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A retrospective comparative series comparing monarc and sparc suburethral slings*#

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ABSTRACT

A Retrospective Comparative Series Comparing Monarc and Sparc Suburethral Slings. Introduction and Hypothesis: There are a number of suburethral slings used in current practice to treat female urinary incontinence. To date there has been a lack of larger comparative series. This paper aims to evaluate the effectiveness and complications of two types of suburethral sling. Methods: A retrospective comparative series comparing 113 consecutive Sparcsuburethral slings with 112 consecutive Monarc slings. Results: The success rate of SparcvsMonarc was similar at 6 weeks (96.1% vs 94.2%, NS) and at 6 months (96.0% vs 92.6%, NS). The Monarc procedure had less intraoperative bladder fenestrations & less postoperative urgency. Conclusions: Both procedures had a similar success rate, while the Monarc had less complications. Brief Summary: Both procedures had a similar success rate, while the Monarc had less complications of intraoperative bladder fenestration & postoperative urgency.

Keywords: Case Control Series; Female Urinary Incontinence; Suburethral Sling

1. INTRODUCTION

Female stress urinary incontinence is defined as the involuntary loss of urine on effort or physical exertion. Prior to the 1990s, surgical treatment was a major procedure, performed via a significant lower abdominal skin incision and the placement of bladder elevating sutures or a fascial sling under the urethra. The minimally invasive synthetic retropubic suburethral sling was first described in 1995 [1]. A subsequent randomised trial with Burch colposuspension found that the procedure was effective with less complications and recovery time [2]. A transobturator approach was introduced in 2001 [3]. To date there have been no larger series comparing the Sparc™ (American Medical Systems, Minnetonka, MN) and Monarc™ (American Medical Systems, Minnetonka, MN) sling procedures. This paper aims to evaluate the effectiveness and complications of these two types of suburethral sling.

2. MATERIALS AND METHODS

A retrospective comparative series comparing 113 consecutive Sparcsuburethral slings with 112 consecutive Monarc slings from 2002 to 2012. The author changed to Monarc slings in 2006 as early studies had suggested a lower incidence of complications.

All patients were evaluated with history, examination, bladder diary, visual analogue scale (VAS) of subjective urinary incontinence bother and urodynamics. Included in this study were women who only had urodynamic stress incontinence (with no voiding difficulty or reduced bladder capacity), and did not need other surgery, such as prolapse surgery.

All surgeries were performed by the author, or under his direct supervision of registrars. Both procedures were performed under general anaesthesia. Tension was corrected so that no leakage was demonstrated with suprapubic pressure with the bladder filled to 300 ml.

The retropubic Sparc sling was inserted via two 5 mm suprapubic incisions and one 10 mm anterior suburethral vaginal incision using the Sparc introducers. Check cystscopy was performed, and the patient discharged upon voiding with a residual of less than 100 mls on bladder scan.

The obturator Monarc sling was inserted via two 5 mm labial incisions and one 10 mm anterior suburethral vaginal incision using the Monarc introducers. Check cystoscopy was performed, and the patient discharged upon voiding with a residual of less than 100 mls on bladder

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scan.

Follow up was at 6 weeks and 6 months by the author. Evaluation at these visits was by examination with a full bladder, history of any urinary symptoms (incontinence, urgency, voiding difficulty), VAS and bladder diary. Statistical analysis was performed using student *T* test and Chi squares with significance reported if $P < 0.05$. Success was defined as no stress incontinence seen at examination and no leaks/wk on bladder diary.

As this review conforms to the standards established by the NHMRC for ethical quality review ethics approval was not sought.

3. RESULTS

There were no significant demographical differences between the two groups (**Table 1**). Hospital discharge & recovery times were quicker for the Monarc group (**Table 2**). The bladder fenestration rate was significantly higher in the Sparc group (**Table 3**). At six weeks both groups had a significant improvement in urinary incontinence (**Table 4**) with the Monarc group having less urgency. This difference was no longer significant at 6 months with both groups having a similar success rate (96% vs 92.6%) (**Table 5**). The five cases of voiding difficulty were managed with an overnight catheter and did not need repeat surgery.

4. DISCUSSION

This current study found a significant improvement is urinary incontinence in both groups at six weeks and six months. There was a slightly better success rate of the Monarc sling at 6 weeks, however at 6 months this was no longer statistically significant. The significant improvement in urinary incontinence was also seen in the VAS scores at six weeks and six months. There were two main differencesbetween the slings. The first was an increased bladder perforation rate for the Sparc procedure (17.2% vs 0.9%, $P = 0.001$). These were successfully treated by repositioning of the trochar with no long term-sequelae. The second was an increased rate of urgency at 6 weeks for the Sparc sling (21.7% vs 8.8%, $P = 0.009$). This was no longer statistically significant at 6 months, although was still increased over the Monarc procedure (19.8% vs 10.8%). There were no episodes of groin pain in either group over the six months of follow up. The incadence of voiding difficulty was low (2%) in both groups. There was one incidence of mesh erosion in each group that was treated with re-epithelisation as day surgery.

The similar success rates at six months for Monarc & Sparc (96.0% vs 92.6%) in this study differs from a recently published systemic review in 2010 [4] which analysed 39 randomised controlled trials of female incontinence procedures. Midurethral tapes had a higher cure rate than Burch colposuspension. Comparing retropubic and transobturator tapes, the former had a slightly higher objective cure rate, with a much higher risk of bladder perforation and voiding difficulty.

A Cochrane review [5] examined 62 trials of synthetic slings and concluded that the obturator route had a less favourable objective cure (84% vs 88%), however with

Table 1. Baseline demographics (mean and standard deviation).

	Monarc (n = 112)	Sparc (n = 113)	P
Age	54.55 [11.33]	55.77 [11.88]	NS
Weight	75.34 [14.67]	76.62 [16.43]	NS
Parity	2.62 [1.43]	2.62 [1.36]	NS
VH/TAH	36.6%	36.5%	NS
Leaks/wk	9.73 [9.25]	10.35 [8.61]	NS
Total voids/day	10.33 [8.9]	11.33 [9.1]	NS
VAS (/10)	5.94 [2.1]	5.9 [1.6]	NS

Table 2. Surgery (mean and standard deviation).

	Monarc (n = 112)	Sparc (n = 113)	P
Time	24.42 [5.80]	27.35 [5.54]	NS
EBL	87.6 [38.5]	80.75 [30.87]	NS
Hospital	1.04 [1.13]	1.63 [1.33]	0.0002
Recovery	3.07 [1.31]	3.48 [1.49]	0.02

Table 3. Complications.

	Monarc (n = 112)	Sparc (n = 113)	P
Voiding Difficulty	3 (2.7%)	2 (1.8%)	NS
Bladder fenestration	1 (0.9%)	23 (17.2%)	0.001

Table 4. Six week complications (mean and standard deviation).

	Monarc (n = 102)	Sparc (n = 105)	P
Leaks/wk	0.75 [2.85][1]	1.77 [5.54][2]	0.05
Total voids/day	7.92 [1.28][3]	7.79 [1.81][4]	NS
6 week success	98 (96.1%)	99 (94.3%)	NS
6 week urgency	9 (8.8%)	26 (21.7%)	0.009
6 week UTIs	2	4	NS
VAS (/10)	0.5 [1.3][5]	0.7 [1.6][6]	NS

[1]Change from baseline leakage $P = 0.0001$; [2]Change from baseline leakage $P = 0.0001$; [3]Change from baseline voids/day $P = 0.004$; [4]Change from baseline voids/day $P = 0.0001$; [5]Change from baseline VAS $P = 0.0001$; [6]Change from baseline VAS $P = 0.0001$.

Table 4. Six month complications (mean and standard deviation).

	Monarc (*n* = 74)	Sparc (*n* = 81)	*P*
Leaks/wk	0.82 [3.65]	1.55 [4.0]	NS
Total voids/day	7.60 [1.4]	7.65 [1.9]	NS
6 month success	71 (96.0%)	75 (92.6%)	NS
6 month urgency	8 (10.8%)	16 (19.8%)	NS
6 month UTIs	1	1	NS
VAS (/10)	0.7 [1.4]	0.9 [1.8]	NS
Mesh Erosion	1	1	NS

less voiding dysfunction (4% vs 7%) and bladder perforation (0.3% vs 5.5%).

The higher bladder perforation rate in this study has also been reported in other retropubic series (2% - 13%) [6-10]. Other complications reported include urinary retention (1% - 20%), urinary infections (1% - 22%) & de novo urgency (2% - 25%). The voiding difficulty rate was low in this current study for both groups.

A literature review found that Monarc has not been commonly compared to Sparc.

In 2005 [11] a prospective randomised trial of 60 patients compared Sparc and Monarc slings, and reported similar success rates at a mean follow up of 9 months.

Kim [12] conducted a prospective randomised trial of SPARC (*n* = 22) and Monarc (*n* = 21) surgeries, and reported similar short term cures rates (81.8% vs 80.9%)

Botros [13] retrospectively compared Monarc (*n* = 125), Sparc (*n* = 52), and TVT (*n* = 99) slings and reported at 3 months the Monarc group had significantly less detrusor overactivity symptoms (8% vs 17% Sparcvs 33% TVT). This finding is similar to this present study.

Rapp [14] compared Monarc (*n* = 39) with Sparc (*n* = 97) slings retrospectively over 36 months for the treatment of intrinsic sphincter deficiency and found similar success rates (77% vs 76%). The lower success, compared to the current study, relates to the more difficult to treat intrinsic deficiency. The complication rate also was lower in the Monarc group (3% vs 7%), however this did not reach statistical significance.

Other reported series may use TVT or TVT-O by way of comparison. In particular the TVT-O group, using the in-out approach, had a higher reported incidence of groin pain however with a lower incidence of bladder perforation, urgency & voiding difficulty [15-19]. The lack of groin pain in this current study, particularly relating to the Monarc group, may be due to the out-in approach with a more precise placement of the trochar in the medial obturator canal that avoids the lateral neurovascular vessels.

Richter [20] performed a large randomised multicentre trial of 597 women with stress urinary incontinence, comparing retropubic TVT (*n* = 298) versus transobturator TVT-O or Monarc (*n* = 299 of which 137 had Monarc) midurethral slings with 12 month follow up. There was a similar objective cure rate (80.8% vs 77.7%), whilst the retropubic group had significantly more intraoperative bladder perforations (5% vs 0%) and higher voiding dysfunction (2.7% vs 0%). Overall the retropubic had significantly more serious adverse events (13.8% vs 6.4%). However groin pain was significantly increased in the obturator group (9.4% vs 4.0), as was vaginal perforations (4.3% vs 2.0%). Of interest was that most occurred in the in-out TVT-O group. This large study can be study can be criticised because there were multiple surgeons (43) and that there were two obturator approaches that were not randomised.

This current series is the largest reported series to compare Monarc with Sparcsuburethal slings for the treatment of stressurinary incontinence, and finds a similar success rate between the Monarc & Sparc at 6 months (96% vs 92.6%), with less intraoperative complications and a trend towards less post operative complications in the Monarc group. Limitations of the study are that the author was not blinded at follow up as to which form of sling was performed. Another limitation is that the groups were historically controlled, with Sparc being performed from 2002-2006 & Monarc from 2006-2010. A learning curve effect could have resulted in the Monarc having a better success rate. A counter to this argument is that the author performed over 100 TVT retropubic slings before Sparc was available.

5. CONCLUSION

In conclusion, both procedures had a similar success rate, while the Monarc had fewer complications of intraoperative bladder fenestration & postoperative urgency, with no reported cases of groin pain.

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