sites were ineffective. Urethral anaesthesia selectively suppressed the response to urethral flow (down to 13% of its control amplitude, p<0.0001), indicating that the responsible afferents are in the urethra.

CONCLUSIONS

Small urethral flows appear to elicit typical large bladder micturition contractions in awake intact animals. The response increasing with the flow rate (4), the reflex effect should be quite significant during the actual normal micturition. The reflex is present in all studied species and has been seen in some neurological patients (5). It receives descending excitatory and inhibitory controls parallel to those of the bladder to bladder micturition reflex (4). Taken together, these data suggest that the negative results in normal awake human subjects are due to descending inhibitory controls rather than to the lack of the appropriate pathways.

REFERENCES

1. *Brain,* (1921), **44**, 23-53
2. *J. Urol.* (1998) **162**, 204-212
3. *J. Neurol. Neurosurg. Psychiatr*, (1952) **15**, 148-149
4. *ICS 27th Annual Meeting*, (1997) Abstr. 257
5. *Scand. J. Urol. Nephrol.*, (1999), **33**, 24-26

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Title (*type in CAPITAL LETTERS, leave one blank line before the text*):

RELATION OF HUMAN BLADDER BLOOD FLOW TO VOLUME AND COMPLIANCE

Aims of Study: The mechanism by which the human bladder is able to maintain perfusion in the face of increasing distention has not been established. The following study was performed in order to characterize how progressive filling changes bladder blood flow and microcirculatory resistance in conscious patients. We also investigated the relationship between bladder compliance and overall bladder blood flow.

Methods: Seventeen awake patients underwent water cystometry followed by cystoscopy under local anesthesia with intramuscular placement of a laser Doppler flow probe into the posterior wall of the bladder. Simultaneous measurements of systemic blood pressure (SBP), bladder blood flow (BBF), and intravesical pressure (Pdet.) were obtained with the bladder filled with normal saline to 0% (empty), 25%, 50%, 75%, and 100% of awake Cystometric capacity (Cmax). Additional measurements were obtained immediately post bladder drainage.

Results: Mean BBF was lowest in the empty state and increased with bladder filling until its highest level occurred at 75% of Cmax. Conversely, mean bladder microcirculatory resistance (MCR; mean SBP/mean BBF) was highest in the empty state and decreased with filling up to 75% of Cmax. From 75% of Cmax to 100% of Cmax, mean Pdet. Increased by 73% (25.2 cmH20 --> 43.5 cmH20), resulting in a 72% increase in mean bladder MCR and a corresponding 36% decrease in mean BBF. Complete bladder drainage led to a drop in mean Pdet. to baseline (0% Cmax) levels while mean

MCR remained low, at only 63% of baseline levels with a corresponding mean BBF which was roughly 1.7X baseline, demonstrating a reperfusion phenomenon. Calculated bladder compliance over the entire filling curve correlated directly with BBF ($p = .025$); i.e. low compliance was associated with low bladder blood flow.

Conclusions: Human bladder blood flow and microcirculatory resistance vary with the degree of bladder filling and the phase of the filling/emptying cycle. In the empty state, despite low intravesical pressure, bladder microcirculatory resistance and blood flow are at their maximum and minimum values respectively. Once filling commences, microcirculatory resistance falls and correspondingly, blood flow increases. When the bladder is filled beyond 75% of its maximum capacity, detrusor pressure rises and microcirculatory resistance is subsequently increased, lowering blood flow. These observations suggest that elevations in bladder wall tension only become significant in reducing BBF when the bladder is near maximal capacity. Acutely after bladder drainage, microcirculatory resistance falls, allowing reperfusion in the collapsed state. Our studies also demonstrated a close correlation between decreased bladder wall compliance and decreased bladder blood flow.

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Title (type in CAPITAL LETTERS, leave one blank line before the text):
CYSTOMETRIC EVALUATION OF BLADDER FUNCTION IN NON-ANESTHETIZED MICE WITH AND WITHOUT BLADDER OUTLET OBSTRUCTION

Aims of Study
Transgenic knockout mice may be a useful tool for examination of the molecular mechanisms underlying various forms of bladder dysfunction.
There are several published reports on cystrometry in mice both without and with bladder outlet obstruction (1-4). However, these investigations have been performed in anesthetized animals, which precludes information on active micturition. Development of a reliable and reproducible cystometric model in the non-anesthetized mouse is desirable.
The aim of the present study was to develop a model for cystrometric study of bladder function in the awake mouse, and to characterize urodynamically and immunohistochemically the normal and infravesically obstructed mouse bladder.
Methods
Normal Balb/CJ mice, and mice with bladder outlet obstruction after surgical, partial ligation of the urethra underwent continuous cystometry as previously described for rats (5). Bladders were also investigated by immunohistochemistry.
Results
During the period of cystometry, reproducible micturition patterns were obtained. Bladder overactivity could be evoked by intravesical administration of capsaicin and prostaglandin E2, and by subcutaneous apomorphine. Marked differences in the urodynamic parameters between normal and obstructed mice were revealed. In mice subjected to urethral obstruction, micturition pressure ($p<0.05$), threshold pressure ($p<0.05$), bladder capacity ($p<0.001$), micturition volume ($p<0.001$), and residual volume ($p<0.05$) increased significantly. There was no difference in basal pressure or compliance between normal and obstructed mice. Non-voiding bladder activity was consistently recorded in obstructed mice; both frequency and amplitude increased significantly ($p<0.01$). Compared to normal bladders, obstructed bladders showed hypertrophy of the bladder wall and various degrees of ìpatchy denervationî of the detrusor.
Conclusions
Continuous cystometry can be reproducibly performed in awake, freely moving normal mice and mice with bladder outflow obstruction. The changes induced by