

OBSERVATION OF INTERNAL URETHRAL ORFICE IMMEDIATELY BEFORE AND DURING URINATION USING REAL-TIME 4D IMAGING ECHOGRAM

Hypothesis / aims of study

Recently, the ultrasound device has developed by the advancement of digital technology and the quality of the images has been improved. The real-time 4D imaging echogram (Volson 730, General electric products) has following feature. Using the ultrasound transducer designed specially, we can scan the body longitudinal, transverse and horizontal section simultaneously, and all data are recorded continuously. So animation of three-dimensional images can be displayed as 4D image. Up to now, we can capture the change of internal urethral orifice only video urodynamic study, but it is flat image. Therefore we observe the changes of internal urethral orifice immediately before and during urination using real-time 4D imaging echogram.

Study design, materials and methods

The 11 healthy male volunteer with no prostate hyperplasia cooperated this study. The mean age was 31.6 years old (range 23-41), the mean body mass index was 24.1 (range 21.5-28.7) and the mean prostate volume was 10.2ml (range 5.2-15.0ml), respectively. The subject lied on his back on the bed. Using ultrasound transducer trans abdominal echogram, the examiner detected internal urethral orifice and ordered to void. All three-dimensional data were recorded and analyzed with software render mode (included Volson 730). The images of the internal urethral orifice were set to observe from the head side. The images were analyzed, and effectiveness of the images was investigated.

Results

The following matters are clarified. 1. Immediately before urination, founds of urinary bladder moves to inferior side. 2. After founds of urinary bladder moving, urination begin at once. 3 during urination, founds of urinary bladder changes the shape into Cylindrical or funnel shape. 4. Posterior urethral vesical angle becomes 180 degrees near. Especially founds of urinary bladder moving, it divided into two groups. One group (5) is naturally moving of base of bladder to inferior side, on the other hand, it is necessary the other group (5) to use the abdominal pressure to move the base of bladder. There is statistically no significant difference between these two groups about age, body mass index and prostate volume respectively.

Interpretation of results

Papa Petros mentioned the relation between the female pelvic floor muscles and bladder neck opening and closure. There are not so many reports about correlation of male pelvic floor muscles and urination. It may relate the motion of founds of urinary bladder, regardless of the presence or absence of the abdominal pressure. Up to the present time, it is not paid attention so much that founds of urinary bladder moves to inferior side immediately before urination. There is a possibility that is important step in the urination beginning. These facts were clarified because the internal urethral orifice and movement of urine can be observed by the echogram at the same time.

Concluding message

We succeed to observe three-dimensional and continuous changes of internal urethral orifice. It seems to be a good tool to clarify voiding function. In the future, we would like to observe female normal controls', urine incontinence patients' and prostate hyperplasia patients' internal urethral orifice, and to examine what change exist in these patients.

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CLINICAL TRIAL REGISTRATION: This clinical trial has not yet been registered in a public clinical trials registry.

HUMAN SUBJECTS: This study did not need ethical approval because Cooperators are my companions, not patients. but followed the Declaration of Helsinki Informed consent was obtained from the patients.