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COMPARISON OF URODYNAMIC CHANGES BETWEEN AUTOLOGOUS FASCIA PUBOVAGINAL SLING AND SYNTHETIC MIDURETHRAL SLING

Hypothesis / aims of study

The mechanism of action of sling surgery in the correction of stress urinary incontinence (SUI) remains unclear. Investigators have shown that after pubovaginal sling (PVS), flow rates decreased while voiding pressures increased(1) however after midurethral sling (MUS) flow rates decreased with no appreciable change in voiding pressure. Furthermore, no differences between retropubic and transobturator MUS were seen. (2) We compared the urodynamic (UDS) changes after autologous fascial PVS and synthetic MUS procedures to determine if post-operative UDS changes were different between these 2 different sling surgeries.

Study design, materials and methods

Women with SUI from 2 separate clinical trials were evaluated with UDS before and after surgery. For the Stress Incontinence Surgical Treatment Efficacy Trial (SISTER), women underwent PVS with autologous fascia and had UDS before and 24 months after surgery.(1) For the Trial Of Mid-Urethral Slings (TOMUS), women underwent either transobturator or retropubic MUS and had UDS before and 12 months after surgery.(2) All women underwent standardized UDS (1,2) which followed ICS Good Urodynamic Practice Guidelines including: Noninvasive uroflow (NIF), cystometrogram (CMG) and pressure flow study (PFS). UDS parameters are listed in tables and include: maximum (Qmax) and average (Qav) flow rates, post void residual (PVR), maximum cystometric capacity (MCC), voiding pressure (Pdet at Qmax), bladder outlet obstruction index (BOOI) and presence of detrusor overactivity (DO).

Propensity score analysis was performed to aid in controlling for bias between the samples selected for the two studies. We used multiple logistic regression analysis to compute the probability of being enrolled in one study vs. the other conditional on baseline characteristics. Controlling for propensity quintile, we tested whether the differences in UDS parameters measured continuously differ according to trial using analysis of covariance on the mean difference scores. For UDS parameters measured categorically, chi-square analysis was used, controlling for propensity scores.

Results

Table 1: Difference in urodynamic testing before and after PVS and MUS

UDS variable	PVS	MUS	p-value*
	Adjusted Mean (SE) Difference (Post-Pre)	Adjusted Mean (SE) Difference (Post-Pre)	
NIF Qmax (ml/sec)	-5.7 (1.4)	-4.7 (0.7)	0.52
NIF Qav (ml/sec)	-4.0 (0.7)	-2.0 (0.3)	0.01
NIF Time to Qmax (sec)	1.7 (1.8)	-0.4 (0.9)	0.35
NIF Voided volume (ml)	-12.1 (16.0)	-4.2 (8.1)	0.67
NIF PVR (ml)	0.6 (5.3)	8.7 (2.9)	0.20
First desire (ml)	51.3 (11.0)	20.4 (5.7)	0.02
Strong desire (ml)	45.5 (12.8)	14.5 (6.7)	0.04
Volume at MCC (ml)	5.1 (11.3)	-14.1 (5.9)	0.16
PFS Qmax (ml/sec)	-5.1 (1.3)	-2.7 (0.6)	0.12
PFS Voided volume (ml)	-50.2 (18.3)	-9.6 (8.2)	0.06
PFS Pdet at Qmax (cm h20)	11.8 (1.7)	3.7 (0.9)	<0.001
BOOI	20.5 (3.3)	6.2 (1.8)	<0.001

*Adjusted for propensity score analysis

Table 2: Frequency of denovo incidence and resolution of Detrusor Overactivity after PVS and MUS; odds ratio (95% CI)

	PVS	MUS	Propensity score adjusted p-value
De novo DO			
n/total n (%)	18/239 (7.5%)	22/439 (5.0%)	
OR (95% CI)	1.38 (0.56, 3.39)	1 Reference	0.48
Resolution of DO			
n/total n (%)	10/231 (4.3%)	36/453 (8.0%)	
OR (95% CI)	0.47 (0.19, 1.67)	1 Reference	0.30

Interpretation of results

While decreases in NIF Qmax were similar for both PVS and MUS, NIF Qav decreased more after PVS. CMG volumes for first desire and strong desire increased after both PVS and MUS but were greater after PVS. No difference in the rate of de novo DO or resolution of DO was seen between the 2 groups. During PFS, decreases in Qmax were seen in both arms with no appreciable difference between the procedures. However increases in Pdet at Qmax and BOOI were greater in the PVS group.

Concluding message

Both PVS and MUS were associated with similar decreases in maximum flow rates during both NIF and PFS. However the PVS group was associated with greater increases in voiding pressures and BOOI suggesting that PVS may function by increasing outlet obstruction more so than MUS. This might explain the higher incidence of post-operative voiding dysfunction seen after PVS.(3) While no difference in de novo and resolution of DO was seen, the PVS group had higher volumes at first and strong desires suggesting changes in storage function may also occur.

References

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Disclosures

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