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Nascimento S¹, Bispo A², Leite K³, Plapler H², Simonetti R², Andreoni C², Füllhase C⁴, Andersson K⁵, Ortiz V², Soler R²

1. Federal University of São Paulo, 2. Federal University of São Paulo, 3. University of São Paulo, 4. Ludwig Maximilans University, 5. Wake Forest University

A NEW ANIMAL MODEL OF INTRINSIC SPHINCTERIC DEFICIENCY IN MALE RATS

Hypothesis / aims of study

Due to the high prevalence of stress urinary incontinence in women, there are several animal models of female intrinsic sphincteric deficiency (ISD). However, there is no report in the literature of a male ISD animal model. The aim of this study was to establish an animal model of ISD in male rats and evaluate morphological and functional differences between males and females.

Study design, materials and methods

30 female and 30 male age-matched Wistar rats were used in the experiments. Half of them underwent electrocauterization of the surrounding tissues lateral to the urethra at the level of the external urethral sphincter (EUS) and the others, a sham operation. The rats were divided into 6 groups of 5 rats for both male and female animals. At 2, 6 and 16 weeks after electrocauterization or sham procedure they were evaluated by anesthetized cystometry, measurement of leak point pressure (LPP) and their urethras were harvested for morphological analyses.

Results

There were no differences in cystometric parameters between sex-time-matched animals, ensuring normal bladder function in the manipulated animals. The mean (SEM) LPP in male and female rats was statistically lower in each time-point compared with sham animals (Table1). When age-time-matched sham operated male and female rats were compared, male animals exhibited a higher LPP in all time points (p<0.0001). At 2 weeks the EUS had similar thickness and morphology in cauterized and sham operated animals, both in male and female rats. Inflammatory changes were seen only in cauterized animals. Male rats had significantly thicker EUS than female rats ($350 \pm 10 \text{ vs } 55 \pm 4.2 \text{ mm}$; p<0.0001). Morphological changes were apparent after 6 weeks in both male and female rats after cauterization, with disruption of the striated muscle and more collagen deposition.

Time point	me point 2 weeks		p value	6 weeks		p value	16 weeks		p value
	Sham	IU		Sham	IU		Sham	IU	
Male	55(4.4)	15(1.7)	< 0.0001	66(1.8)	21(3.4)	< 0.0001	64(4.6)	18(1.9)	< 0.0001
Female	39(1.2)	14(3.5)	< 0.0001	41(5.5)	16(1.1)	< 0.0002	39(1.4)	17(1.0)	< 0.0001

Table 1: LPP of sham vs electrocauterized animals

Interpretation of results

Even though both male and female rats exhibited similar responses to the injury, changes in LPP in male rats were more pronounced, considering that they had higher basal LPP than female rats. This difference in LPP in sham animals might be due to anatomical differences between male and female rats, as length and thickness of the EUS. Electrocauterization of the urethral sphincter produced a durable intrinsic sphincteric deficiency in male rats, similar to what happens in female rats. Damage to the striated muscle may have contributed to the change and maintenance of lower LPPs.

Concluding message

We established a durable and reliable animal model of male intrinsic sphincteric deficiency in rats.

Disclosures

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