

Table. The detrusor leak point pressure in normal and diabetic rats without medication according to the age.

Age(weeks)	Group	Without medication	L-NAME ¹	Sodium Nitroprusside ²
12	Control	26.05±4.86	29.51±0.87	13.77±3.25
	DM	32.10±12.01	34.26±2.91	19.73±6.76
24	Control	26.84±4.50	37.04±2.14	15.14±5.48
	DM	39.17±5.72**	37.90±7.36	22.15±2.82
36	Control	37.09±3.95	33.64±2.44	21.45±6.67
	DM	34.71±5.69	29.45±1.52	26.04±4.16

Average ±standard deviation(mmHg)

**p<0.01: Each comparison with normal control

1. Detrusor leak point pressure with pre-injection of L-NAME

2. Detrusor leak point pressure with injection of sodium nitroprusside

27

Author(s): K. Niknejad, M.P. Sullivan, H.T.Nguyen, S.V. Yalla, C.A. Peters.

Institution, city, country: Division of Urology, Boston Veterans Affairs Healthcare System, Children's Hospital, Harvard Medical School, Boston, MA USA

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

HEPARIN-BINDING EPIDERMAL GROWTH FACTOR-LIKE GROWTH FACTOR EXPRESSION IN BLADDER SMOOTH MUSCLE IN RESPONSE TO PASSIVE AND ACTIVE FORCE.

AIMS OF STUDY: Bladder outlet obstruction produces increased smooth muscle mass and bladder dysfunction. Previous studies have demonstrated that mechanical stretch induces Heparin-binding epidermal growth factor-like growth factor (HB-EGF) expression in cultured bladder smooth muscle cells, mediated by an autocrine release of Angiotensin II (Ang II) [1]. HB-EGF is produced in smooth muscle of the bladder and stimulates smooth muscle proliferation [2]. The peptide hormone Ang II has been implicated in hypertrophic responses in cardiac and smooth muscle cells when it binds and activates angiotensin type 1 (AT1) receptors [3,4]. In this study, the effect of active and passive tension on HB-EGF expression in bladder tissue was determined. We also evaluated whether the stretch induced HB-EGF expression was Ang II dependent.

METHODS: Urinary bladders were removed from anesthetized rats. The bladder body was separated from the bladder base and cut into strips. Bladder tissue was placed in perfusion chambers containing oxygenated Krebs's solution at 37° and placed under 2 grams of tension. Tissue was equilibrated for 45-60 minutes. In some chambers, a continuous train of electric field stimulation (20 volts, 0.4 Hz, 5ms) was delivered to the suspended tissue. In other chambers, the tissue was stretched to a force of 2 grams, but not stimulated. Muscle strips were subjected to passive or active tension for 4, 6, or 8 hours with or without exposure to losartan (AT1 receptor antagonist). After the experiment, tissue was frozen in liquid nitrogen and relative levels of HB-EGF mRNA were measured by semi-quantitative RT-PCR.

RESULTS: Passive stretch of smooth muscle strips resulted in an increase in HB-EGF mRNA expression in a time dependent fashion. Active contraction, induced by electric field stimulation, augmented the passive stretch induced HB-EGF mRNA expression at each time point.

Exposure to losartan decreased the amplitude of contraction and inhibited the HB-EGF mRNA expression induced by electric field stimulation.

CONCLUSION: In the obstructed bladder, hypertrophy of smooth muscle cells is associated with

414 Abstracts

alterations in levels of various growth factors. These changes may result from repetitive mechanical stresses on bladder smooth muscle cells in response to outlet obstruction. Our results indicate that increases in both passive and active force of bladder smooth muscle stimulate HB-EGF gene expression and thus play a role in the development of bladder hypertrophy. The reduction in HB-EGF mRNA in the presence of losartan suggests that HB-EGF gene expression is mediated in part by autocrine AngII. These findings may support a potential pharmacologic role for losartan in preventing or reversing bladder smooth muscle hypertrophy.

1. Am J Physiol. C1247-C1254, 1998.
2. J Clin Invest. 99:1028-1036, 1999.
3. Cell. 75:977-984, 1993.
4. J Clin Invest. 92:3003-3007, 1993.

28

Seif C¹, Braun P, Weiß J, Bross S, Alken P, Juenemann P

Institution, city, country:

Dept. of Urology, University Hospital Mannheim, Mannheim, Germany

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

OPTIMIZATION OF SACRAL ANTERIOR ROOT STIMULATION (SARS) BY THE APPLICATION OF MULTICHANNEL-GENERATED, QUASITRAPEZOIDAL PULSES IN AN ANODAL BLOCK TECHNIQUE IN A CANINE MODEL

AIMS OF STUDY After spinal cord injury with loss of bladder function, reservoir function and voiding control can be restored by sacral anterior root stimulation (SARS) with deafferentation. Previous studies with modified, size-adapted Finetech Brindley electrodes revealed very good results in selective sphincter blockade and simultaneous bladder stimulation using modified quasitrapezoidal (QT) pulses in an anodal block technique. The aim of this study was to apply four QT-pulses, determined in previous trials, by means of a multichannel bladder stimulator.

METHODS In acute animal trials, lumbar laminectomy (L4-L7) and sacral deafferentation (S1-S4) were performed in 6 male anaesthetized foxhounds. The sacral anterior root S2 was placed into a modified tripolar Brindley electrode. Two mono- and two biphasic quasitrapezoidal (QT) pulses were applied in uni- and bilateral trials. Sphincter pressure was urodynamically monitored. Current parameters that demonstrated the best sphincter pressure reduction in unilateral application were utilized for multichannel stimulation. Bilateral measurements were analyzed, evaluated and compared with the multichannel sphincter pressure results. A two-channel current source (Fraunhofer Institute, IMBT) with two direct arbitrary programmable signal channels initiated stimulation. Each anterior root was stimulated separately.

RESULTS A selective urethral sphincter blockade was achieved in all QT series. In bilateral stimulation trials the average sphincter pressure could be reduced to 8.05 % of its maximum value. In multichannel stimulation sphincter pressure reduction to 4.78 % was seen. For maximal sphincter blockade the average current applied (1.1 to 1.2 mA) was the same with multichannel stimulation and with bilateral stimulation.

CONCLUSIONS It is possible to achieve selective urethral sphincter relaxation with the application of quasitrapezoidal pulses in an anodal block stimulation technique. The application of individually specified current parameters to each sacral nerves enables better sphincter blockade than bilateral stimulation using the same parameters for each side with the application of the same amount of current. Multichannel stimulation is essential in the development of a neurostimulator that will induce coordinated and synergic bladder contractions. In the near future it will be possible to adjust the signal and current in this stimulator for simultaneous parameter application in accordance with bladder filling.

29

C-H Jiang

Institution, city, country:

Department of Biomedicine and Surgery, Faculty of Health Sciences,
University of Linköping, 581 85 Linköping, Sweden

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

INFLUENCE OF INTRAVESICAL LOW PH ON THE MICTURITION REFLEX THRESHOLD IN THE RAT