Abstract #433: Risk Factors for Mesh Revision Associated with Midurethral Sling Procedures for Stress Urinary Incontinence

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Hypothesis / aims of study

- Midurethral sling (MUS) is considered the gold standard procedure for surgical management of stress urinary incontinence (SUI) in females.

- Up to 3-4% of women who undergo mesh placement for SUI may require mesh revision within 10 years. Long-term complications of MUS include mesh complications: mesh exposure, voiding dysfunction, and de-novo overactive bladder symptoms, recurrent UTIs, or chronic pain. (1, 2, 3)

- In a study of 3,307 women who underwent MUS of which 89 were revised, most common indications for revision were urinary retention (43.8%), voiding symptoms (42.7%). 21.3% of patients required revision for mesh exposure. In a cohort study of 188,454 women who underwent MUS, the majority (60%) of subsequent removals/revisions were due to mesh exposure rather than urinary retention. (4)

- Our study aim is to report on risk factors associated with MUS mesh revision, in order to decrease the potential for mesh complications, and to better counsel patients preoperatively.

Study design, materials and methods

- The retrospective cohort study included women from our urogynecology practice diagnosed with mesh complications following MUS procedure for SUI, who subsequently underwent mesh revision from January 2016 to September 2023.

- We recorded patient demographics, history of sling revisions, concomitant procedures, duration of follow-up, and subsequent mesh revisions in women who experienced postoperative mesh complications.

- Means were calculated for patient age, parity, BMI. Percentages were calculated for baseline demographics.

Results and interpretation

- Baseline demographics of the study participants (n=36) are summarized in Table 1. The mean patient age was 59.69 years, average parity was 2.31. Mean body mass index was 29.37 kg/m2. 2 participants (5.56%) reported being current smokers, 5 participants (13.89%) had diabetes mellitus (DM). 16 participants (44.44%) had hypertension, 8 participants (22.22%) had asthma.

- Mean patient vaginal deliveries was 2.11. 58.33% of participants were sexually active. Prior to presenting at our practice, 6 participants (16.67%) had undergone sling revision procedure at outside institutions. 10 patients (27.8%) had prior hysterectomy.

- 26 (72.2%) patients had evidence of mesh exposure on pelvic examination, and their mean age was 60.58 years, while 10 (27.8%) patients without mesh exposure, their mean age was 57.4 years. Mean parity was higher in patients with mesh exposure (2.42) compared to those without mesh exposure (2). Mean BMI was similar between the two groups (29.22 kg/m2 versus 29.76 kg/m2). A higher proportion of patients with mesh exposure reported being sexually active (62%), compared to patients without mesh exposure (50%) (Table 2).

- Mean follow-up after sling revision was 16 months (range 1 month - 6 years). 2 patients (6.67%) had a second mesh revision, 1 patient (2.8%) underwent 2 subsequent mesh revisions.

- 25 patients who required mesh MUS revision underwent MUS at outside institution, and data on concomitant POP surgery was not available. 11 patients had their original MUS (TOT sling) performed by study authors. 9 patients (81.8%) underwent additional pelvic reconstructive surgery concomitantly with MUS. 3 participants (27.3%) underwent concomitant hysterectomy. 7 (63.6%) participants underwent Anterior Colporrhaphy (AC). 2 (18.2%) patients underwent Vaginal vault suspension (VVS). 1 patient received sacrocolpopexy, and 1 high uterosacral ligament fixation. 2 participants (18.2%) underwent both hysterectomy and AC concomitantly, while 2 participants (18.2%) underwent VVS and AC. 4 participants (36.4%) underwent 2 or more concurrent pelvic reconstructive surgeries (Table 3).

- 16.67% of our patient had undergone a prior sling revision before presenting at our practice, and 3 patients (9.47%) required a third revision during the study period.

Table 1: Baseline Demographics of Study Participants (n=36)

Average Age (years)	59.69
Average Parity (n)	2.31
Average BMI (kg/m2)	29.37
Current Smoker	2 (5.56%)
DM	5 (13.89%)
HTN	16 (44.44%)
Asthma	8 (22.22%)
Vaginal delivery average	2.11
Sexual activity	21 (58.33%)
Prior sling revision	6 (16.67%)
History of Hysterectomy	10 (27.8%)
Sling Placement procedure performed at our institution	11 (30.56%)

Table 2: Baseline Demographics in Patients with Mesh Exposure vs. Patients without Mesh Exposure (n=36)

	Mesh Exposure (n=26)	No Mesh Exposure (n=10)
Average Age (years)	60.58	57.4
Average Parity (n)	2.42	2
Average BMI (kg/m2)	29.22	29.76
Sexual activity	16 (62%)	5 (50%)
Prior Hysterectomy	7 (27%)	3 (30%)

*Table 3: Presenting Symptoms on Initial Visit (n=36)**

Symptom	Mesh Exposure (n=26)	No Mesh Erosion (n=10)
Pain	9	2
Incomplete Voiding	10	1
Urge Incontinence	6	4
Recurrent UTIs	3	3
Vaginal Bleeding	1	2
Mixed Incontinence	1	2
Prolapse	1	2
Sensation of Foreign Body In Vagina (Self or Partner)	7	1
Vaginal Spotting with intercourse	1	1
Asymptomatic	2	1
Stress Urinary Incontinence	1	1
Dyspareunia	7	3
Voiding Dysfunction	2	3
Pelvic Floor Dysfunction/Pelvic Pain	1	3
Chronic Vaginal Discharge	1	0
Microscopic Hematuria	1	1
Nocturia	1	1

Conclusions

- Patients with mesh exposure were older, and were more likely sexually active, versus those without mesh exposure. Sexual activity was reported as an independent risk factor associated with MUS mesh exposure. Possible explanations may be that sexually active women are more likely to detect vaginal mesh exposure, and our results align with this finding (2). In our study, patients with mesh exposure were older, which agrees with studies that associate increasing age with mesh erosion (1). This is likely associated with vaginal atrophy and decreased integrity of the vaginal mucosa following menopause and hypoestrogenism.
- Smoking was found to be a significant risk factor for MUS mesh revision, due to impaired wound healing. Similarly DM, which has been reported to be a risk factor for mesh revision due to detrimental impact of DM on wound healing. While most patients will require one sling revision, there are patients who may require two or more mesh revisions following a MUS. In our study, these patients had higher parity, BMI, and prevalence of DM than the rest of the cohort.
- MUS are commonly performed concurrently with other pelvic surgeries, such as concomitant POP procedures which been shown to increase the risk of postoperative voiding dysfunction. AC has been shown to increase risk of sling revisions and mesh exposure, due to either mesh erosion or urinary retention, which is in line with study findings.
- Among the patients who underwent MUS mesh revision, most patients had a concomitant POP surgery, with the most common concomitant procedure being AC. AC may decrease mobility of anterior vaginal wall, which may cause voiding dysfunction, and also require additional incisions, and possible compromise wound healing.
- Our study suggests that concomitant VVS with MUS was associated with increased sling revision for mesh exposure and urinary retention, findings that align with prior published data (2). It is possible that pelvic anatomic changes occurring in women undergoing concurrent VVS and MUS may contribute to voiding dysfunction.
- Patients with MUS revision who underwent a concomitant hysterectomy are more likely to have had a prior POP surgery, or a concomitant POP repair, both of which have been associated with mesh complications.
- Some studies suggest that vaginal incision length greater than 2 cm for MUS was a risk factor for mesh erosion (3). Longer vaginal incisions in AC may impair healing, aligning with our observations of increased risk of MUS revision associated with these concomitant procedures.
- Our study aligns with these findings, and suggests that a smaller size of vaginal incision for MUS may help reduce risk of mesh exposure. In addition, we recommend performing two separate shorter length incisions during concomitant MUS and AC procedures.

Concluding message

- MUS remain the gold standard for SUI surgical management.

- Potential complications of MUS include mesh exposure and urinary retention, and may require one or more mesh revisions.

- We suggest counseling patients regarding risks of combined MUS and POP procedures, and developing surgical techniques that minimize the potential risk for MUS mesh complications

References

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