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Title (type in CAPITAL LETTERS): **COMPARISON OF LEAK POINT PRESSURE METHODS IN THE FEMALE RAT**

AIMS OF STUDY

An animal model of Stress Urinary Incontinence (SUI) would be useful for investigation of pathophysiology and development of new treatments. Recently, attempts have been made to develop appropriate animal models [1,2]. However, development of a model is dependent on an appropriate measure of abdominal Leak Point Pressure (LPP), the standard clinical method of diagnosing SUI. The aim of this study was to use urodynamics to compare bladder pressures during Spontaneous Voids (SV), measurement of LPP, and induced sneezing in female rats.

METHODS

Under ketamine (60 mg/kg) and xylazine (7.5 mg/kg) anesthesia, a suprapubic catheter (PE-50 tubing) was implanted in the bladder dome of six virgin female rats (180-200g) [3]. Two days later, the rats were tested urodynamically under urethane anesthesia (1.2g/kg). The animals were placed in a supine position and the bladder was emptied and filled via the catheter with 0.5ml room temperature saline over 10 minutes. The abdomen was slowly depressed manually while bladder pressure was measured through the catheter. As soon as leakage of urine was observed at the urethral meatus, the pressure on the abdomen was removed. The peak pressure was taken as LPP. The bladder was filled again for 1 min (0.05ml) to replace the leaked saline and LPP was remeasured. The bladder was filled again for 1 min and the rats were stimulated to sneeze by cutting off a whisker and using it to tickle the nostril [1]. Bladder pressures were recorded during sneezing and any leakage was noted. Bladder pressure was recorded continuously during the study, so if a SV occurred during filling, the peak bladder pressure was noted and bladder filling began again afterward. Time course of LPP, SV, and sneeze were calculated from the start of pressure rise until pressure returned to baseline values. Mean peak pressure and mean time course were obtained for LPP, sneeze, and SV measurement in each animal. Data is presented as mean ± standard deviation of 5-6 animals. ANOVA followed by Student-Newman-Keuls test was used to compare the three tests. $P<0.05$ was considered significant.

RESULTS

A sneeze generates low bladder pressure (figure 1a). Bladder pressure generated by a SV increases and decreases slowly (figure 1B) since smooth muscle relaxes slowly [4]. Bladder pressure generated by a LPP decreases quickly after the external application of increased abdominal pressure was removed (figure 1c). Peak pressures during LPP (39.2 ± 13.5 cmH_2O) were significantly higher than peak pressures during sneeze (8.6 ± 1.1 cmH_2O) but were not significantly

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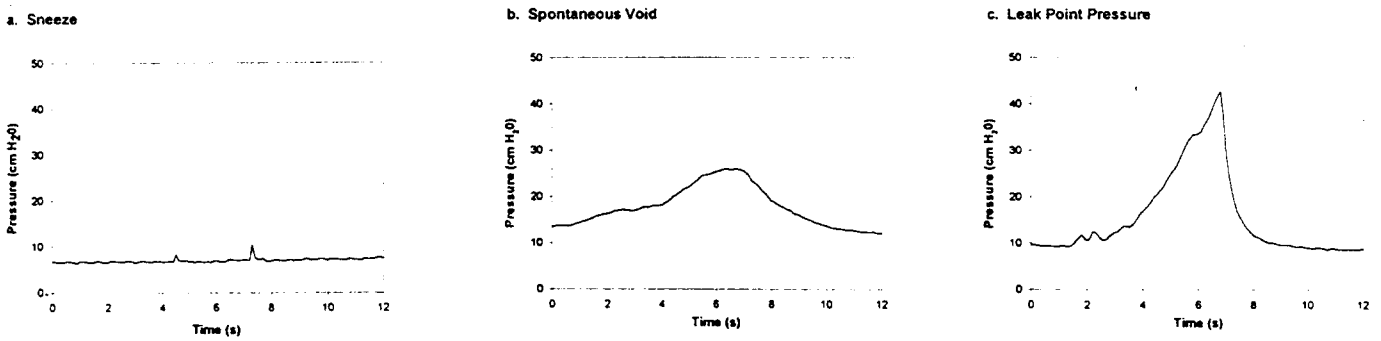
different from peak pressures during SV (24.6 ± 1.3 cmH_2O). The time course of a sneeze (0.4 ± 0.2 sec) was significantly shorter than the time course of LPP (4.8 ± 1.7 sec) or SV (5.8 ± 2.9 sec). No rat leaked from a sneeze unless the sneeze triggered a SV. LPP triggered a SV in 2 rats and sneeze triggered a SV in 4 rats. In 1 rat, sneezes could not be induced.



CONCLUSIONS

The novel method of testing LPP presented here can be performed reliably and slowly enough to detect any changes due to development of SUI in rats. Sneezing is not inducible in all rats and may not generate enough bladder pressure to detect leakage. Without measuring bladder pressure via urodynamics, it is impossible to determine if similar pressures are generated by sneezes in all rats. With urodynamics, it is possible to distinguish between LPPs, SVs, and sneezes.

REFERENCES

[1] Urology 52: 143-151, 1998.

[2] Int. Urogynecol. J. 9: 88-93, 1998.

[3] Neurourol. and Urodynam. 6; 331-338, 1987.

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