Combined Urodynamic and Ultrasonic Techniques: A New Diagnostic Method for the Lower Urinary Tract

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The lower urinary tract has been examined both morphologically and functionally by combined urodynamic study and radiographic cystourethrography (Bates et al. 1970). The combined urodynamic and cystourethrographic techniques, however, require appropriate radiographic facilities, and the time for fluoroscopic examination is limited to minimize the risk of radiation exposure. To solve these problems we used the ultrasonic method, instead of the radiographic methods, as an imaging modality. The present paper describes this new diagnostic method for the lower urinary tract — combined urodynamic and ultrasonic techniques —.

As schematically depicted in Fig. 1, the urodynamic study is performed using DISA 2100 Uro-System and the data are stored in a TEAC R-80 data recorder. The bladder pressure is measured through a suprapubic polyethylene tube inserted into the bladder percutaneously. The electromyogram is recorded via a needle electrode which is placed in the external urethral sphincter by the transperineal route. The ultrasonic study is performed using a Toshiba SAL-30A sonolayer. Transrectal longitudinal ultrasonotomography of the bladder and urethra by electronic linear scanning in real time (Oka et al. 1980) is performed and the image is stored in a Victor CR-6060 video recorder. The bladder and urethra are examined morphologically and functionally by the combined urodynamic and ultrasonic techniques continuously during the phase of bladder filling and voiding.

Fig. 2 demonstrates a study performed by the combined urodynamic and ultrasonic techniques. Transrectal longitudinal ultrasonogram shows that the bladder neck is closed at A (the phase of bladder filling) and the bladder neck, proximal urethra and external sphincter region are fully open at B (the phase of voiding) on the urodynamic tracing.

It seems that the combined urodynamic and ultrasonic techniques are useful for the evaluation of lower urinary tract dysfunction and add a new direction to urodynamics.

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Fig. 1. Schematic drawing of combined urodynamic and ultrasonic techniques to evaluate lower urinary tract.

Fig. 2. Urodynamic tracing and transrectal longitudinal ultrasonogram.

References
