

## **NEW OBJECTIVE MEASURES TO QUANTIFY STRESS URINARY INCONTINENCE IN A NOVEL DURABLE ANIMAL MODEL OF INTRINSIC SPHINCTER DEFICIENCY.**

### Hypothesis / aims of study

Existing animal models of stress urinary incontinence (SUI) are limited due to the low rate of incontinence seen in the animals and to their relatively low durability. In addition, most methods described to measure incontinence are operator dependent. The aim of this study was to develop a new durable animal model of SUI and establish objective measures to quantify SUI

### Study design, materials and methods

We subjected female rats to transabdominal urethrolisis. At baseline and at 1, 4, 8, 12 and 24 weeks after intervention animals underwent cystometry and evaluation with abdominal leak point pressure (ALLP). Urethral resistance was evaluated by retrograde urethral perfusion pressure (RUPP). Tissues were obtained for histology and immunohistochemistry.

### Results

Normal female rats had an average ALPP of 19.4 cmH<sub>2</sub>O and RUPP of 22.6 cmH<sub>2</sub>O at baseline. More than 93% of the animals had significantly decreased ALPP and RUPP after the procedure. The mean ALPP and RUPP decreased to 9.8 cmH<sub>2</sub>O and 11.2 cmH<sub>2</sub>O respectively by one week after urethrolisis. These changes were maintained for up to 24 weeks. The animal model had excellent inter-observer and intra-observer reliability. Changes seen in urethral resistance and ALPP appear to be mediated by apoptosis, decreased neuronal mass, and smooth muscle atrophy.

### Interpretation of results

These results indicate that transabdominal urethrolisis is a reliable method of achieving durable decreased urethral resistance in a SUI model. RUPP and ALPP are objective and reproducible methods of assessing urethral resistance. Changes in continence and urethral resistance appear to be mediated by denervation and smooth muscle atrophy, which are seen in both elderly incontinent patients and in patients with intrinsic sphincter dysfunction

### Concluding message

Transabdominal urthrolisis ia a reliable animal model for simulating the smooth muscle atrophy and decreased urethral resistance of intrinsic sphincter deficiency. The model is reproducible and durable. RUPP and ALPP are objective and reproducible methods to assess urethral resistance in this animal model. This is an attractive model for investigating interventional and regenerative therapies aimed at treating SUI.

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