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LEAK POINT PRESSURE TESTING AFTER TISSUE ENGINEERED SLING PLACEMENT IN A MODEL OF STRESS URINARY INCONTINENCE

Aims of Study

The purpose of this study was to evaluate the functional effects of a tissue engineered sling in an animal model of stress urinary incontinence (SUI). There is very little treatment-oriented research utilizing tissue engineering techniques for SUI. Using such techniques, we propose to develop a truly physiologic sling, not from synthetic or cadaveric tissue, but rather an engineered sling that can be implanted to repair a damaged urethral sphincter. This abstract is the first step toward this goal.

Methods

Female rats were divided into four groups (n=5/group): a control group (C) had no pre-LPP interventions, a denervated group (D) that underwent bilateral PSNT and periurethral dissection without sling placement, a SIS sling group (S) that had concomitant bilateral PSNT and SIS suburethral sling placement, and finally the tissue engineered sling group (M) that underwent concomitant bilateral PSNT with implantation of a tissue engineered sling. Suburethral sling placement was performed via a transabdominal approach using a sling sutured to the pubic bone. Tissue engineered slings were prepared with muscle derived cells obtained via the preplate technique and subsequently seeded for 2 weeks on an SIS scaffold. Suburethral slings were implanted for two weeks prior to LPP testing using the verticle tilt/intravesical pressure clamp method (Fraser et al., 2000, J Urol., 163:76). Intravesical pressure was increased in 1-2 cm steps for ~30 seconds/step until visible leakage (LPP). The mean values of 3-4 trials were analyzed and data is presented as mean SEM.

Results

LPPs from both sling groups (S and M) were not different than untreated controls (C). The S, M, and C groups all had significantly higher LPPs than PSNT alone animals (D). Importantly, no rat from either sling group (S and M) demonstrated signs of urinary retention.

LPP in cm H2O

	C	D	S	M
Mean	46.1	18.0	51.2	51.4
SEM	1.8	6.6	1.6	6.0

Conclusions

Placement of tissue engineered slings in an animal model of SUI resulted in LPP measurements that were not significantly different from LPPs of the untreated control or SIS alone groups. These data demonstrate that the incorporation of stem cells into SIS slings does not adversely alter the mechanical advantage of sling placement in a stress urinary incontinence model, and therefore sets the stage for future functional studies of tissue engineering sling materials.