European Journal of Obstetrics & Gynecology and Reproductive Biology 207 (2016) 89–93

Contents lists available at ScienceDirect

European Journal of Obstetrics & Gynecology and Reproductive Biology

journal homepage: www.elsevier.com/locate/ejogrb

# Long-term functional results after unilateral mid-urethral sling transection for voiding dysfunction

F. Baekelandt[a,b,*], P. Van Oyen[a], C. Ghysel[a], F. Van der Aa[b], J. Ampe[a]

[a] Department of Urology, Saint-John's Hospital, Brugge, Belgium
[b] Department of Urology, University Hospitals, Leuven, Belgium

ARTICLE INFO

*Article history:*
Received 5 April 2016
Received in revised form 25 August 2016
Accepted 18 October 2016

*Keywords:*
Synthetic mid-urethral sling
Sling transection
Stress urinary incontinence
Urgency
Urge urinary incontinence

ABSTRACT

*Objective:* To investigate the long-term outcomes of unilateral mid-urethral sling transection to treat voiding dysfunction after synthetic mid-urethral sling placement for stress urinary incontinence.
*Study design:* Twenty-three patients who underwent an unilateral sling transection were analyzed retrospectively. Patient records were analyzed for subjective outcome, and pre- and postoperative flow patterns were used as objective outcome parameters.
*Results:* At the first postoperative follow-up, 77.3% of the patients remained dry. After a mean follow-up of 42 months, 73.9% of patients were continent. The flow pattern after lateral sling transection was significantly better than pre-operatively, with higher maximum flow rate (24.2 ml/s, $p = 0.001$), higher mean flow rate (10.4 ml/s, $p = 0.001$), higher voided volume (308.5 ml, $p = 0.002$) and lower residual volume (28.7 ml, $p = 0.003$). At final postoperative follow-up, eight patients (34.8%) reported urgency and six patients (26.1%) were incontinent; four of these patients (17.4%) mainly had urge incontinence.
*Conclusions:* Unilateral mid-urethral sling transection is a safe, effective technique to treat voiding symptoms with good preservation of continence. The technique repairs the obstructive flow effectively. Urgency and urge incontinence after mid-urethral sling placement are difficult to treat with transection alone.



## Introduction

Stress urinary incontinence (SUI) affects up to 40% of women, and this is likely to increase due to the aging population [1–3]. The number of implanted synthetic mid-urethral slings (MUS), the main treatment option for SUI, is also likely to increase, along with its complications.

Complication rates after MUS implantation range from 4.3% to 75.1% for retropubic MUS and from 10.5% to 31.3% for transobturator synthetic MUS [2]. The rate of postoperative voiding dysfunction varies from 0% to 24% depending on the type of sling implanted [2–5]. The numbers are so high and variable because of the diversity with which voiding dysfunction can present after sling surgery [6]. The number of patients requiring surgical intervention for voiding dysfunction varies from 0.1% to 7% [2,3,5,7].

Several techniques have been reported for the treatment of voiding dysfunction after previous sling surgery. The treatment options include transection (midline or lateral; uni- or bilateral), sling loosening, partial or complete sling excision, and complete urethrolysis. All treatment types have strengths and weaknesses, and many of the studies addressing these techniques were small with short follow-up, combined several types of transection techniques, and treated a mixture of biological grafts and synthetic meshes. As transobturator tape (TOT) is one of the more recent techniques, studies focusing mainly on TOT mesh transections are fairly scarce. As such, the authors undertook a retrospective analysis of their experience with the unilateral MUS transection technique for synthetic meshes.

## Materials and methods

All patients who had undergone a unilateral synthetic MUS transection between 2009 and 2014 at the study institution were analyzed retrospectively. In total, 23 consecutive patients were included in the study.

Electronic patient records were reviewed for slow urinary stream, difficulty voiding, need to bend forward to void, new-onset or worsened storage symptoms, urgency incontinence, recurrent urinary tract infection (UTI), clinical examination and flow rates

* Corresponding author at: University Hospitals Leuven, Herestraat 49, 3000 Leuven, Belgium. Fax: +32 16 34 66 99.
*E-mail address:* f.baekelandt@telenet.be (F. Baekelandt).

http://dx.doi.org/10.1016/j.ejogrb.2016.10.020
0301-2115/

[6,8–10]. Cystoscopy and urodynamics were performed routinely prior to sling placement to exclude surgical complications following anti-incontinence surgery (AS) [10]. No patients had an overactive detrusor at this stage. In this study, urodynamic criteria for obstruction as an indication for surgical transection were not used routinely; several studies in the past have shown that these criteria are poor predictors for the outcome of urethrolysis, and that a normal urodynamic study does not preclude a women from having iatrogenic urinary obstruction [5,6,10].

The number of incontinence pads required per 24-h period was used to evaluate SUI. Complete resolution of incontinence was defined as zero pad use. Patients were also asked about their overall satisfaction following all procedures using a five-point Likert scale.

In order to evaluate the resolution of obstructive flow following sling transection, flow rate measurements (FRM) before sling transection were compared with FRM after sling transection. FRM suitable for analysis were only obtained for 15 patients; unfortunately, not all patients complied with the instruction to attend their follow-up appointments with a full bladder, and they were not able to void with an empty bladder. Eleven of the 15 patients had their first AS at the study institution, and their baseline FRM before sling surgery were used as control data.

All sling transections were performed in a single institution by the same urologist. The technique used was a one-sided lateral sling transection. The patient was installed in a dorsal lithotomy position, and a vertical incision was made lateral to the urethra (left or right side at the surgeon's discretion) following catheterization. The sling was identified with a finger following dissection with scissors. The sling was then freed from the urethra with a small clamp. Using the opened small clamp as a guide, the mesh was sharply divided with a scalpel. In this way, the caudal and contralateral part of the urethra remained suspended. Following haemostasis, the wound was closed with a fast-resorbing suture.

All statistical analyzes were performed using Statistical Package for the Social Sciences (IBM Corp., Armonk, NY, USA). Chi-squared test, paired *t*-test (normal distributed data on Anderson–Darling test) and the related samples Wilcoxon signed rank test were used for statistical analyzes.

## Results

### *Epidemiology*

Table 1 summarizes the characteristics of the study population. Mean age at transection was 58 years, mean body mass index was 27 kg/m$^2$, and mean follow-up was 42 months (range 4–72 months, median 56 months). The mean interval between the last AS and unilateral MUS transection was 15 months.

Six patients waited for >1 year before undergoing surgical treatment for their symptoms. No significant difference in continence or urgency was found between this group and the 17 patients who choose an early (mean 4 months) surgical solution ($p = 0.37$ and $p = 0.386$, respectively).

**Table 1**
Epidemiological characteristics of the study population.

| Population | $n = 23$ |
|---|---|
| Mean age at transection (years) | 58.3 |
| Mean weight (kg) | 72.7 |
| Mean height (cm) | 164.2 |
| Mean body mass index (kg/m$^2$) | 27.0 |
| Mean time to transection (months) | 14.7 |
| Mean follow-up (months) | 42.2 |

**Table 2**
Summary of the surgical history of the study population.

| Type of anti-incontinence surgery undergone most recently | $n = 23$ | |
|---|---|---|
| TOT outside-in | 17 | 73.9% |
| TOT inside-out | 4 | 17.4% |
| TVT | 2 | 8.7% |
| Multiple anti-incontinence procedures | $n = 4$ | |
| Redo anti-incontinence surgery | 3 | 13.0% |
| Failed transection of TOT | 1 | 4.3% |
| Sacral neuromodulator | 1 | 4.3% |
| Previous pelvic surgery | $n = 9$ | |
| Hysterectomy | 4 | 17.4% |
| Colporrhaphy anterior | 3 | 13.0% |
| Anterior prolapse mesh repair | 2 | 8.7% |
| MMK procedure | 1 | 4.3% |
| MMK procedure with Burch modification | 1 | 4.3% |
| Extra-uterine pregnancy | 1 | 4.3% |
| Transurethral resection of bladder | 1 | 4.3% |

TOT, transobturator tape; TVT, tension-free vaginal tape; MMK, Marshall–Marchetti–Krantz.

In total, 23 patients received a sling transection at the study institution. Twenty-one patients had previously had a TOT mesh and 2 patients had previously had a retropubic MUS. The medical history of the patients, as shown in Table 2, was very heterogeneous: 10 patients (43.5%) had undergone (multiple) previous pelvic procedures.

Complaints leading to the decision to perform sling transection were: voiding symptoms (10 patients, 43.5%), urinary retention (seven patients, 30.4%), urgency (six patients, 26.1%), pain or dyspareunia (four patients, 17.4%) and recurrent UTI (four patients, 17.4%). All patients with dyspareunia and recurrent UTI had either voiding or storage symptoms and were therefore included in this study.

### *Functional outcome*

Before undergoing AS, the median use of pads was three pads per day (Fig. 1). Flow rates before AS are summarized in Table 3. Four patients (17.4%) reported urgency.

Before sling transection, mean maximal flow rate was 10.5 ml/s, mean flow rate was 4.0 ml/s, mean voided volume was 159.0 ml and mean residual volume was 148.0 ml (Table 3). Twenty patients in this study reported difficulty voiding or urinary retention at this point. At this time, six patients reported urgency symptoms: two patients reported persisting urgency, and four patients had de-novo urgency after sling placement.

One month after sling transection, 77.3% of the patients reported no loss of urine (Fig. 1). Continence remained significantly better than before AS ($p < 0.0001$). All flow rates after transection were significantly better than flow rates before sling transection. Flow rates after transection were comparable with flow rates before first AS in all patients. The mean postvoid residual (PVR) after transection (28.7 ml) was significantly less than the mean PVR before transection (148.0 ml; $p < 0.0001$) (Table 3).

At final follow-up, 73.9% of patients reported no urine loss at all (Fig. 1). The continence results were not significantly different from the results 1 month postoperatively ($p = 0.733$). Continence remained significantly better than before AS ($p < 0.0001$). Incontinence recurred in six patients (26.1%): of these, two patients (8.7%) reported pure SUI, one (4.3%) had mixed urinary incontinence and three patients (13.0%) had urge incontinence. At final follow-up, eight patients (34.8%) reported storage symptoms. One patient in this group developed urge incontinence after a ureteric re-implantation secondary to complicated abdominal surgery. One