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## The catheter straight guide does not reduce the incidence of bladder penetration during TVT placement by the experienced surgeon

Published online: 13 December 2005  
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**Abstract** Tension-free vaginal tape (TVT) is a well-established surgical procedure for treating female urinary stress incontinence. The operation, described by Ulmsten et al. in 1995, is based on a midurethral Prolene tape support. TVT is accepted as an easy-to-learn and safe minimally invasive surgical technique. Bladder perforation with sling material was described as a complication of former surgical methods for correcting female urinary stress incontinence as well as of TVT. The aim of this analysis was to determine whether the use of a straight inserter for identifying and displacing the bladder prior to inserting TVT needles reduces the occurrence of bladder penetration. Out of 524 patients undergoing TVT and followed for up to 68 months, 68 (13%) had TVT bladder penetrations, all of which were diagnosed and corrected during surgery. All but the last 50 patients had a straight inserter introduced during the procedure. The effect of this surgical step is estimated and discussed.

**Keywords** Bladder penetration · Catheter straight guide · TVT

[1–4]. Common complications of former operations for treating urinary stress incontinence, such as intraoperative blood loss and pelvic or abdominal organ injury, postoperative appearance of detrusor instability, sexual mechanical problems, and urethral erosion, are rare in the TVT era [1–3]. Bladder perforation is known to complicate all types of corrective female urinary incontinence surgery [5]. TVT-related bladder penetration is relatively frequent, up to 24% of cases [1–3, 6]. But being both easy to diagnose on cystoscopy and to correct by needle withdrawal and reinsertion, it is widely accepted as a mild surgical complication necessitating 24-h drainage only. No further surgical measures such as hemostasis or penetration site repair are usually needed. The patient's prognosis and the TVT procedure's therapeutic effect are not altered because of bladder penetration. Reported here is a series of 524 TVT patients in which bladder penetration occurred in 68 (13%). All but the last 50 patients had a straight inserter introduced prior to TVT needle insertion. The effect of this surgical measure for reducing the bladder penetration rate is addressed.

### Introduction

The tension-free vaginal tape (TVT) procedure for surgical correction of female urinary stress incontinence was described by Ulmsten et al. in 1995. Being a minimal invasive operation with a high success rate and a low complication rate, it has rapidly become popular since then

### Materials and methods

Patients diagnosed with urinary stress incontinence, both clinically and urodynamically, were referred for the TVT procedure. All of the procedures, except for the last 50, included straight inserter introduction into the Foley catheter prior to TVT needle insertion, according to Ulmsten et al.'s original description [1]. This is meant to permit identification of the urethra and bladder. Using the straight inserter, the surgeon displaces the bladder dorsolaterally, clearing the TVT needle route. With the last 50 patients undergoing TVT, a straight inserter was not used, and hydrodissection was not performed in the space of Retzius prior to needle insertion. All patients had diagnostic cystoscopy before the TVT needles were withdrawn in order to rule out bladder penetration. Bladder-penetrating needles were retrieved and reinserted, and cystoscopy was repeated to evaluate needle position, bladder damage, and bleeding.

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Findings were documented, and patients were followed for up to 68 months.

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## Results

From April 1998 through December 2003, 524 TVT procedures were performed. Of these, 298 patients (57%) had significant pelvic floor relaxation necessitating anterior and/or posterior colporrhaphy, and 39 (7%) had vaginal hysterectomy. Sixty-eight patients (13%) were diagnosed with at least one bladder-penetrating TVT needle. The bladder penetrations were recorded along with the progress of these patients' and were later retrieved from the filed data. In the first 50 operations, the penetration rate was 24% (12 patients). The last 50 nonteaching operations were performed without introducing a straight inserter. The penetration rate with this group was 6% (three patients). The 50 nonteaching operations immediately preceding these, having included introduction of the straight inserter, had a bladder penetration rate of 8% (four patients). None of the patients had significant bleeding, and neither hemostasis nor blood transfusion was needed. Bladder wall damages were minor in all of the patients, and no surgical intervention was required for repair.

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## Discussion

The TVT procedure, being a suburethral sling operation, carries the hazard of bladder penetration [1–3]. This complication, although relatively frequent, is widely accepted as a mild surgical complication because it necessitates only 24-h drainage and no further surgical measures for damage repair or bleeding control. Failure to detect and correct this operative complication may lead to dysuria and recurrent urinary tract infection, urinary calculi formation, and a reduced therapeutic success rate. Hence, as with other urinary incontinence corrective surgery techniques, diagnostic cystoscopy is mandatory during this procedure. This provides immediate recognition and correction of TVT bladder penetration, ensuring that this surgical complication is kept within acceptable limits. Reported here are 68 out of 524 TVT patients (13%) diagnosed and treated successfully for bladder penetration. A reduction in the penetration rate from 24% (12 patients) in the first 50

operated patients to 6% (three patients) in the last 50 operated patients indicates that the surgeon's experience may have a reductive influence on TVT bladder penetration. Ulmsten et al., in their original report of the TVT procedure, advocated introducing a straight inserter into the Foley catheter before placing the needle in order to reduce the bladder penetration rate. Although reasonable, this recommendation was never challenged. The data reported here place doubt on the necessity of this step when an experienced surgeon performs the TVT. Because this is a series study and the last 50 patients did not have the rigid catheter guide, the surgeon's learning curve might be a confounding variable responsible for the decline in the bladder penetration rate. Therefore, these data should be confirmed by a double-armed study before adopting a change in procedure.

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## Conclusions

The necessity of introducing a straight inserter into the Foley catheter for reducing the bladder penetration rate with TVT is addressed. Abandoning the rigid guide did not increase the bladder penetration rate when done after the surgeon's learning curve. This study places doubt on the necessity of this device for the experienced surgeon.

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