International Continence Society August 22-26, 1999 29th Annual Meeting Denver, Colorado USA

Category No. 1 | Video Demonstration | Ref. No. 145A

Abstract Reproduction Form B-1

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Title (type in CAPITAL LETTERS): **Selective block of urethral sphincter contraction using differently shaped pulses for anodal block stimulation with a Brindley electrode in the dog**

Aims of Study: Patients with spinal cord injury present dysfuntion of urinary bladder and urethral sphincter. One treatment option is sacral rhizotomy and sacral anterior root stimulation with a Finetech Brindley stimulator. Its major disadvantage is the lack of selective stimulation, resulting in simultaneous sphincter and bladder contraction followed by unphysiological micturition. This study investigates the possiblity of selective sphincter blockade and bladder stimulation using a Brindley electrode.

Methods: In n=11 male anaesthetied fox hounds complete posterior rhizotomy was performed. The anterior roots S2 were stimulated with six different quasi-trapezoidal (QT) pulses (pulse lenght range 600-1400 µsec, stimulation current 0.1 - 2.0 mA, frequency 20 Hz) using a tripolar Brindley electrode. Sphincter and bladder pressure were measured urodynamically.

Results:All 11 animals showed a maximal reduction of the initially highest sphincter pressure over 80 % when QT-pulses with long pulse lenghts (> 900 µsec) were used. Applying these long QT-pulses in 5 of 11 trails the sphincter pressure was inhibited compleetly (100%). QT-pulses with short duration (< 900 µsec) showed a sphincter pressure reduction over 80 % in 2 trails and complete inhibition in 1 animal. Stimulating at maximal sphincter blockade the average bladder pressure was 33.48 cm H_2O higher than the average sphincter pressure. In three times a strong micturition was observed. Selective blockade of the sphincter was possible by applying QT pulses. To recieve minimal sphincter pressures the duration of the pulse length should be long. The bladder remained uninfluenced by this block and kept their excitabilety at any time.

Conclusions:This study shows that selective bladder stimulation with no or only little coactivation of the urethral sphincter is possible. A physiological micturition can be achieved by using a tripolar Brindley electrode. Introduction of this stimulation technique into clinical practice should not face major difficulties considering the usage of the Finetech-Brindley stimulator is esthablished.

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Abstract Reproduction Form B-1

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Title (type in CAPITAL LETTERS): VIDEO DEMONSTRATION-THE CONTRIBUTION OF THE PROSTATIC ANTERIOR FIBROMUSCULAR STROMA TO THE OPENING THE URETHRA

AIMS OF STUDY

The zonal anatomy of the prostate by McNeal (1) showed clearly that the prostate has an anterior fibromuscular stroma (AFMS), which is composed mainly of smooth muscle at the anterior portion to the urethra. It blends proximately with the detrusor muscle fibers at the bladder neck, laterally with the prostatic capsule, and distally its thickness increases to about the level of the verumontanum. In the young male, up to one third of the prostate may be attributed to these fibromuscular tissues. Despite detailed anatomical description of the AFMS, its physiological function and pathogenesis remain unknown. We hypothesized that the AFMS could contribute actively to micturition. Since in BPH patients the AFMS could be stretched outward by the enlarged transition zone (TZ) as a so-called thin surgical capsule, we hypothesized that the stretched AFMS might lose its contribution to micturition. Fortunately, the AFMS is clearly visible in the young male with the use of transrectal sonography (TRS) as the mainly anterior portion of the urethra, and its movement during voiding is monitored easily, as previously reported (2). In this video presentation, real time monitoring with TRS was able to demonstrate the dynamic movement of the fibromuscular elements in the AFMS during voiding. In addition, in aged patients with LUTS, monitoring of the prostate during voiding demonstrated the possible pathophysiological contribution of the AFMS.

METHODS

In this video presentation, voiding processes were demonstrated in healthy young males as well as elderly patients with LUTS. Subjects underwent TRS using ultrasonic diagnostic equipment (Aloka SSD-2000), providing bi-plane transrectal sonograms of the urethra as well as the prostate during voiding.

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Abstract Reproduction Form B-2

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In healthy young males, in the longitudinal view, the portion anterior to the urethra corresponds to the AFMS and almost all the portion posterior to the urethra corresponds to the glandular zones (GZ) including the peripheral and central zones. In the transverse view, the area of AFMS was observed as hypoehoic. With the aim of quantitative evaluation of the fibromuscular elements in the AFMS, we measured the velocity (mm/sec) of the movement of the pixels.

RESULTS

In healthy young males, using a longitudinal view of the prostate during the hesitation time before the passing of urine, the likely active movement of the pixels corresponded to the fibromuscular elements in the AFMS. This was observed toward the different directions from the vertical to the axis of the urethra, although the pixels in the GZ did not move at all. The maximum velocity of the movement of the pixels in the AFMS was 3.2 m/sec. In contrast, when the urine started to pass, the likely passive movement of the AFMS caused by the passing urine was also observed toward the vertical direction to the axis of the urethra.

Using a transverse view, during voiding, the opening directions of the urethral wall were observed only anterior-radially within the area of the AFMS, syncronized with the movement of the pixels only in the AFMS but not in the GZ.

In an elderly patient suspected of having a bladder neck contracture, the striking difference from a healthy male was the lack of bladder neck opening, which was syncronized with the observed movement of the pixels in the AFMS in the healthy young male. In a patient with an enlarged TZ, neither the movement of the TZ nor that of the stretched AFMS were observed at all during voiding.

CONCLUSIONS

The movement of the AFMS may be not only passive caused by the passing urine but also active in itself. Age-related disorder of the movement of the AFMS could relate to the pathophysiology of the opening of the urethra.

REFERENCES

1. J Urol **107** : 1008, 1972. 2. Neuro Urodyn **17** : 377, 1998.