carer was referred to the urogynaecology clinic with a 2 year history of mixed incontinence. She described both stress and urge incontinence and frequency of micturition. On examination, there was no significant utero-vaginal prolapse and no pelvic masses. Cystometry showed no evidence of USI despite repetitive testing throughout the filling phase. DO was seen both spontaneously and with coughing. The maximum detrusor pressure reached 40 cm H_2O and was associated with leakage.

She failed to respond to the advice on fluid intake with formal physiotherapy and bladder drill. The patient took courses of tolterodine tartrate XL 4 mg daily and trospium chloride 20 mg b.i.d. She stopped the tolterodine due to anti-cholinergic side effects (headache and visual disturbance). Trospium improved her urgency and urge incontinence but had no effect on the stress incontinence symptoms. Repeat cystometry performed whilst the patient was taking trospium again failed to demonstrate USI despite repetitive coughing throughout the filling phase. There was persistent DO. Her voiding was unremarkable and she passed 573 ml with a maximum flow rate of 30 ml/s and a maximum detrusor pressure of 41 cm H_2O. She emptied her bladder completely. The TVT procedure was performed as described by Ulmsten et al. [1] but under spinal anaesthesia. The patient sustained a left sided bladder perforation. The catheter was left in place for 24 h. She

voided spontaneously with no residual and was discharged home on the second day after surgery.

At 3 months' follow-up, the patient's symptoms of stress leakage had completely resolved and the urgency symptoms continued to be controlled with trospium. The patient was seen for a separate gynaecological complaint (menorrhagia) 18 months later. She had stopped her trospium and the urgency had returned. There were no symptoms of stress incontinence. A cystoscopy performed at the time of a microwave endometrial ablation showed no abnormality of the bladder. She was started on solifenacin succinate 5 mg daily with good effect. Whilst on treatment, a repeat urodynamic test showed suppression of her unstable contractions, no evidence of USI and normal voiding (flow rate of 34 ml/s on a volume of 556 ml with a detrusor pressure of 30 cm H_2O).

Case 2

A 30 year old G4P3 patient was referred to the urogynaecology clinic with a 7 year history of mixed stress and urge incontinence. She also complained of vaginal prolapse symptoms. She had already been unsuccessfully treated with physiotherapy. Examination revealed a grade 2 cystocele and grade 1 rectocele (Baden Walker) with grade 2 uterine descent. Cystometry studies showed DO but no evidence of stress incontinence. She failed to respond to conservative treatments. Courses of tolterodine tartrate XL 4 mg and propiverine hydrochloride 15 mg b.i.d. failed to improve her symptoms.

In view of her debilitating stress incontinence symptoms, she was offered a TVT together with a vaginal hysterectomy, anterior and posterior repairs. At 3 months' follow-up, the stress leakage symptoms had resolved, although there was some persisting urgency, which was controlled with tolterodine. There was no recurrent prolapse.

Discussion

The TVT as described by Ulmsten et al. in 1996 has now largely replaced colposuspension as the primary surgical treatment for USI. Extensive data on the TVT procedure in the literature report a cure rate for stress incontinence of 66–90% [2, 4]. Studies looking at the effect of the TVT on DO are confined to a small number of papers examining the use of the procedure in women with mixed urinary incontinence. These studies show a subjective improvement in urgency symptoms in a proportion of patients with mixed incontinence undergoing TVT [5, 6]. There was one retrospective cohort study demonstrating a 47% objective cure rate for DO in patients undergoing the TVT procedure for mixed incontinence [7]. There is also evidence that co-existing DO is associated with failed surgery for stress incontinence [8].

The successful use of the TVT procedure in women with stress leakage symptoms but no urodynamic evidence of stress incontinence was not reported in the literature. The postulated method by which the TVT cures stress incontinence is based on the theory that stress incontinence arises due to pubo-urethral ligament (PUL) and bladder neck/urethral closure dysfunction. Surgical correction thus requires the placing of a sling around the mid-urethra at the PUL insertions [9]. DO was shown to cause urethral relaxation during bladder filling [10, 11]. This may be the reason why some women with DO complain of the symptom of stress incontinence. Women with USI do not exhibit any such urethral relaxation. The TVT probably works by providing a fulcrum around which the urethra kinks [12]. In women with DO, this mechanism may counteract the urethral relaxation caused by the DO and hence the symptom of stress incontinence is cured. In the two patients discussed here, it is interesting to note that the urgency symptoms persisted post-operatively despite resolution of the stress leakage. This would be in keeping with the above theory, as the underlying DO remains untreated.

The two cases discussed in this report raise interesting questions about the use of urodynamics before continence surgery. The RCOG currently recommends that women undergoing surgery for USI should have urodynamic investigations pre-operatively [3]. This is mainly because it was shown that there are improved success rates for interventions when directed by urodynamic studies rather than symptoms alone [13]. It is also well-known that discrepancies can exist between patient symptoms and the findings of urodynamic investigations [14]. However, there is currently no randomised control trial evidence to support the mandatory use of pre-operative urodynamic studies in patients undergoing urogynaecological surgery. Despite this, it must be acknowledged that pre-operative urodynamic assessment does, for the reasons discussed above, reflect current good practice in the United Kingdom. In a survey of sub-specialists in urogynaecology, 100% always perform urodynamic studies before continence surgery [15]. Studies, which have not included pre-operative urodynamic studies showed much lower cure rates when the TVT was performed in women with mixed incontinence [16]. Although in the cases discussed in this report, the symptom of stress leakage was in fact due to DO and was effectively cured by the TVT procedure, the knowledge of the underlying pathophysiology offered valuable opportunity to attempt pharmacological treatment before eventual surgical management. The urodynamic result could represent a false negative—the patient did in fact have USI but the test merely failed to detect this. Whilst it is impossible to exclude this, it seems unlikely as stress leakage was not

demonstrated over two tests (case 1) with vigorous coughing with up to 573 ml in the bladder. Over the two tests, the patient (case 1) performed 12 sets of coughs. She performed a Valsalva generating a detrusor pressure of 60 cm H_2O on top of an overactive detrusor contraction of 40 cm H_2O. None of these measures provoked urinary loss.

The use of the TVT procedure in patients with mixed incontinence remains controversial, particularly due to a lack of randomised control trials. Its use in patients with stress leakage, but no evidence of USI is at the very limits of current knowledge regarding indications for TVT. These cases also raise interesting questions about the use of urodynamics before continence surgery. We would not recommend that the TVT operation be used routinely in women with DO. However, rarely, in carefully selected women who have failed to improve with conservative therapies, there may be some improvement in the symptom of stress incontinence if this is a debilitating symptom for the patient.

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