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Title (type in CAPITAL LETTERS): ULTRASONIC MEASUREMENT OF BLADDER WEIGHT AS A PREDICTOR OF ACUTE URINARY RETENTION IN PATIENTS WITH BENIGN PROSTATIC HYPERPLASIA

AIMS OF STUDY

The acute onset of urinary retention (AUR) is, although not life-threatening, one of the most undesirable events for elderly men. Estimates of the occurrence of AUR has been reportedly different among subjects examined, ranging from 4 to 15 per 1,000 person-years. The accurate prediction of AUR would contribute much in selecting treatment option for patients with clinically diagnosed benign prostatic hyperplasia (BPH).

Although the pathogenesis of AUR is not fully understood, it is likely that the presence of infravesical obstruction caused by BPH must be involved in the occurrence of AUR. Recently, we reported that ultrasound estimated bladder weight (UEBW) could be measured non-invasively and used as a urodynamic parameter representing infravesical obstruction (1,2). This study was designed to reveal the possible use of UEBW as a predictor of AUR in patients with BPH.

METHODS

A total number of 160 men with BPH (72.0±7.3 years) consisted a cohort of this study. They visited our clinic with lower urinary tract symptoms including AUR and underwent urodynamic studies including transrectal sonography (TRS) of the prostate and the measurement of UEBW. BPH was diagnosed mainly based on TRS findings. They had neither disorders suggesting the presence of neurogenic bladder dysfunction nor prostate cancer. Among 160 patients, 31 (19.4%) presented to our clinic with AUR.

TRS was performed using a chair-type scanner and horizontal sonograms of the prostate were photographed every 5 mm. Prostatic volume and transition zone (TZ) volume were calculated using step-section volumetry. A TZ index was obtained by dividing TZ volume by prostatic volume. UEBW was measured using transabdominal sonography with a 7.5 MHz probe. From the thickness of the anterior bladder wall and the intravesical volume, UEBW was calculated supposing the bladder to be sphere (1). An unpaired Student's t-test was used to compare the age and ultrasonic measures between the groups. The chi-square for trend was used to assess whether percentages increased or decreased in relation to an ordered classification. For all statistical tests,

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a p-value less than 0.05 was considered significant.

RESULTS

Between patients with and without AUR, there were significant differences noted for age (75.4±7.7 vs 71.1±7.0 years, p<0.005), prostatic volume (45.5±25.1 vs 35.8±23.5 gm, p<0.05), TZ volume (29.4±20.0 vs 20.2±20.2 gm, p<0.05), TZ index (0.606±0.159 vs 0.493±0.203, p<0.005) and UEBW (50.3±15.6 vs 34.7±13.6 gm, p<0.0001). The receiver-operating characteristic curve analysis comparing prostatic ultrasonic measures and UEBW demonstrated that UEBW was superior to prostatic volume, TZ volume and TZ index in detecting AUR. The relative risk of AUR varied by UEBW (Table). BPH patients with UEBW greater than 35.0 gm were 13.4 times as likely to suffer from AUR.

UEBW (gm)	Acute urinary retention		Statistics		
	YES (n=31)	NO (n=129)	χ^2	Relative risk (95% CI)	*p*-value
≧ 30	30	75	14.9	21.6 (4.9 - 95.0)	0.0001
< 30	1	54			
≧ 35	28	53	22.3	13.4 (4.8 - 37.6)	< 0.0001
< 35	3	76			
≧ 40	23	37	20.2	7.1 (3.1 - 16.2)	< 0.0001
< 40	8	92			

CONCLUSIONS

The present study demonstrated an increased UEBW to be associated with an increased risk of AUR in BPH patients. UEBW might be promising as a non-invasive urodynamic parameter which is capable of identifying BPH patients at increased risk of AUR.

REFERENCES

1.Urology 47:942-947, 1996. 2.J Urol 157:476-479, 1997.