

parameters such as maximum flow rate (Qmax), average flow rate (Qave), time to initiation of flow and voiding time were correlated with AG number. In addition, the diagnostic accuracy, sensitivity and specificity of different Qmax, Qave and PVR cut-off levels were analyzed.

**Results:** In the whole study group, 45 patients (59%) have been found to be obstructed according to ICS nomogram in PFS whereas 24 (32%) were classified as unobstructed and 7 (9%) as equivocal. Seven equivocal patients were further classified as obstructed according to P-Q slope [1]. Linear regression analysis revealed no significant correlation between AG-number, IPSS and following uroflowmetric parameters: Qmax, Qave, time to initiation of flow, voiding time, Qmax/voiding time, time to Qmax/voiding time, Qave/Qmax (All  $r^2$  values < 0.1). In the prediction of obstruction, the accuracy, sensitivity and specificity rates of two different Qmax cut off levels, 10 ml/sec and 15 ml/sec have been found to be 57%, 56%, 58% and 67%, 87%, 25%, respectively. Also, the accuracy, sensitivity and specificity rates of two different Qave cut off levels, 5 ml/sec and 8 ml/sec have been found to be 68%, 80%, 42% and 83%, 96%, 32%, respectively. There was a significant difference between obstructed and un-obstructed patients in terms of PVR volumes (Student-t test,  $p=0.0008$ ). However, the linear regression between PVR measurements and AG-number was found to be statistically not quite significant with a weak correlation ( $p=0.08$ ,  $r=0.2$ ).

All patients with a PVR higher than 100 ml were found to be obstructed according to ICS-nomogram leading to a specificity and positive predictive value of 100% for PVR. However, the same cut-off level for PVR revealed relatively low accuracy and sensitivity rates with 40% and 13.4%, respectively.

**Conclusion:** There is a considerable discrepancy between IPSS, findings on simple uroflowmetry and obstruction as defined by ICS nomogram and AG number in aging men presenting with LUTS. These findings suggest a multi-factorial etio-pathology of voiding dysfunction in the elderly male population and the lack of specificity of the current evaluation criteria.

#### **References:**

1. The Abrams-Griffiths nomogram. World J Urol, 13:34-9, 1995.

## 40

#### **Author(s):**

T Iwata, O Ukimura, M Kojima, K Kumamoto, M Kawata, T Miki

#### **Institution, city, country:**

Dept. of Urology, Kyoto Pref. Univ. of Med. Kyoto, Japan

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

POSSIBLE DIFFERENCES IN INNERVATION BETWEEN ANTERIOR FIBROMUSCULAR STROMA AND OTHER REGIONS OF THE PROSTATE

#### **Aims of Study**

According to McNeal's zonal anatomy (1), the prostate has the anterior fibromuscular stroma (AFMS) as non-glandular tissue composed of smooth muscle and connective stroma surrounding the urethra. Despite detailed anatomical description of the AFMS, its physiological function remains unknown. Recently, we reported the possible contribution of the prostate to micturition mainly through the active movement of the AFMS to open the prostatic urethra (2), and additionally reported the possible involvement of the age-related fibrous change of the AFMS to age-related disturbance of micturition (3). The aim of this study is to reveal possible differences between the AFMS and other prostatic regions focused on peripheral nerve innervation. In this study, we

evaluated the distribution of protein gene product 9.5 (PGP9.5), a general structural neuronal marker which visualized all types of nerves(4) as well as the distribution of neuronal innervation in the prostate comparing between AFMS and other prostatic regions.

#### Methods

The whole prostate specimen was obtained from autopsy with no urinary tract diseases and no symptoms suggestive of infravesical obstruction, although histological benign prostatic hyperplasia was present. Whole mount sections were obtained with 2 mm interval in proximal part from verumontanum. An immunohistochemical staining was performed using antibodies against PGP 9.5, tyrosine hydroxylase (TH), neuropeptide Y (NPY) and vasoactive intestinal peptide (VIP). To investigate potential differences in the innervation of the prostate, we evaluated several regions based on McNeal's zonal anatomy, including the AFMS, transition zone (TZ), peripheral zone (PZ), the urethra (U), the ejaculatory duct (ED) and preprostatic sphincter (S). Using a computer assisted color images analysis system, the density of the positive nerve fibers to each antibody was measured. These measurements were performed at least 3 fields in each region. Ratios of TH-, VIP- and NPY-positive density to PGP9.5 were obtained by dividing their positive densities by the density positive for PGP 9.5. An unpaired t-test was used for statistical analyses to compare data between regions examined.

#### Results

Positive nerve fibers for PGP9.5 were abundant along with the smooth muscle fibers in the AFMS as well as other prostatic regions. These fibers showed varicose in shape. Density for PGP 9.5 was significantly greater in PZ than in AFMS (Table 1). The ratio of TH-positive density to PGP9.5 was significantly greater in AFMS than in TZ (Table 2). The ratio of VIP-positive density to PGP9.5 was significantly lower in the AFMS than in PZ, U and ED (Table 2).

Table 1 Density of PGP9.5 positive nerve fibers (per 100mm<sup>2</sup>)

	AFMS (n=7)	TZ (n=6)	PZ (n=7)	U (n=7)	ED (n=5)	S (n=4)
PGP 9.5	3.00±0.9	1.50±1.0	5.60±1.9*	2.00±0.9	3.60±2.7	2.50±1.3

\*p<0.01 vs AFMS n:section number

Table 2 Ratios (%) of TH-, NPY- and VIP-positive density to PGP9.5

	AFMS (n=7)	TZ (n=6)	PZ (n=7)	U (n=7)	ED (n=5)	S (n=4)
PGP9.5	100	100	100	100	100	100
TH	60.00±31.0	24.70±17.3*	36.30±5.5	39.00±15.7	78.70±35.6	119.50±48.7
NPY	47.20±16.8	64.60±19.0	71.70±12.4	43.90±7.1	85.00±28.6	61.50±32.1
VIP	16.30±9.4	38.40±21.8	52.10±19.5*	39.00±12.0*	61.30±29.5*	6.20±1.8

\*p<0.01 vs AFMS

#### Conclusions

This study first demonstrated that the AFMS had definite neuronal innervation as confirmed by the immunohistochemical analysis. We observed significantly different innervation in the AFMS comparing with TZ, PZ, urethra or ejaculatory duct. It is generally accepted that catecholamine neurons identified by TH contain NPY, whereas cholinergic neurons possess VIP. These results may suggest the AFMS to be endowed with possible particular function different from other prostatic regions particularly such as TZ and PZ. Investigation whether predominant innervation of catecholaminergic neurons on the AFMS than cholinergic neurons is present or not is under way.

#### REFERENCES

1. Monograph Urol 9 : 36, 1988.
2. Neurourol Urology 17 : 377, 1998.
3. Neurourol Urology 18 : 360, 1999
4. Histochemistry 97 : 61-68, 1992