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Title: POOR MOVEMENT OF ANTERIOR FIBROMUSCULAR STROMA OBSERVAED BY VOIDING SONOGRAPHY IN PATIENTS WITHOUT BPH IN REFERENCE TO PRESSURE-FLOW STUDY

Aim of study:

According to McNeal's zonal anatomy, the prostate has the anterior fibromuscular stroma□AFMS□ as non-glandular tissue composed of smooth muscle and connective stroma surrounding the urethra. Recently we reported the possible contribution of the AFMS to micturition to open the prostatic urethra using real time monitoring with the longitudinal view of transrectal ultrasonography during voiding (voiding TRUS) (1). In addition, we reported the age-related relative increase of the connective tissue in the AFMS (2), and speculated that the poor movement of the AFMS due to fibrosis could account for the age-related dysfunction of micturition especially in the patients without BPH. In our previous study, we reported the clinical usefulness of quantitative parameter of voiding TRUS, which could contribute to diagnose of the obstructive site confirmed by the pressure-flow study (PFS) (3). The aim of this study is to reveal the possible contribution of the AFMS to the age-related voiding dysfunction. In this study, in the patients with voiding dysfunction who underwent both PFS and voiding TRUS, we measured the dynamic change of lower urinary tract in voiding TRUS, in special reference to the anterior portion of the prostate, which could correspond with the AFMS in the patients without BPH.

Methods:

In 1999-2000, consecutive 46 patients (mean 71 years) with voiding dysfunction underwent both PFS and voiding TRUS. Voiding TRUS was performed using a longitudinal scanning of the urethra during voiding in standing position. In a longitudinal view of the TRUS, we measured the thickness of the anterior portion of the prostate (TAP), which was measured perpendicularly to an axis of the urethra at the point of the verumontanum. The TAP was measured both before and during voiding. A new parameter, named by AFMS index, was obtained by dividing the TAP during voiding by the TAP before voiding. The higher the AFMS index be, the poorer the movement of AFMS. In addition, for the ultrasonographic diagnosis of bladder neck obstruction (BNO) as reported previously (3), we measured both the diameters of bladder neck (D-BN) as well as the diameter of prostatic urethra (D-PU), which were measured perpendicularly to an axis of the urethra at the maximum urethral opening. Both D-BN and D-PU were measured at the maximum flow. D-PU was measured at the middle point between the bladder neck and the verumontanum. BN index was obtained by dividing D-PU by D-BN, and using the value of 1.36 as a threshold of diagnosis for BNO (3). The lower the BN index be, the severer the BNO. Prostate volume (PV) was also measured using conventional TRUS. The value of Abrams-Griffiths (AG) number was obtained according to PFS.

Results:

In 46 patients, there were significant differences in D-BN (7.5 ±6.1 mm vs. 10.8 ±5.3 mm , $p<0.05$) between patients with and without obstruction. D-BN ($r=0.369$, $p<0.05$) correlated significantly with AG number. In a subgroup of 25 patients who had PV less than 30 ml, D-BN correlated significantly with AG number ($r=0.405$, $p<0.05$). In the 25, AFMS indices was significantly higher in those with obstruction (0.87±0.20) than in those with non-obstruction (0.78±0.13) ($p<0.05$). Out of 11 patients who had PV less than 30 ml with obstruction as determined by PFS, 3 were diagnosed to have BNO, and 8 to have no BNO. Comparing the AFMS index between the men with and without BNO among the 11 obstructive patients without BPH, the AFMS index is significantly higher in the men without BNO ($p<0.05$). (Table.1)

Table.1	11 Obstructive patients with PV<30 ml	
	BNO (+) (n=3)	BNO (-) (n=8)
AFMS index	0.59±0.15 *	0.97±0.05 *
AG number	82.3±39.8	57.3±18.8
Qmax (ml/sec)	7.2±2.0	7.7±3.4

Conclusions:

Measurements of dynamic change in the AFMS as well as the opening urethra during voiding with TRUS could contribute to diagnosing of the anatomical localization of obstructive lesion. The poor movement of AFMS could account for the age-related urinary disturbance in the patients without BPH and without BNO.

References:

1. Neuro Urody 17:377,1998.
2. Neuro Urody 19:427,2000.
3. ICS 2000 abstract No.285