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# FUNCTIONAL CHANGES IN ADRENERGIC RAT DETRUSOR CONTRACTILITY DURING BLADDER OUTLET OBSTRUCTION (BOO)

**Aims of Study**
BOO leads to symptoms associated with bladder overactivity. In addition alpha adrenergic blockers can resolve these symptoms independently of their ability to resolve obstruction. These findings suggest alterations in adrenergic control of bladder function, secondary to outlet obstruction. We investigated the adrenergic in vitro contractility of bladder strips derived from obstructed and sham operated rats.

**Methods**
Female rats were partially obstructed by placing a ligature around the urethra. After six weeks, obstructed and sham rats were anesthetized with isoflurane, the bladders were removed, and full-thickness strips of detrusor were cut and mounted in an organ bath filled with Kreb's solution. In vitro contractility was measured after stimulation with various concentrations of Norepinephrine (NE) and Phenylephrine (PHE).

**Results**
Addition of NE to the baths very consistently produced significant relaxation in control bladder strips, reducing both baseline tension and the phasic contractions. In contrast, NE increased phasic activity in obstructed animals, and the reduction in baseline tension was much less than in control animals. Blockade of b adrenergic receptors (AR) with propranolol unmasked excitatory effects of NE, while blockade of a1 ARs with prazosin suppressed the excitatory responses. PHE produced increased phasic activity in both control and obstructed animals. However, PHE was more potent, and possibly more efficacious, in obstructed bladder.

**Conclusions**
There is a shift in the effect of NE from inhibition to excitation of phasic contractile activity in bladder muscle strips following obstruction. In addition, the obstructed bladder appears more sensitive to the contractile effects of PHE. This increased alpha-adrenergic detrusor susceptibility – probably caused by either alpha adrenergic receptor subtype shift or b adrenergic receptor downregulation - may explain irritative symptoms associated with BOO.