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ORIGINAL ARTICLE

# Comparison of the clinical outcomes of transobturator and single-incision slings for stress urinary incontinence

**Ling-Ying Wu, Tsai-Hwa Yang, Fu-Tsai Kung, Fei-Chi Chuang, Kuan-Hui Huang***

*Department of Obstetrics and Gynecology, Kaohsiung Chang Gung Memorial Hospital, Kaohsiung City, Taiwan*

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**Abstract** The aim of this study was to compare the clinical outcomes of anti-incontinence surgeries employing the transobturator sling and single-incision sling (SIS). Our hypothesis is that the outcome of the SIS is not inferior to the obturator sling. This retrospective study reviewed the medical records of patients who underwent anti-incontinence surgery with the transobturator sling or SIS from July 2005 to November 2014. Patients who underwent concomitant pelvic organ reconstruction with an artificial mesh were excluded. Assessments included preoperative and postoperative urodynamic examinations, perioperative complications, and postoperative urogenital symptoms. A total of 122 women were recruited according to the inclusion and exclusion criteria. Among them, 68 patients underwent transobturator sling procedures while 54 patients underwent SIS procedures. The subjective failure rate of the transobturator sling and SIS were 10.2% and 18.5%, respectively ($p = 0.292$). The objective failure rate, defined as a pad test showing more than 2 g of urine, was 10.2% for the transobturator sling and 12.9% for the SIS ($p = 0.777$). SIS resulted in less blood loss, operative time, length of hospital stay, and transient voiding dysfunction after the operation. No major complication occurred after either surgical intervention. In conclusion, SIS and transobturator slings might have similar efficacy, safety, and effects on new-onset urogenital symptoms.


Conflicts of interest: All authors declare no conflicts of interest.

* Corresponding author. Division of Urogynecology, Department of Obstetrics and Gynecology, Kaohsiung Chang Gung Memorial Hospital, 9F, Numer 123, Ta-Pei Road, Niaosung District, Kaohsiung City 833, Taiwan.
*E-mail address:* gynh2436@cgmh.org.tw (K.-H. Huang).

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## Introduction

Stress urinary incontinence (SUI) is the involuntary leakage of urinary flow as abdominal pressure increases, and the bladder neck opens. It is the most common type of urinary incontinence in women and leads to deterioration in the quality of life of those affected. The prevalence of SUI ranges from 4% to 35% [1,2] and increasing numbers of patients are complaining about the problem. One possibility for this increase is that people are living longer, and aging is a risk factor for SUI [3].

Determining the optimal management of SUI is essential due to its adverse effect on quality of life. The initial management of SUI includes conservative therapy such as pelvic floor muscle training, electrical stimulation, biofeedback, and pessary use. However, patients often consider these treatments time-consuming and less effective.

The Burch colposuspension procedure was regarded as the "gold standard" initially; nevertheless, with the development of reproducible minimally invasive techniques, anti-incontinence slings have become the commonest SUI treatment [4]. The first synthetic polypropylene midurethral sling, known as tension-free vaginal tape (TVT), was introduced by Ulmsten in 1996, and it had satisfactory effects on SUI [5,6]. In an 11-year prospective study, the subjective cure rate was 77% while the objective cure rate was 90% [7]. In another prospective study lasting 17 years, the subjective cure rate was 90%, and the objective cure rate was 87% [8]. In a previous study we conducted, concomitant surgery with TVT had a satisfactory objective cure rate of 84.9—86.8% [9].

To minimize tissue trauma and complications, the sling was inserted towards the transobturator area and was called transobturator sling. Such slings were known as TVT-O (tension-free vaginal tape-obturator, Ethicon, NJ, USA) and Monarc (American Medical Systems, Eden Prairie, MN, USA). A systematic review and a prospective randomized trial revealed that their efficacies were satisfactory to patients compared with TVT [10,11].

The most recent surgical development for the treatment of SUI is the single-incision sling (SIS), also known as the MiniArc (American Medical Systems), which was developed in 2007. The MiniArc needs only one incision in the vaginal wall, and the sling is much shorter than previous midurethral slings. Because the sling is only around 8 cm in length, its insertion trajectory is shorter, so complications such as bladder perforation, major vascular injury, and postoperative pain in the groin region are avoided. A prospective study reporting 1-year outcomes for the MiniArc showed that 90.6% of the patients had a negative cough stress test after the procedure [12]. Another two studies showed equal efficacy of the transobturator sling and SIS [13,14]. Nevertheless, a meta-analysis collecting data from nine randomized, controlled trials showed inferior subjective and objective cure rates and higher reoperation rates for SUI when SIS was compared with the standard midurethral sling [15]. Because the efficacy of the SIS compared with the transobturator sling is still under debate, we compared the effectiveness of both procedures for the treatment of SUI and its associated urogenital symptoms.

## Methods

In this retrospective study, we compared the clinical outcomes of two types of anti-incontinence slings, the transobturator sling and the SIS. We enrolled patients who underwent anti-incontinence surgery using the TVT-O, Monarc, or MiniArc techniques and slings at a tertiary referral urogynecological center in Kaohsiung, Taiwan from July 2005 to November 2014. Data on the TVT-O procedure was collected from May 2007 to November 2014. Data on the Monarc sling procedure was collected from July 2005 to July 2009, while MiniArc sling data was collected from September 2010 to July 2014. All study candidates were both clinically and urodynamically diagnosed with SUI. We excluded patients who underwent concomitant pelvic organ reconstruction surgery with an artificial mesh in order to exclude other factors that could have impacted the urodynamic studies and clinical outcomes. Baseline characteristics, blood loss, operative time, length of hospital stay, and preoperative and postoperative urodynamic studies were assessed. Perioperative complications, failure, and the effects on urogenital symptoms were also analyzed and compared.

All of the surgeries were performed by two experienced surgeons (KHH and FCC). Prophylactic antibiotics (intravenous cefazolin 1 g) were administered 30 minutes before surgery and every 8 hours for 2 days after surgery. All of the procedures were performed in the lithotomy position under general anesthesia, except when the patient's condition was unsuitable; then, the anesthesia was converted to spinal anesthesia. The slings were inserted according to the techniques described by the manufacturers. Intraoperative cystoscopy was performed on each patient following sling insertion to detect possible bladder injury. Thereafter, vaginal packing with gauze for compression and Foley catheter for urination were placed appropriately.

Usually, the vaginal gauze and Foley catheter were removed the following day if the patient underwent SIS and after 2 days for the group that underwent transobturator sling insertion. Residual urine (RU) after self-voiding was checked with ultrasound, and if the RU was more than 100 mL, we performed intermittent catheterization until the RU was less than 100 mL. Once patients voided smoothly, and the RU was less than 100 mL twice consecutively, the patients could be discharged. Postoperative monitoring in the outpatient department was conducted at 1 week, 1 month, 3 months, 6 months, and 12 months after the surgery, and then annually. Postoperative urodynamic studies and the urinary pad test were completed 6 months after the surgery.

We reviewed the charts and recorded the patients' subjective complaints regarding new-onset and postoperative urogenital symptoms and the times at which they occurred. Such symptoms included urgency, urgency incontinence, nocturia, urinary retention sensation, enuresis, and dyspareunia. Because we intended to identify the *de novo* symptoms, if the patients had complained of these symptoms before the surgery, they were classified into the unaffected group.

Collected data was analyzed using independent and paired *t*-tests for parametric and nonparametric continuous