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Title: HIGH INTRAVESICAL POTASSIUM CONCENTRATION REDUCES BLADDER CAPACITY IN PIGS.

Aims of Study

Hohlbrugger and colleagues (1) have demonstrated that altering the composition of the urine may affect micturition in the rat, and have proposed that high K⁺ in the urine may be responsible for bladder overactivity. We have examined the effects of altering the composition of filling solutions in pigs with the aim of establishing more relevant urodynamic models in which to examine this phenomenon further.

Methods

Under general anaesthesia 8 female Large White pigs underwent implantation of tunnelled vesical, peritoneal and central venous catheters allowing chronic access as previously described (2). After five days of postoperative recovery, standard cystometry was performed under light sedation using a continuous intravenous infusion of propofol (2-8mg/kg/h). The animals bladders were filled with either a 154mM NaCl solution or an iso-osmolar KCl solution (both warmed to 37°C) at a rate of 50ml/min. Filling was continued until a sustained detrusor contraction occurred and the voided solution collected. The following parameters were continuously recorded Pves, Pabd, Pdet and Vinf. For the purposes of this study each animal underwent two separate urodynamic sessions, one study with 5 NaCl fills and a second with 2 NaCl fills followed by 3 KCl fills. Any residual filling solution was aspirated between each fill and its volume recorded.

Results

When performing a series of 5 repeat fills with NaCl solution the volume infused before the onset of a voiding contraction was consistent throughout. During the second session the mean Vinf when filling with NaCl was 469mls. Changing the filling solution to iso-osmolar KCl solution resulted in a drop of the mean Vinf to 314mls. This reduction was highly significant (n=8, p=0.007, students t-test). There were no significant differences in any of the other urodynamic parameters recorded.

Conclusion

These results suggest that alterations in the electrolytic composition of the urine may indeed affect micturition parameters in an animal model which is physiologically similar to humans. Further work is ongoing to determine the underlying mechanisms.

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References

1. Hohlbrugger G. 1999. Urinary potassium and the overactive bladder. Br J. Urol 803:22-27.
2. Greenland JE, Brading AF. 1996. Urinary blood flow changes during the micturition cycle in a conscious pig model. J Urol 156:1858-1861.