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The Effect of Age on Stress and Urgency Urinary Incontinence Outcomes in Women Undergoing Primary Midurethral Sling

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Abstract

Introduction and Hypothesis—The primary aim was to characterize stress urinary incontinence (SUI) symptom distress and impact after a midurethral sling (MUS) in women ≥70 compared to women <70 years of age.

Methods—A retrospective cohort study of women undergoing a primary MUS. The primary outcome was SUI symptoms defined as either “moderately” or “quite a bit” responses to 1 of the two SUI questions of the Pelvic Floor Distress Inventory-20 (PFDI-20). Urgency urinary incontinence (UUI) was defined as either “moderately” or “quite a bit” responses to the UUI question of the PFDI-20. The Pelvic Floor Impact Questionnaire (PFIQ-7), Patient Satisfaction Questionnaire (PSQ), and Patient Global Impression of Improvement (PGI-I) questionnaires were also administered pre- and post-operatively.

Results—Mean age of patients ≥70 years (N=160) was 75.4±4.5, <70 years (N=536) was 56.2±9.4. Multivariable analysis revealed no difference in SUI failure rates in older compared to younger cohorts, adjusted OR 1.7, 95% CI: 0.9–3.1. Women <70 demonstrated greater improvement in urinary incontinence (UI) symptom impact (–20.4 (33.0) vs –12.2 (30.7), p=0.01) and women ≥70 had greater persistent UUI symptoms (31.5% vs 23.3%, p=0.04); there was no difference between cohorts in resolution of UUI (29.6% vs 34.2%, p=0.34). Younger women reported a greater impression of improvement compared to older women (67.7% vs 56.6%,

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p=0.01, respectively), and there was no difference in satisfaction (83.2% vs 77.0%, p=0.08, respectively).

Conclusions—Older and younger women have similar SUI outcomes after MUS; however, older women have more persistent UII and a worse impression of improvement of their urinary tract condition.

Keywords

Age-related outcomes; older woman; lower urinary tract symptoms; midurethral sling

Introduction

Stress urinary incontinence (SUI) which affects up to 35% of women, is the involuntary leakage of urine with increases in abdominal pressures [1,2]. While SUI can be treated both non-surgically and surgically, the only documented long term curative treatment is surgery. The most common surgical treatment performed in the United States is the midurethral sling (MUS) procedure with more than 103,000 procedures performed annually [3,4]. MUS is now considered the gold standard for SUI treatment and success rates of these procedures at 12 months range from 77% to 90%, reflecting differences in definition of success [4]. As a result of the high prevalence of SUI and large number of MUS procedures performed each year, the procedure is performed on women over a wide range of ages.

The effect of the age of the patient and outcome of a MUS procedure is a characteristic that has not been well characterized. A study of 1,356 sling procedures on women age 65 and older stratified patients by age into two groups, one less than 75 years of age and the other 75 years of age and older. Results demonstrated objective outcomes in younger women were significantly better with respect to postoperative urgency urinary incontinence (UII) (20.0% vs 12.6%), treatment failure (10.5% vs 7.2%), and outlet obstruction (10.5 vs 6.6%) after MUS [5].

Given the general paucity of data on age related effects for outcomes of MUS on SUI and UII, our primary aim was to characterize SUI and UII symptom distress and impact outcomes after a primary (MUS) using validated measures in women ≥ 70 (older women) compared to women < 70 (younger women). Differences in *de novo* and persistent UII, patient satisfaction, and patient impression of improvement were also characterized. We hypothesized that older women undergoing primary MUS for SUI would have worse outcomes compared to younger women with regard to cure rate and satisfaction.

Materials and Methods

A retrospective cohort study evaluating all women who underwent a primary MUS procedure from April 1, 2006, to December 31, 2009 by the Division of Urogynecology and Pelvic Reconstructive Surgery at the University of Alabama at Birmingham was conducted. MUS procedures were identified by Current Procedural Terminology code. Institutional Review Board approval was obtained.

This current study was a secondary analysis utilizing an established database from a previously published primary analysis by Parden, et al [6]. Women included in our study were those with no history of prior MUS procedure and minimum follow up was 12 months. Women undergoing primary MUS were separated into two cohorts: women < 70 (younger women) and women ≥ 70 (older women).

The retropubic MUS used was the Gynecare® tension-free vaginal tape. The transobturator MUS used was the Monarc®. All sling procedures were performed as originally described [7,8]. Procedures were performed by four attending urogynecology surgeons during the study period. The data were not extracted by the surgeons and were entered into a password-protected database that was inaccessible to the surgeons.

The primary symptom distress outcome for SUI was defined as either a “moderately” or “quite a bit” response to at least one of the two SUI questions on the Urogenital Distress Inventory (UDI) subscale of the Pelvic Floor Distress Inventory-20 (PFDI-20): “Do you usually experience urine leakage related to laughing, coughing, or sneezing?” and “Do you usually experience small amounts of urine leakage (that is, drops)?” [9]. “Cure” of SUI was defined by an answer of “not at all” or “somewhat” to both of the above questions.

UUI was defined at baseline and follow-up as either “moderately” or “quite a bit” responses to the UDI subscale UUI question: “Do you usually experience urine leakage associated with a feeling of urgency; that is, a strong sensation of need to go to the bathroom?” [9]. Resolution of *de novo* UUI and persistent UUI were evaluated and compared between cohorts. Patients were considered to have resolution of UUI symptoms by responding “no” or “not at all” to the urgency urinary incontinence question of the PFDI-20 post-operatively. Patients were considered to have *de novo* UUI if they answered “no”, “not at all”, or “somewhat” in response to the UUI, PFDI-20 question at baseline and answered “moderately” or “quite a bit” post-operatively. Persistent UUI symptoms were defined as having baseline and post-operative “moderately” or “quite a bit” responses on the UUI subscale question. Symptom-specific effect on quality of life (QOL) was assessed using the Urinary Impact (UIQ) Questionnaire subscale of the PFIQ-7.

Patient impression of improvement was assessed with the Patient Global Impression of Improvement Questionnaire (PGI-I) and patient satisfaction was assessed with the Patient Satisfaction Questionnaire (PSQ) [10, 11]. The PGI-I consists of a single question, “Circle the one response that best describes how your urinary tract condition is now, compared to how it was before you had surgery.” There are seven possible responses ranging from “very much better” to “very much worse.” and improvement was defined as “very much/much” better. The PSQ consists of a single question, “How satisfied are you with your progress since your surgery?” in which the three possible responses are “completely satisfied,” “somewhat satisfied,” and “not satisfied” where satisfaction was defined as “completely/somewhat” [10,11].

All questionnaires were collected preoperatively (except the PGI-I and PSQ) and again at follow up and were scored using published protocols. Student t-test, Wilcoxon rank sum test, chi-square and Fisher’s exact were used to compare outcomes between the two age

groups. Multivariable regression analyses were performed controlling for baseline UUI symptoms, obesity, medical comorbidities, tobacco use, prior hysterectomy, vaginal estrogen use, concurrent prolapse surgery, and Valsalva leak point pressures. All tests of significance were evaluated at a 0.05 level of significance. SAS v9.2 (SAS Institute Inc., Cary, NC, USA) was used for all statistical analyses.

Results

A total of 707 women were eligible for this analysis and 696 had complete follow-up responses for SUI and UUI from the PFDI-20. The mean age of patients in the older group (n=160), ≥ 70 years old, was 75.4 ± 4.5 , and the mean age of patients in the younger group (n=536), < 70 years old, was 56.2 ± 9.4 . There was no difference in mean follow-up between the groups (37.6 ± 16.5 months for women < 70 and 37.2 ± 16.2 months for women ≥ 70 , $p=0.81$).

Women in the older age group had significantly higher proportions of medical comorbidities including hypertension, diabetes mellitus, osteoporosis, and chronic obstruction pulmonary disease (70.6% vs 50.8%, $p<0.0001$). In addition, women in the older cohort had significantly higher number of prescription medications, vaginal estrogen use, history of prior hysterectomy and prior surgery for repair of pelvic organ prolapse (Table 1). Regarding the lower urinary tract, older women had significantly higher anti-cholinergic use for overactive bladder (13.2% vs 7.7%, $p=0.031$), detrusor overactivity (23.4% vs 10.7%, $p=0.0004$), and lower median, range, and baseline valsalva leak point pressures (VLPP) ($88.5 [70.7, 115.7]$ vs $110 [86, 139.7]$ cm H₂O, $p<0.0001$) compared to younger women. Further, there were no differences in baseline UDI symptom distress or impact scores between older and younger women; however, a significantly higher proportion of older women had baseline UUI symptoms (64.1% vs 51.4%, $p=0.01$). Other clinical and demographic factors are noted in Table 1.

There was no difference in unadjusted SUI failure rates between age stratified cohorts, 27.4% in younger women vs 33.1% in older women, $p=0.16$. Multivariable analysis controlling for baseline UUI, obesity, comorbidities (hypertension, diabetes mellitus, osteoporosis, and chronic obstruction pulmonary disease), smoking, hysterectomy, vaginal estrogen use, concurrent prolapse surgery, and VLPP revealed no difference in primary SUI failure rates in older women compared to younger women, adjusted OR 1.7, 95% CI 0.9–3.1, $p=0.09$. Younger women demonstrated greater improvement in urinary impact with a greater decrease in PFIQ-7 score (-20.4 ± 33 vs -12.2 ± 30.7 , $p=0.01$), however, there was no difference in symptoms distress improvement between younger and older women (-23.9 ± 30.1 vs -19.4 ± 31.0 , $p=0.14$, respectively).

There was no significant difference in *de novo* symptoms (7.5% in younger vs 4.3% in older women, $p=0.22$), or in resolution of UUI symptoms (29.6% in younger vs 34.2% in older women, $p=0.34$), between the age groups after primary MUS. There was a significant difference in persistent UUI symptoms in the older group (31.5% vs 23.3%, $p=0.04$).

There was no difference in the proportion of subjects reporting post-operative satisfaction between the cohorts according to the PSQ (83.2% in younger women vs 77.0% in older women, $p=0.08$). However, younger women reported a greater global impression of improvement of their urinary tract condition post-operatively as compared to older women (67.7% vs 56.6%, $p=0.01$).

Discussion

In these well characterized cohorts of older and younger women, SUI outcomes measured using a robust and validated patient reported outcome measure and controlling for potential confounding variables were similar, after a primary MUS procedure. In this study, younger women did report a greater impression of improvement of their urinary tract condition after surgery.

Our findings are similar to a recent study in which 1,225 women undergoing MUS procedures (955 retropubic, 270 transobturator), stratified by age (women greater than or equal to 80 and women less than 80), found no significant difference in cure rate, long-term rate of voiding difficulty, or rate of *de novo* urgency incontinence using subjective outcome measures. In this study, multivariate analysis did not demonstrate age to be an independent predictor of sling failure[12].

The improvements in the UDI scores of both the older and the younger women cohorts exceeded the minimum important differences (MID) (11 points); however, only the younger women met the MID for the UIQ score (16 points) [13]. This finding may explain the differences noted between the cohorts in impression of improvement and may reflect inherent differences between younger and older women presenting for primary MUS procedures. Though not directly addressed in this study it is conceivable that younger women, despite similar baseline UDI and UIQ scores to older women, report a greater sense of improvement because they have been suffering from their urinary tract conditions less than older women.

Although subjective cure may be similar between cohorts, there may be significant differences in objective outcomes in older women. Nager, et al. demonstrated that women with baseline VLPP in the lowest quartile ($VLPP < 86$ cm H₂O) have a nearly 2-fold increased odds of objective failure after MUS, regardless of MUS route, transobturator or retropubic approach. [14] Our data demonstrated that, at baseline, older women presenting for primary MUS did have a significantly lower VLLP than younger women. Furthermore, the baseline VLLP in our cohort of older women closely approximated the previously reported lowest quartile.

It is unclear which factors are directly reflected by the patients' responses but they likely involve physiologic, social, and psychological interactions. It is important to note that while younger women reported a greater impression of improvement, there was no difference in the proportion of subjects reporting post-operative satisfaction between the age groups. This suggests that both groups may have had similar degrees of improvement within the context of their post-operative expectations and activity levels.

Older women had a significantly higher proportion of baseline UUI symptoms and while there were no differences between the age groups in resolution of UUI symptoms or *de novo* UUI after primary MUS, there was a significantly greater persistence of UUI symptoms in older women. These findings could be due to worse symptoms at baseline in older women including a significantly higher proportion of older women at baseline with detrusor overactivity and may also contribute to a lower global impression of improvement.

Limitations of the study include those inherent to a retrospective cohort design, as well as incomplete medical records and nonresponder bias inherent in the primary acquisition of data [6]. Despite these limitations, the study was strengthened by clear and robust validated outcome measures and a large sample size.

Older and younger women have similar SUI outcomes after primary MUS; however, older women have more persistent UUI symptoms and a worse impression of improvement in their urinary tract condition following primary MUS as compared to younger women. As population demographics continue to evolve, specifics on age-related outcomes of urinary incontinence interventions deserve further investigation. This information will be helpful for providing more robust patient counseling to all women regarding expectations of surgical intervention for SUI.

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References

1. Groth T, Guralnick ML, O'Connor RC. Review of female stress urinary incontinence. *Minerva Med.* 2007; 98:203–209. [PubMed: 17592441]
2. Nilsson CG, Palva K, Rezapour M, et al. Eleven years prospective follow-up of the tension-free vaginal tape procedure for treatment of stress urinary incontinence. *Int Urogynecol J Pelvic Floor Dysfunct.* 2008; 19:1043–1047. [PubMed: 18535753]
3. Oliphant SS, Wang L, Bunker CH, et al. Trends in stress urinary incontinence inpatient procedures in the United States, 1979–2004. *Am J Obstet Gynecol.* 2009; 200:521.e1–521.e6. [PubMed: 19375571]
4. Richter H, Albo ME, Zyczynski HM, et al. Retropubic versus transobturator midurethral slings for stress incontinence. *N Engl J Med.* 2010; 362:2066–2076. [PubMed: 20479459]
5. Anger JT, Litwin MS, Wang Q, et al. The effect of age on outcomes of sling surgery for urinary incontinence. *J Am Geriatr Soc.* 2007; 55:1927–1931. [PubMed: 18081671]
6. Parden A, Gleason J, Jauk V, et al. Incontinence outcomes in women undergoing primary and repeat midurethral sling procedures. *Obstet Gynecol.* 2013; 121:273–278. [PubMed: 23344276]
7. Ulmsten U, Henriksson L, Johnson P, et al. An ambulatory surgical procedure under local anesthesia for treatment of female urinary incontinence. *Int Urogynecol J Pelvic Floor Dysfunct.* 1996; 7:81–85. [PubMed: 8798092]
8. Delorme E. Transobturator urethral suspension: mini-invasive procedure in the treatment of stress urinary incontinence in women. *Prog Urol.* 2001; 11:1306–1313. [PubMed: 11859672]

9. Barber MD, Chen Z, Lukacz E, et al. Further validation of the short form versions of the Pelvic Floor Distress Inventory (PFDI) and Pelvic Floor Impact Questionnaire (PFIQ). *Neurourol Urodyn.* 2011; 30:541–546. [PubMed: 21344495]
10. Yalcin I, Bump R. Validation of two global impression questionnaires for incontinence. *Am J Obstet Gynecol.* 2003; 189:98–101. [PubMed: 12861145]
11. Burgio KL, Goode PS, Richter HE, et al. Global ratings of patient satisfaction and perceptions of improvement with treatment for urinary incontinence: validation of three global patient ratings. *Neurourol Urogyn.* 2006; 25:411–417.
12. Stav K, Dwyer PL, Rosamilia A, et al. Midurethral sling procedures for stress urinary incontinence in women over 80 years. *Neurourology and Urodynamics.* 2010; 29:1262–1266. [PubMed: 20878996]
13. Barber MD, Spino C, Janz NK, et al. Pelvic Floor Disorders Network. The minimum important differences for the urinary scales of the Pelvic Floor Distress Inventory and Pelvic Floor Impact Questionnaire. *Am J Obstet Gynecol.* 2009; 200:580.e1–580.e7. [PubMed: 19375574]
14. Nager C, Sirls L, Litman H, et al. Urinary Incontinence Treatment Network. Baseline Urodynamic Predictors of Treatment Failure One Year after Midurethral Sling Surgery. *J Urol.* 2011; 186:597–603. [PubMed: 21683412]

Table 1

Demographic Characteristics

Characteristic	< 70 (n=536)	70 (n=160)	p
Time from Surgery to Mail date (months)	37.6 ± 16.5	37.2 ± 16.2	0.81
Time from Surgery to Question (months)	38.7 ± 16.5	38.2 ± 16.3	0.72
Age	56.2 ± 9.4	75.4 ± 4.5	<0.0001
Race			
Caucasian	492 (92.7%)	153 (95.6%)	0.27
African-American	33 (6.2%)	5 (3.1%)	
Other	6 (1.1%)	2 (1.3%)	
Married	411 (77.6%)	96 (60.4%)	<0.0001
BMI			
Normal (<25)	144 (27.0%)	66 (41.3%)	0.008
Overweight (25–29)	220 (41.3%)	62 (38.8%)	
Obese (>=30)	169 (31.7%)	32 (20.0%)	
Obese	169 (31.7%)	32 (20.0%)	0.004
Diabetes (DM)	66 (12.3%)	17 (10.7%)	0.57
Hypertension (HTN)	226 (42.3%)	93 (58.1%)	0.0004
Hyperlipidemia	130 (24.3%)	56 (35.2%)	0.006
Osteoporosis (Osteo)	46 (8.6%)	38 (23.8%)	<0.0001
Neurologic Disease	26 (4.9%)	10 (6.3%)	0.48
Chronic Obstructive Pulmonary Disease (COPD)	21 (3.9%)	3 (1.9%)	0.32
Medical Co-morbidities	416 (78.1%)	143 (89.4%)	0.002
DM, HTN, Osteo & COPD	271 (50.8%)	113 (70.6%)	<0.0001
Num Prescript Meds	4.5 ± 3.5	5.8 ± 3.1	<0.0001
Smoker	51 (9.6%)	4 (2.5%)	0.002
Alcohol Intake	164 (30.8%)	37 (23.6%)	0.08
Vaginal deliveries	497 (93.3%)	153 (96.2%)	0.17
Menopause	403 (75.2%)	159 (99.4%)	<0.0001
Hysterectomy	316 (59.0%)	117 (73.1%)	0.001
Prior surgery for repair of prolapse	152 (28.9%)	63 (39.9%)	0.01

Characteristic	< 70 (n=536)	70 (n=160)	p
Oral Estrogen	133 (25.1%)	30 (19.1%)	0.12
Vaginal Estrogen	349 (69.9%)	138 (90.2%)	<0.0001
Anticholinergic Use	41 (7.7%)	21 (13.2%)	0.03
Other Prior incontinence surgery			
None	482 (91.6%)	142 (91.0%)	0.81
Burch	16 (3.0%)	6 (3.9%)	
Marshall-Marchetti-Krantz(MMK)	10 (1.9%)	3 (1.9%)	
Pubovaginal sling	12 (2.3%)	2 (1.3%)	
Other	6 (1.1%)	3 (1.9%)	
POPQPointC	-5 (-8, -3)	-3.25 (-7, 0)	<0.0001
Detrusor overactivity	39 (10.7%)	29 (23.4%)	0.0004
Vesical pressure Leak (mean Q50d)	110 (86, 139.7)	88.5 (70.7, 115.7)	<0.0001
PDET at QMax	22 (15, 31)	22.5 (13.1, 31.4)	0.55
Voiding Mechanism – Detrusor			
Valsalva/Mixed	193 (68.4%)	52 (64.2%)	0.47
	89 (31.6%)	29 (35.8%)	
Type of MUS			
TVT	475 (88.8%)	150 (93.8%)	0.07
TOT	60 (11.2%)	10 (6.3%)	
Concurrent prolapse surgery	369 (68.8%)	126 (78.8%)	0.02
Concurrent apical suspension	265 (49.4%)	83 (51.9%)	0.59
Concurrent cystocele repair	263 (49.1%)	74 (46.3%)	0.53
Concurrent hysterectomy	131 (24.4%)	22 (13.8%)	0.005
Cystotomy with trocar	26 (4.9%)	9 (5.6%)	0.71
Estimated blood loss	75 (50, 125)	75 (50, 100)	0.39
Baseline UDI6	53.3 ± 24.7	52.3 ± 29.4	0.73
Baseline UIQ7	43.5 ± 18.0	40.8 ± 30.3	0.35