# Solifenacin in Women with De Novo Overactive Bladder after Tension-Free Obturator Vaginal Tape—Is it Effective?

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**Abbreviations and Acronyms**

DO = detrusor overactivity
MUS = mid urethral sling
OAB = overactive bladder
OABq-SF = OAB Questionnaire Short Form
PdetQmax = detrusor pressure at Qmax
PGI-I = Patient Global Impression of Improvement
Qmax = maximum urine flow rate
SUI = stress urinary incontinence
TVT = tension-free vaginal tape
TVT-O = obturator TVT
USS = Indevus Urgency Severity Scale
UUI = urgency urinary incontinence

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**Purpose:** To our knowledge no group has evaluated antimuscarinic efficacy in patients with de novo overactive bladder after mid urethral sling placement. We assessed solifenacin efficacy in women with de novo overactive bladder after obturator tension-free vaginal tape placement compared to a control group.

**Materials and Methods:** We prospectively considered all women with de novo overactive bladder symptoms at a 3-month followup visit after placement of obturator tension-free vaginal tape. Patients with overactive bladder preoperatively and those with obstructive symptoms or signs were excluded from analysis. Women who satisfied inclusion and exclusion criteria (group 1) were compared with a series of consecutive naïve patients with overactive bladder symptoms without a previous surgical procedure for stress urinary incontinence (group 2). We prescribed 12-week antimuscarinic therapy with oral solifenacin 5 mg once daily. Objective outcomes included changes from baseline in 3-day voiding diary data. Subjective efficacy was evaluated using the Overactive Bladder Questionnaire Short Form, Urgency Severity Scale and Patient Global Impression of Improvement questionnaires.

**Results:** A total of 110 patients with de novo overactive bladder after obturator tension-free vaginal tape placement completed solifenacin treatment and were included in group 1. They were compared with 120 consecutive naïve women with overactive bladder (group 2). Group 1 presented at the 3-month followup visit with significantly less benefit in the mean decrease in urgency and urgency urinary incontinence episodes daily (−1.1 vs −2.3 and −0.2 vs −1.1, respectively, each $p < 0.0001$). In group 1 we also found a lower subjective solifenacin effect. Previous obturator tension-free vaginal tape placement was an independent predictor of failed solifenacin treatment.

**Conclusions:** Antimuscarinic treatment with solifenacin had significantly lower efficacy in women with de novo overactive bladder after mid urethral sling placement than in controls.

**Key Words:** urethra; urinary bladder, overactive; suburethral slings; solifenacin; drug evaluation

TENSION-FREE MUS placement currently represents the most effective, safe surgical procedure for female SUI with excellent subjective and long-lasting objective cure rates.[1] Despite its efficacy this procedure might lead to de novo OAB or worsening preexistent OAB symptoms.



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Previous groups reported about a 4% to 33% rate of de novo OAB symptoms after TVT placement[2] while only limited data are available on the relationship between TVT-O and de novo OAB symptoms.[3] These symptoms may negatively affect patient satisfaction and health related quality of life after sling surgery.[4]

Similarly, women with UUI have worse quality of life than women with other forms of urinary incontinence.[4] Some groups evaluated possible mechanisms and risk factors associated with de novo OAB after sling procedures. It may be caused by subtle impedance to flow that does not quite meet obstruction criteria[5] or it may be due to dissection during operation with consequent partial denervation of the detrusor muscle, which can lead to alterations in its function.[6] Another possible reason is that in these patients OAB may be caused by a weak urethral sphincter mechanism, resulting in funneling of the proximal urethra. It was postulated that when urine enters the proximal urethra, it produces sensory stimulation resulting in reflex bladder contraction[7,8] since urethral afferent nerve activity can induce involuntary detrusor contraction.[9,10] However, despite all proposed theories the exact mechanism underlying this condition is still unknown. Furthermore, to our knowledge no group has evaluated pharmacological treatment of de novo OAB after MUS.

We compared antimuscarinic efficacy in patients with de novo OAB after MUS placement to that in patients with idiopathic OAB.

## MATERIALS AND METHODS

This prospective study was done at a single urogynecological unit at University of Insubria, Varese, Italy. Between January 2007 and January 2013 we considered all consecutive women who complained of de novo OAB symptoms at a 3-month followup visit after a TVT-O procedure performed at our urogynecologic unit for urodynamic stress incontinence. The same experienced surgeon performed all surgical procedures, as described by de Leval.[11] We excluded from study all women who complained of OAB symptoms and/or detrusor overactivity preoperatively. Exclusion criteria included clinically significant voiding dysfunction (symptoms of hesitancy, slow stream, intermittence, straining to void, feeling of incomplete bladder emptying or urinary retention), postvoid residual volume greater than 100 ml, Qmax on uroflowmetry less than 15 ml per second, maximum detrusor pressure during voiding greater than 50 cm $H_2O$ at the 3-month postoperative urodynamic evaluation, persistent SUI, previous radical pelvic surgery or previous irradiation, a neurological cause of OAB (diabetes mellitus, stroke, etc), greater than stage 1 pelvic organ prolapse, documented recurrent urinary tract infections, any medical condition contraindicating antimuscarinic medication or previous pharmacological treatment for OAB.

Women who met these inclusion and exclusion criteria (group 1) were compared with a series of consecutive naïve patients with OAB symptoms who were prospectively identified during the same study period based on the same inclusion and exclusion criteria but without a previous surgical procedure for SUI (group 2).

The screening visit was defined as visit 0. At this visit patients underwent medical history collection, physical examination, post-void bladder ultrasound, urodynamic evaluation, bladder wall thickness measurement and urine laboratory analyses, including urine culture. They received a 3-day voiding diary to record urgency and incontinence episodes. Physical examination was performed with the patient in the lithotomy position and pelvic organ prolapse was determined during a maximal Valsalva maneuver according to the pelvic organ prolapse quantification system.[12] All women were evaluated with urodynamics as previously described,[13] including uroflowmetry, filling cystometry and pressure flow study, by a trained urogynecologist using a standardized protocol in accordance with ICS (International Continence Society) Good Urodynamic Practice Guidelines.[14] We recommended fluid restriction in all cases.

Eligibility was determined at visit 1 (2 weeks after visit 0) based on results recorded in the 3-day voiding diary. For study inclusion patients had to experience at least 3 urgency episodes during the 3-day voiding diary period. Eligible women in each group received 12-week antimuscarinic therapy with 5 mg solifenacin orally once daily. The solifenacin manufacturer was not involved in the study and did not provide funding or drugs.

At the 12-week followup examination (visit 2) objective outcomes included the change from baseline in results recorded in a second 3-day voiding diary. Subjective efficacy outcomes were evaluated using OABq-SF,[15] USS[16] and PGI-I.[17] OABq-SF includes a symptom severity scale and a quality of life scale, each ranging from 0 to 100. Higher scores on the symptom severity scale indicate worse symptoms while higher scores on the quality of life scale indicate better quality of life. USS defines urgency severity as 0—none, 1—mild, 2—moderate or 3—severe. In addition to scores of 0 to 3, urgency with urinary incontinence was defined as a score of 4. PGI-I is a patient reported measure of perceived improvement with treatment on a scale of 1—very much better to 7—very much worse. At visit 1 all patients completed OABq-SF and USS. At visit 2 all patients completed OABq-SF, the USS and the PGI-I.

All methods, definitions and units are in agreement with the ICS standardization of terminology.[18] Institutional review board approval and written informed consent were obtained in all cases.

### Study Outcomes

The primary outcome was the change from baseline in the mean number of urgency episodes per 24 hours, as reported in the 3-day voiding diary at visit 2. Secondary efficacy outcomes included the change from baseline in the mean number of UUI episodes per 24 hours, voided volume per micturition, the proportion of participants with complete resolution of urgency and UUI, the change from baseline in OABq-SF and USS scores at visit 2, and PGI-I.