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Lee J[1], Dwyer P[1], Lim Y[1], Rosamilia A[2], Polyakov A[2], Alvarez J[1], Stav K[3]

***1.*** *Mercy Hospital for Women, Melbourne Australia,* ***2.*** *Monash Medical Centre, Melbourne Australia,* ***3.*** *Assaf Harofeh Medical Centre, Zeriffin, Israel; Mercy Hospital for Women, Melbourne Australia*

# THE EFFECT OF MIDURETHRAL SLINGS ON DENOVO URGENCY AND URGENCY URINARY INCONTINENCE

Hypothesis / aims of study

Systematic reviews have suggested that the rate of *denovo* irritative voiding symptoms from RCTs of midurethral slings (MUS) is in the order of 11-19% (1). Population based prevalence studies have indicated a greater impact on health related quality of life from the urgency component of lower urinary tract symptoms (2). Although MUS procedures are generally very effective in treating stress urinary incontinence (SUI), there is a concern these procedures might lead to *de novo* urgency urinary incontinence, and consequently patient dissatisfaction. We aim to determine the independent risk factors for development of *denovo* urgency (*d*U) or *denovo* urgency urinary incontinence (*d*UUI) following MUS procedures.

Study design, materials and methods

We prospectively assessed 598 consecutive women who presented without urgency or urgency urinary incontinence, all of whom underwent MUS surgery from May 1999 till Aug 2007, with a mean follow up of 50 months. Consent was obtained from women together with approval from the local ethics committee. Comprehensive history comprised of demographics, medical history, symptoms of lower urinary tract and pelvic floor dysfunction, followed by full physical examination, urodynamic assessment and surgical reports, recorded on a detailed proforma. *d*U or *d*UUI was defined as occurring in those women who presented *without* urinary urgency OR urgency urinary incontinence and subsequently developed urinary urgency or urgency urinary incontinence following MUS, respectively at long term follow up. Women who defaulted from follow up were interviewed via telephone using structured questionnaires derived from Urogenital Distress Inventory (3). Clinical data were separated according to presence or absence of (i) *d*U (n=374); (ii) *d*UUI (n=598). Chi-square tests, independent t tests, and ANOVA tests were used to compare the two groups (presence vs. absence of *d*U or *d*UUI) by baseline characteristics and clinical factors. Clinical parameters possibly associated with each of above factors were assessed using multiple logistic regression analysis with stepwise building of an optimal model for prediction. Receiver operator curve (ROC) was performed for calculated probabilities from the final model.

Results

The mean age was 59.4±13.3 years. The overall subjective rate for *d*U & *d*UUI was 27.7% & 13.7% respectively. The mean follow-up was 215.3±101.9 weeks. Results of univariate analysis of clinical parameters is summarised in Table 1, with Table 2 summarising the independent risk factors for developing *d*U or *d*UUI. Age, length of follow up, menopausal status, use of HRT, parity, cystometric capacity, volume at first sensation, urodynamic voiding dysfunction level of surgical experience, type of anaesthesia, presence of intraoperative bladder perforation, use of mesh for prolapse surgery, were not significant risk factors (p>0.05). Multivariate analysis showed intrinsic sphincter deficiency (ISD), previous stress incontinence surgery, urodynamic detrusor overactivity (DO) confers significant odds whereas concomitant apical prolapse surgery confers inverse odds towards developing *d*U or *d*UUI post MUS.

Interpretation of results

The presence of intrinsic sphincter deficiency (ISD), history of previous sling / colposuspension or prolapse surgery and urodynamic detrusor overactivity (DO) significantly increased the risks of women developing *d*U or *d*UUI post MUS. A concurrent apical prolapse operation protects against developing *d*U or *d*UUI post MUS. The ROC for *d*U and *d*UUI indicate the model is a good fit with area under curve of 0.7875 and 0.6851 respectively.

Concluding message

Previous stress incontinence surgery, presence of urodynamic ISD or DO significantly increases, whereas concomitant apical prolapse surgery significantly decreases the risk of women developing denovo overactive bladder symptoms following MUS.

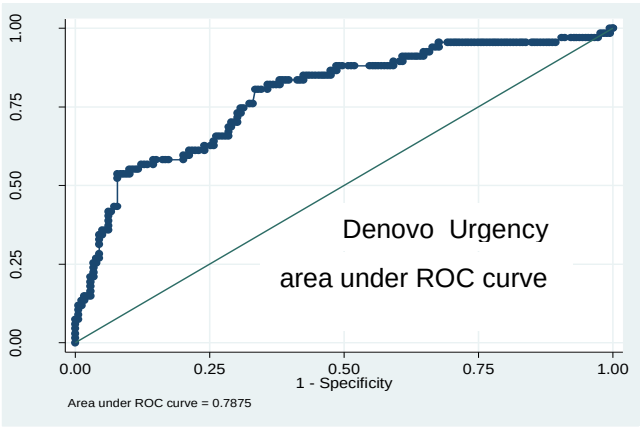
Table 1. Univariate analysis of risk factors for ***denovo* Urgency or *denovo***

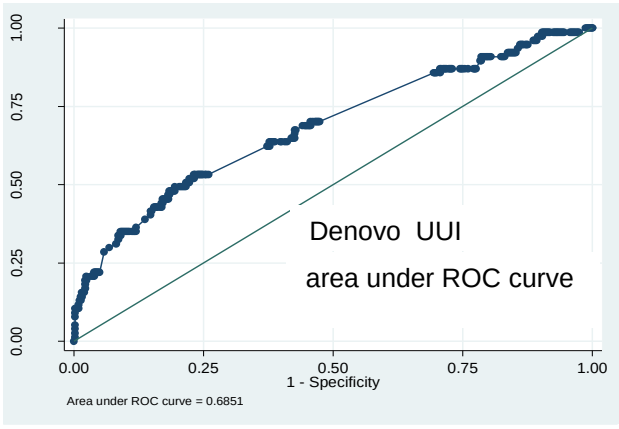
| ***Denovo* Urgency** | n=99 (%) | n=259 (%) | **p value** | ***Denovo* Urgency UI** | n=82 (%) | n=598 (%) | **p value** |
|---|---|---|---|---|---|---|---|
| n=358 | *d*U | No *d*U | | n=598 | *d*UUI | No *d*UUI | |
| Age (yrs) Mean ±SD | 61.3 ±13.0 | 60.0±13.2 | 0.129 | Age (yrs) Mean ±SD | 59.3 ±12.2 | 59.4±13.4 | 0.936 |
| Follow up (wks) M ±SD | 219.8±99.5 | 220.7±103 | 0.936 | Follow up (wks) M ±SD | 216.8±104 | 215.1±101 | 0.889 |
| SUI only | 93 (93.9) | 251 (96.9) | | SUI only | 47 (57.3) | 297(57.6) | |
| no SUI & no Urgency | 6 (6.06) | 8 (3.09) | 0.194 | SUI & Urgency | 25 (30.5) | 193 (37.4) | |
| | | | | no SUI & no Urgency | 5 (6.1) | 9 (1.7) | **0.043** |
| | | | | o SUI Urgency only | 5 (6.1) | 17 (3.3) | |
| Prev POP surgery | 32 (32.3) | 57 (22.0) | **0.043** | Prev POP surgery | 30 (36.6) | 133(25.8) | **0.041** |
| Prev SUI surgery | 35 (35.4) | 34 (13.1) | **<0.0001** | Prev SUI surgery | 21 (25.6) | 86 (16.7) | **0.05** |
| Prev Burch Colpo | 11 (11.1) | 15 (5.8) | 0.083 | Prev Burch Colpo | 16 (19.5) | 39 (7.6) | **0.001** |
| Prev Sling | 24 (24.2) | 19 (7.3) | **<0.0001** | Prev Sling | 5 (6.1) | 47 (9.1) | 0.369 |
| BMI Mean ±SD | 28.4 ±4.8 | 26.5 ± 4.0 | **0.001** | BMI Mean ±SD | 29.0 ±5.3 | 26.8 ±4.4 | **0.001** |
| BMI >30 | 34 (34.3) | 46 (17.8) | **0.004** | BMI >30 | 31 (37.8) | 104 (20.2) | **0.003** |
| Ant Vag POP stg>1 | 60 (60.1) | 188 (72.6) | **0.028** | Ant Vag POP stg>1 | 60 (73.2) | 375 (72.7) | 0.925 |
| Apical Vag POP stg>1 | 35 (35.4) | 137 (52.9) | **0.003** | Apical Vag POP stg>1 | 46 (56.1) | 272 (52.7) | 0.568 |
| | | | | | | | |
| Capacity(ml) Mean ±SD | 481.7±69.2 | 484.5±73.5 | 0.741 | Capacity(ml) Mean ±SD | 490±104.9 | 471.2±72.4 | 0.125 |

| 1st Sens (ml) Mean ±SD | 209±107.2 | 227±98.8 | 0.202 | 1st Sens (ml) Mean ±SD | 219±112.2 | 228±103.3 | 0.56 |
|---|---|---|---|---|---|---|---|
| ISD | 20 (20.2) | 27 (10.4) | **0.014** | ISD | 20 (24.4) | 63 (12.2) | **0.003** |
| USI & DOI | 16 (16.2) | 15 (5.8) | **0.005** | USI & DOI | 19 (23.2) | 37 (7.2) | **<0.0001** |
| Q<15 &/or PVR>50 | 4 (4.0) | 15 (5.8) | 0.546 | Q<15 &/or PVR>50 | 6 (7.3) | 31 (6.0) | 0.692 |
| | | | | | | | |
| Repeat SUI Surgery | 35 (35.4) | 34 (13.1) | **<0.0001** | Repeat SUI Surgery | 20 (24.4) | 85 (16.5) | 0.08 |
| Retropubic MUS | 60 (60.6) | 191 (73.8) | | Retropubic MUS | 65 (79.3) | 364 (70.5) | |
| Transobturator MUS | 39 (39.4) | 68 (26.2) | **0.015** | Transobturator MUS | 17 (20.7) | 152 (29.5) | 0.103 |
| MUS alone | 79 (79.8) | 186 (71.8) | | MUS alone | 56 (68.3) | 353 (68.4) | |
| MUS & POP Surgery | 20 (20.2) | 73 (28.2) | 0.272 | MUS & POP Surgery | 26 (31.7) | 163 (31.6) | 0.983 |
| Vault suspension | 4 (4.0) | 17 (6.6) | 0.363 | Vault suspension | 4 (4.9) | 49 (9.5) | 0.172 |
| Apex stg<1 No OP | 63 (63.6) | 116 (44.8) | | Apex stg<1 No OP | 35 (42.7) | 229 (44.4) | |
| Apex stg>1 No OP | 32 (32.3) | 126 (48.7) | | Apex stg>1 No OP | 43 (52.4) | 238 (46.1) | |
| Apex stg>1 Apex OP | 3 (3) | 14 (5.4) | **0.016** | Apex stg>1 Apex OP | 3 (3.7) | 38 (7.4) | 0.502 |
| Would Not recommend Surgery to friend | 18 (18.2) | 2 (0.8) | **<0.0001** | Would Not recommend Surgery to friend | 17 (20.7) | 11 (2.1) | **<0.0001** |

Table 2. Multivariate analysis – independent risk factors for ***denovo* Urgency or *denovo* Urgency Urinary Incontinence**

| ***denovo* Urgency** | **OR** | **95%CI** | **p value** | ***denovo* Urgency UI** | **OR** | **95%CI** | **p value** |
|---|---|---|---|---|---|---|---|
| ISD | 3.94 | 1.50 –10.38 | **0.007** | ISD | 2.5 | 1.31-4.8 | **0.06** |
| Prev Sling | 3.69 | 1.45 – 9.37 | **0.006** | Prev Colposusposuspension | 2.5 | 1.23-5.07 | **0.011** |
| Prev prolapse surgery | 2.45 | 1.18 – 5.10 | **0.016** | | | | |
| Urodynamic USI ***&*** DOI (mixed) | 1.99 | 1.15 – 3.48 | **0.014** | Urodynamic USI ***&*** DOI (mixed) | 1.85 | 1.31-2.6 | **<0.0001** |
| Cough Stress Test (Pos) | 1.82 | 1.18 - 2.80 | **0.007** | Baseline LUT (noSUI/NoU NoUUI OR No SUI U only) | 1.35 | 1.03-1.78 | **0.031** |
| Apical POP / Apical Op | 0.58 | 0.41 – 0.81 | **0.002** | Vault Suspension | 0.29 | 0.087-0.97 | **0.045** |





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|---|---|
| ***Specify source of funding or grant*** | **None** |
| ***Is this a clinical trial?*** | **No** |
| ***What were the subjects in the study?*** | **HUMAN** |
| ***Was this study approved by an ethics committee?*** | **Yes** |
| ***Specify Name of Ethics Committee*** | **Human Research Ethics Committee, Mercy Hospital for Women** |
| ***Was the Declaration of Helsinki followed?*** | **Yes** |
| ***Was informed consent obtained from the patients?*** | **Yes** |