259

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EVALUATION OF BLADDER OUTLET OBSTRUCTION USING DOPPLER ULTRASONOGRPAHY

AIMS OF STUDY: We reported a noninvasive pressure-flow like urodynamic system based on the concept of Doppler sonography[1]. Using this technique, we investigated to identify parameters that would diagnose bladder outlet obstruction (BOO).

METHODS: Thirty-one men who underwent pressure-flow studies were included. The ultrasound probe were operated transperineally, color data were averaged every 0.5sec and flow velocity curve were obtained by a personal computer. Uroflow rates from urethral meatus were also measured. The maximum flow velocities at the whole prostatic urethra(V_0), at distal prostatic urethra just above the urethral sphincter(V_1) and at the membranous urethra below it(V_2) were also obtained and used to derive the velocity ratio(VR), which was V_1/V_2. Corresponding functional cross-sectional area of the urethra at these three sites(A_0, A_1 and A_2) were calculated as Q_{max}/V. All parameters obtained by velocity-flow urodynamics were compared with URA (Group specific urethral resistance factor) and AG number(AG), the established pressure-flow parameters of compressive BOO[2] Based on the AG, men were categorized into obstructed(AG more than 40), equivocal(AG 20 to 40) and unobstructed(AG less than 20)[3].

RESULTS: Of 31 men, 14 were obstructed by pressure-flow criteria, 10 were equivocal for obstruction and seven were unobstructed. From the x-y plots obtained, A_1 correlated best with URA, with Spearman's ρ of -0.628. VR and A_0 had ρ of 0 579 and -0.434 against URA, respectively. The Spearman's ρ for V_1 against AG, A_0 against AG, A_1 against AG, and VR against AG, were 0.416, –0.486, –0.644 and 0 632, respectively. A_1 and VR are the parameters, which correlated well with AG. Three groups (obstructed, equivocal or unobstructed group) detected by pressure-flow studies, could be clearly differentiated by a velocity-flow related nomogram combined VR with Q_{max}(Figure).

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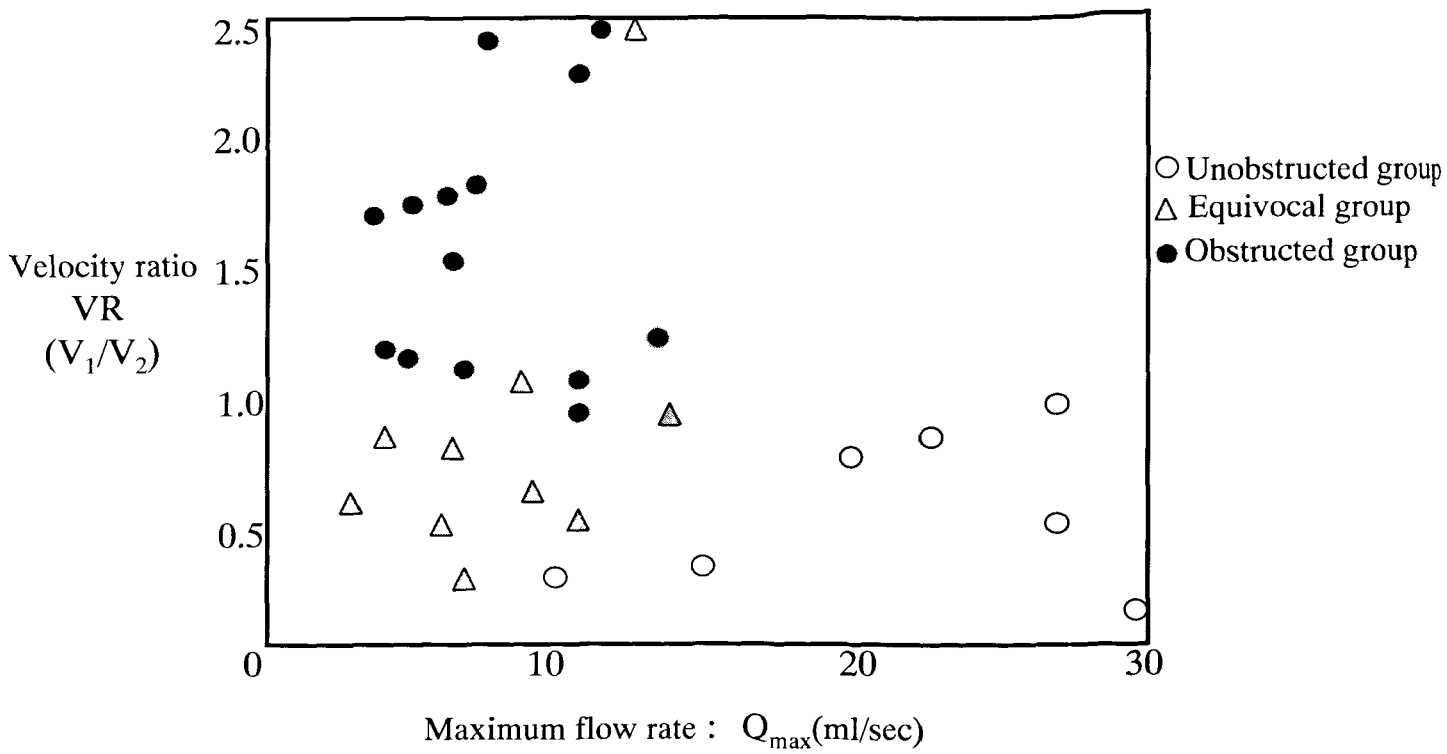
Figure : Velocity ratio(VR: V_1/V_2) versus Q_{max}



CONCLUSIONS: The potential noninvasive pressure-flow like urodynamic evaluation based on Doppler ultrasound has been expanded. This velocity-flow urodynamics can be used successfully in the diagnosis of compressive BOO using functional cross-sectional area at distal prostatic urethra(A_1) or velocity ratio(VR) as a reliable parameter.

REFERENCES:

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