Comparison of midurethral sling outcomes with and without prolapse repair

Gwen M. Grimsby, MD, Mark D. Tyson, MD, Christopher E. Wolter, MD
Department of Urology, Mayo Clinic, Phoenix, Arizona, USA

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Introduction: *To compare the outcome of single incision and retropubic midurethral slings when performed with and without concomitant repair of pelvic organ prolapse (POP).*

Materials and methods: *A retrospective chart review was conducted of all midurethral slings performed with and without concomitant POP repair by a single provider from September 2008 to April 2010. Prolapse was repaired transvaginally with light-weight polypropylene mesh or robotically via sacrocolpopexy based on the nature of the prolapse and surgeon preference. Success of the sling procedure was defined as complete resolution of leakage or great improvement of leakage based on the Patient Global Impression of Improvement score.*

Results: *Eighty-nine patients underwent a midurethral sling procedure. Forty-five patients received a single incision sling, 18 of which had concomitant POP repair. Forty-four received a retropubic sling, 16 of which had concomitant POP repair. Successful treatment of SUI in the single incision sling group was 89% (24/27) which was not significantly different from the retropubic only sling group 93% (26/28), p = 0.61. However, a significant difference was seen in the successful treatment of SUI in the single incision sling plus prolapse repair group 67% (12/18) versus the retropubic sling plus prolapse repair group 94% (15/16), p = 0.05.*

Conclusion: *We found a higher incidence of single incision mid-urethral sling failure when done at the same time as repair of pelvic organ prolapse in comparison to sling placement alone. There is no difference in the success of retropubic slings when done with or without concomitant prolapse repair.*

Key Words: stress urinary incontinence, pelvic organ prolapse, midurethral sling

Introduction

By 80 years of age, approximately 11% of women will require surgery for stress urinary incontinence (SUI) and pelvic organ prolapse (POP).[1] Often defects occur in more than one compartment and one compartment may contain several defects and thus, SUI and POP often occur concomitantly.[2] It is desirable for patients to have a repair multiple defects at the same time for minimized anesthetic risk and faster convalescence.[2] Unfortunately, up to 17% of women may require a second surgery for recurrence of POP or SUI after initial repair.[3]

Controversy exists regarding the effect of concomitant prolapse repair and sling placement.[4] In addition, the type of SUI procedure to perform and when to add a SUI surgery in patients with occult or absent preoperative SUI is unclear. It has been previously reported that inclusion of a Burch colposuspension at the time of abdominosacrocolpopexy reduced

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Address correspondence to Dr. Christopher E. Wolter, Department of Urology, Mayo Clinic, 5777 East Mayo Blvd, Phoenix, AZ 85054 USA

postoperative SUI.[5] However, these results cannot be applied to midurethral slings or to transvaginal or laparoscopic robotic prolapse repairs.

Unfortunately, the medical literature is conflicting regarding concomitant midurethral sling placement and POP repair with some studies showing differences in cure rates and others reporting no difference.[6] In particular, to our knowledge, the success of single incision midurethral slings with concomitant POP repair has not been reported in the current literature. The objective of this study was to examine the outcomes of both single incision and retropubic midurethral slings when performed with and without concomitant POP repair.

Materials and methods

After IRB approval by our institution, a non-funded retrospective chart review was performed of all women who underwent placement of a midurethral sling performed by a single provider between September 2008 and April 2010 with and without concomitant POP repair. Preoperative urinary incontinence was confirmed by physical exam as well as multi-channel urodynamics when indicated. The choice of sling was based on surgeon preference. Pelvic organ prolapse was repaired transvaginally, with light-weight polypropylene mesh, or robotically via sacrocolpopexy based on the nature of the prolapse and surgeon preference.

Sling procedures were performed by a fellowship trained urologist according to previously described techniques.[7-9] Transvaginal prolapse repairs and robotic sacrocolpopexies were performed as previously described by Leu et al[10] and Dimarco et al[11] respectively. In the case of the robotic sacrocolpoxy we did not, however, use a traction suture through the colon. With concomitant sling and prolapse repair, the sling was placed after completion of the prolapse repair procedure so that the alteration of the vaginal axis was finalized before addressing the urethra.

For sling only procedures, patients were discharged home on the day of surgery unless medically contraindicated. For concomitant sling and prolapse repairs, patients were kept in the hospital overnight. A voiding trial was performed in the post-anesthesia care unit (PACU) for outpatients and on postoperative day (POD) one for inpatients. Any patient with the inability to void greater than 50% of their bladder capacity or post-void residual > 200 mL was considered to be in urinary retention and discharged home with a Foley catheter. A voiding trial was scheduled for these individuals 1-5 days later. Patients were seen for follow up at 2 weeks with a uroflow and post-void residual (PVR) and at 6 weeks postoperatively with a uroflow and PVR if the 2 week study was equivocal for obstruction, at 6 months, and then annually thereafter.

Success of the sling procedure was defined as complete resolution of leakage or great improvement of leakage based on the Patient Global Impression of Improvement score and lack of leakage on postoperative physical exam. All other results were considered sling failures. The outcomes and complications of the single incision and retropubic midurethral slings with and without prolapse repair were compared.

All statistical calculations were computed using Stata/SE v 10.0 (College Station, TX, USA) for Mac OS X. Continuous variables were analyzed using the Kruskal-Wallis test. Analysis of categorical data was performed using the chi-squared and fisher-exact tests where appropriate.

Results

Eighty-nine patients underwent midurethral sling placement. Forty-five patients underwent a single incision sling, 18 of which had concomitant POP repair. Forty-four underwent retropubic sling, 16 of which had concomitant POP repair. Of the 34 patients with prolapse repairs, 13 had a robotic sacrocolpopexy and 21 had a transvaginal repair, Figure 1.

The average patient age was 67 years old (47-89). Ten patients (11%) had undergone a previous repair of pelvic organ prolapse and 33 (37%) had a prior anti-incontinence procedure. Mean valsalva leak point pressure on urodynamics was 80 cm H_20 (40-130). Forty-eight patients (58%) had mixed urinary incontinence by history. Mean body mass index (BMI) was 28 kg/m^2 (19-40). Mean follow up was 180 days.

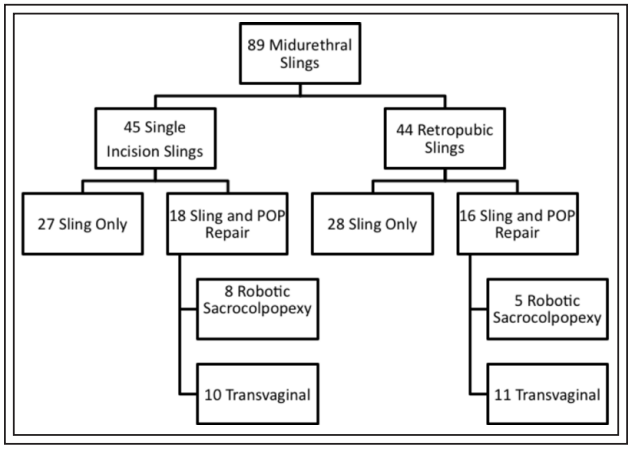

Figure 1. Breakdown of surgical procedures.

TABLE 1. **Preoperative demographics**

a: Sling only

	Single incision (27)	**Retropubic (28)**	**p value**
Age (yr)	64.7	68.1	0.28
Follow up (days)	151.7	155.6	0.93
Previous incontinence procedure	9/26	12/23	0.22
Mixed urinary incontinence	13/26	14/23	0.45
Leak on exam UDS parameters	15/25	18/23	0.17
Qmax (mL/s)	21.0	23.8	0.44
Capacity (mL)	309.7	382.1	0.11
PVR (mL)	22.1	32.3	0.54
vLPP (cm H_20)	83.4	74.2	0.22
Detrusor overactivity	5/25	2/23	0.27

b: Sling and prolapse repair

	Single incision + prolapse (18)	**Retropubic + prolapse (16)**	**p value**
Age (yr)	71.71	69.71	0.51
Follow up (days)	235.9	136.2	0.08
Previous incontinence procedure	4/17	7/14	0.13
Previous prolapse repair	3/17	6/14	0.12
Mixed urinary incontinence	11/17	7/14	0.41
UDS parameters			
Qmax (mL/s)	17.1	20.2	0.54
Capacity (mL)	331.4	310.6	0.72
Post-void residual (mL)	53.7	53.8	0.99
vLPP (cm H_20)	62.8	82.7	0.38
Detrusor overactivity	9/13	7/10	0.97
Prolapse stage	2.7	2.6	0.64

Patient demographics for the sling only groups and the sling with concomitant prolapse repair groups are presented in Tables 1a and 1b respectively. There was no significant difference in age, length of follow up, previous incontinence or prolapse procedure, presence of mixed urinary incontinence by history, or urodynamic findings between the single incision sling and retropubic groups or between the various slings with prolapse repair groups.

Peri-operative demographic information for the sling only and sling with concomitant prolapse repair patients are presented in Tables 2a and 2b respectively. Successful treatment of SUI in the single incision sling groups was 89% (24/27) which was not significantly different from the retropubic only sling group 93% (26/28), p = 0.61. However, a significant difference was seen in the successful treatment of SUI in the single incision sling plus prolapse repair group 67% (12/18) versus the retropubic sling plus prolapse repair group 94% (15/16), p = 0.05. There was no difference in estimated blood loss (EBL), operative time, or length of hospital stay between the sling only groups or sling plus prolapse repair groups respectively.

Of the patients who had sling failure with concomitant prolapse repair, six out of seven had transvaginal repairs and one out of seven had a robotic repair. There were seven patients who experienced postoperative de novo irritative voiding symptoms after sling placement (1 in the single incision sling with prolapse repair group, 3 in the retropubic sling group, and 3 in the retropubic and prolapse repair group). There were no cases of sling erosion or extrusion.

TABLE 2. **Perioperative demographics**

a: Sling only			
	Single incision (27)	**Retropubic (28)**	**p value**
OR time (mins)	42.4	49.3	0.29
Estimated blood loss (mL)	28.9	41.5	0.07
Hospital days	0.346	0.261	0.80
Body mass index	26.88	29.36	0.12
Success	24/27	26/28	0.61
b: Sling and prolapse repair			
	Single incision + prolapse (18)	**Retropubic + prolapse (16)**	**p value**
OR time (mins)	178.4	175.2	0.89
Estimated blood loss (mL)	111.8	121.4	0.66
Hospital days	1.35	1.36	0.99
Body mass index	26.5	28.3	0.25
Success	12/18	15/16	0.05

Discussion

Previous trials have provided level I evidence that inclusion of a Burch colposuspension at the time of abdominosacrocolpopexy reduced postoperative SUI in women who did not report symptoms of SUI prior to prolapse repair.[5] However, there has been a shift away from the Burch procedure and data is less clear with regards to whether or not to include a mid-urethral sling at the time of prolapse repair. However, it is fairly clear that it is reasonable to include a sling in a symptomatic patient with urodynamic evidence of SUI.[2] The literature focuses primarily on retropubic or transobturator slings with prolapse repair. In this study, we compared the outcomes of single incision and retropubic midurethral slings for the treatment of SUI at the time of prolapse repair and found that single incision slings have an inferior success rate in this situation.

Single incision "mini slings" employ a self-fixating system and are performed with a single incision in the anterior vaginal wall.[12] Advantages include less tissue damage by lowering the number of incisions from three to one and avoiding needle penetration of the obturator foramen or retropubic space in an effort to avoid potential organ damage.[12] Various studies have shown success rates ranging from 70%-90% after 1 year of follow up.[13-20] Our success rate of 89% with the single incision sling alone is comparable to that from the literature as well as not significantly different from the 93% success rate of the retropubic only slings in our cohort. We choose to include a comparison of patients who received a sling without prolapse repair to highlight the success of the single incision sling, albeit relatively short term, in our hands and thus eliminate the possibility that the sling itself does not adequately treat SUI or that the surgeon who performed all procedures was not placing the device correctly.

We did not, however, see the same success rates in the single incision sling group when performed concomitantly with a POP repair with only 67% of women meeting our definition of success. We could not find any literature reporting the success of mini-slings with prolapse repair. However, the data regarding success of other midurethral slings with prolapse repair ranges from 37% to 98%.[21-25] The range of success rates is likely partially due to the variability in the definition of "success" by different authors. Regardless, by our definitions, we saw a significantly better outcome in the retropubic sling and prolapse group with 94% success of the sling procedure.

Some experts have hypothesized that damage to similar anatomic structures leads to loss of both pelvic support and continence.[26] Others have suggested that concomitant SUI and POP represent a marker for more severe pelvic floor disorders.[27] We hypothesize that patients with pelvic organ prolapse likely have already compromised pelvic floor structures and thus the single incision sling may not provide enough support

to adequately treat their SUI as it would in a patient with only SUI. In comparison, according to both the literature noted above and our own data, the retropubic sling appears to be able to provide the support needed to adequately treat SUI in the face of POP, at least in the timeframe we have studied, when compared to single-incision slings.

One could argue that performing POP and SUI repairs concomitantly may affect the success rates of the incontinence procedure. Unfortunately, the literature is conflicting with some authors reporting worse cure rates for incontinence in patients with concomitant prolapse repair compared to those without while other authors have shown that concomitant prolapse repairs did not impact incontinence rates.[21,26,28] We do not feel that the prolapse repair itself was the reason for the worse success rate in the single incision sling group. If that was the case then we should have seen poor success rates in our retropubic sling group also.

Limitations to our study include the retrospective nature, lack of randomization, small sample size, and limited follow up. In addition, there exists a need in the literature for a more uniform definition for reporting success after procedures for treatment of SUI. Further longitudinal follow up of our cohort will hopefully strengthen the findings presented here.

Conclusion

There appears to be a higher incidence of single incision midurethral sling failure when completed at the same time as repair of pelvic organ prolapse in comparison to single incision midurethral sling placement alone. We hypothesize this may be the case because of failure of the single incision sling to adequately re-support the urethra in a patient with an already compromised pelvic floor. There appears to be no difference in success of retropubic slings when done with or without concomitant prolapse repair. Because of this early analysis, we now only place a retropubic sling at the time of combined prolapse and incontinence procedures.

Disclosure

Dr. Christopher Wolter is a meeting participant for Allergan and a lecturer for Coloplast. □

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