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# Laparoscopic Artificial Urinary Sphincter in Women for Type III Incontinence: Preliminary Results

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## Abstract

***Purpose:*** To evaluate the feasibility by laparoscopy of the AMS 800 (American Medical Systems, Inc., Minnetonka, Minnesota) artificial urinary sphincter in women with type III incontinence.

***Materials and methods:*** Four women with genuine stress incontinence due to intrinsic sphincter deficiency were operated by laparoscopy. Primary criterion was negative Marshall test. One patient had not undergone surgery, and we performed laparoscopic promonto-fixation in the same procedure. Two of the three remaining patients had previous TVT (tension-free vaginal tape) with complications regarding the perforation and erosion of bladder mucosa and urethra. Laparoscopic explantation of TVT was performed 3 months previously. In the last case, previous urethropexy and laparoscopic promonto-fixation in association with TVT were performed 10 years and 1 year ago respectively.

A modified surgical procedure was used to implant the AMS 800 through laparoscopic transperitoneal approach, with placement of the cuff around the bladder neck between the periurethral fascia and the vagina.

***Results:*** Mean age was 68.5 (50–79) years. Mean closure pressure was 24.5 (20–28) cm. Water. There was no erosion or extrusion. The only significant risk factor was previous surgery. The operative time was less than 3 hours. The hospital stay was 8 days. The mean follow-up was 6 (3–13) months. Activation was done 6 to 8 weeks after implantation. Social continence (1 pad use with moderate leakage) and improvement of quality of life was reported in one patient. In this case the balloon was changed in order to obtain more pressure in the cuff. Resolution of incontinence was achieved in 3 patients.

***Conclusions:*** The AMS 800 can be successfully implanted by laparoscopy to treat women with genuine stress incontinence, a low urethral closure pressure and negative Marshall test indicating severe intrinsic sphincter deficiency. A long term follow-up is warranted to determine the efficacy and durability of this procedure.


**Keywords:** Laparoscopy; Urinary incontinence, stress; Urinary sphincter; Artificial

## 1. Introduction

Intrinsic sphincter deficiency denotes an intrinsic malfunction of the urethral sphincter itself. In its most overt form (type III stress incontinence), it is characterised by an open vesical neck at rest and a low vasalva leak point pressure [1]. Treatment options for intrinsic sphincter deficiency include the pubovaginal sling procedure or placement of an artificial urinary sphincter. More conservative measures involve periurethral injection of collagen, autologus fat or polytef, and sponge plugs placed in the vagina or vulva.

The artificial urinary sphincter was first implanted in 1972, and subsequent improvements in design, surgical technique and patient selection have resulted in reduced complication rates and improved satisfaction [2]. It is used in both men and women. The currently used sphincter, AMS 800 (American Medical Systems,

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Inc., Minnetonka, Minnesota), consists of 3 silicone components, including a control pump, elastic pressure balloon reservoir and inflatable occlusive urethral cuff. The balloon reservoir holds a specific volume of fluid, which can exert a range of preset pressures (range 51 to 90 cm. Water) on the cuff. The cuff is implanted around the urethra at the bladder neck and applies pressure circumferentially when inflated. The control pump is implanted in the labium, and contains the fluid resistor and valves for the transfer of normal saline contrast media solution to and from the cuff. To use the device the patient applies pressure to the pump to deflate the cuff and allow emptying of the bladder, after which refilling of the cuff occurs passively after 2 to 3 minutes.

The laparoscopic bladder neck suspension was first described by Vancaillie and Schuessler [3]. Since then, there have been numerous descriptions of a variety of techniques for the laparoscopic approach to bladder neck suspension [4–6].

Many investigators have suggested that patients with stress urinary incontinence may have combination of anatomic hypermobility of the bladder neck and element of intrinsic sphincter dysfunction [7]. For this reason, the sling urethropexy has recently been advocated for all patients with stress urinary incontinence in an attempt to improve the long term success rates of surgical intervention. The laparoscopic sling urethropexy may be a minimally invasive alternative with more acceptable success rates in the management of stress incontinence.

Our aim was to evaluate the efficacy and safety of the AMS 800 implanted by transperitoneal laparoscopic approach, implanted in four cases of women with genuine stress incontinence, due to intrinsic sphincter deficiency, as primary indication or after previous other surgery.

## 2. Materials and methods

Four women with genuine stress incontinence were included in the study between August 2003 and June 2004. These patients presented with urinary incontinence due to sphincteric insufficiency, and had normal detrusor function and bladder compliance. A physical examination was conducted with patient in the lithotomy and standing positions, with the bladder empty to assess the pelvic organs, and full to check for incontinence and perform the Marshall test. Primary inclusion criterion was a negative modified Marshall test [8]. A standard positive test involves the demonstration of leakage on straining or coughing and the suppression by elevation of the vagina on both sides of the vesical neck. A positive test is usually an indication for urethrocystopexy, while a negative test is considered a poor prognostic indicator for conventional surgery. As a false-positive test can result from the presence of a cystocele or uterine prolapse, the test was performed using a half speculum or vaginal retractor to reduce prolapse and a clamp to elevate the bladder neck. The bladder was filled as close as possible to its functional capacity before testing.

Uroflowmetry was conducted and urethral closure pressure was determined. Patients in whom bladder overactivity was diagnosed were excluded as an indication for AMS 800.

The presence of prolapse was not a contraindication of the artificial urinary sphincter. One of the 4 patients had a cystocele grade 3 and rectocele grade 3 concomittent with intrinsic sphincter deficiency. Laparoscopic promonto-fixation was performed at the same procedure as a first step before placing the sphincter.

Regarding previous surgery for urinary incontinence, 2 patients had previously received TVT in another institution with bladder mucosa erosion in one case and urethral erosion in the other, by prolene mesh. In these 2 cases, due to bladder overactivity, bladder infection and persistence of incontinence, we had previously performed a laparoscopic ablation of the TVT 3 months prior to the AMS 800 procedure. The remaining patient had already received laparoscopic transperitoneal promonto-fixation with a TVT procedure in our institution one year ago, despite the fact that she had urinary intrinsic sphincter deficiency. She had a persistence of leakage and more than 5 pads used per day.

The mean follow-up was 6 (3–13) months and patients had 50, 71, 74, 79 years old respectively.

The same surgeon performed all the procedure.

## 3. Technique

Performance of Laparoscopic sling urethropexy was first reported by Kreder and Winfield [9] for the management of intrinsic sphincter dysfunction. In their report, they noted that although laparoscopic sling urethropexy was a feasible procedure, the most difficult part of the surgery was the dissection of the bladder neck and proximal urethra from the anterior vaginal wall. Schuessler and Tecuanhuey [10] reported their initial experience with the Laparoscopic sling procedure, and suggested that a wide dissection, at least 6 to 8 mm lateral to the proximal urethra, may eliminate the high risk for urethral injury.

The four patients had sterile urine at surgery. Broad-spectrum intravenous antibiotics, most commonly cephalosporin and gentamicin, were administered in the preoperative holding area. In the operative room strict adherence to sterile techniques were observed in order to minimize potential infections. Broad spectrum intravenous antibiotics were continued throughout the hospitalization for 5 days. Oral antibiotics (usually a cephalosporin) were continued until the end of hospitalization and for 2 weeks following discharge.

There is no specific anatomic contraindication to laparoscopic urinary artificial sphincter, though in those who have received previous surgery, the operation is more difficult.

The surgical technique involved placing the patient in dorsolithotomy position with access to vagina. An