

BLADDER WALL THICKNESS AND ULTRASOUND ESTIMATED BLADDER WEIGHT IN HEALTHY ADULTS WITH PORTATIVE ULTRASOUND DEVICE

Hypothesis / aims of study

Bladder wall thickness (BWT) and ultrasound estimated bladder weight (UEBW) are parameters used to evaluate bladder outlet obstruction (BOO) and overactive bladder (OAB). These parameters can also be determined by portative ultrasound devices which are convenient for use. However, with this device there are only a few studies estimating normal values in healthy population for BWT and UEBW. Therefore, the aim of the study was to estimate BWT and UEBW in healthy population with a portative ultrasound device and their relationship with demographic parameters.

Study design, materials and methods

BWT and UEBW was determined non-invasively with portative ultrasound device; BladderScan BVM 6500 which can measure bladder volume, wall thickness, area and mass (UEBW) at a frequency of 3.7MHz at functional bladder capacity (Figure 1). Gender, age, body mass index (BMI) and parity was recorded.

Results

We evaluated 48 healthy women and 47 healthy men, aged 18–56 (mean±SD; men: 38.1±10.3, women: 36.9±10.1, $p>0.05$), according to power analysis. Any person with symptoms and history of lower urinary tract dysfunction and renal disease was excluded from the study. Body mass index (BMI) was 26.7±3.9 and 23.1±3.5 in men and women respectively ($p<0.01$). Parity was 1.3±1.6 in women. Mean BWT was 2.0±0.4 mm and UEBW was 44.6±8.3 g.s at a mean volume of 338.0±82.1 ml in the study population. Mean bladder volume was 351.3±86.0 ml and 325.0±76.7 ml, mean BWT was 2.1±0.5 mm and 1.9±0.4 mm and UEBW was 46.2±8.0 g and 43.0±8.4 g in men and women, respectively. Although higher results were obtained in men, either BWT or UEBW at higher bladder volumes, compared to women, did not differ significantly by gender ($p>0.05$). BWT and UEBW were not correlated with BMI and age. Parity did not differ regarding BWT and UEBW in women.

Interpretation of results

Normal value for BWT is 2.0 ml and for UEBW it is 44.6 g interpreted with portative ultrasound device. In contrast to some studies, our results displayed non significant difference between men and women and higher BWT and UEBW values which may be due to technical and ethnical differences (1,2,3). BMI, age, gender did not have a significant impact on BWT and UEBW.

Concluding message

Determined values in healthy population for BWT and UEBW, regarding BMI, age, gender and parity are estimated with portative ultrasound devices which are future promising, for their convenient, easy, non-invasive, time-efficient hand-held use for screening without any need of a specialist. In the future, determined cut-off values for conditions effecting both BWT and UEBW such as BOO and OAB with portative ultrasound devices may be very useful in our clinical practice.

References

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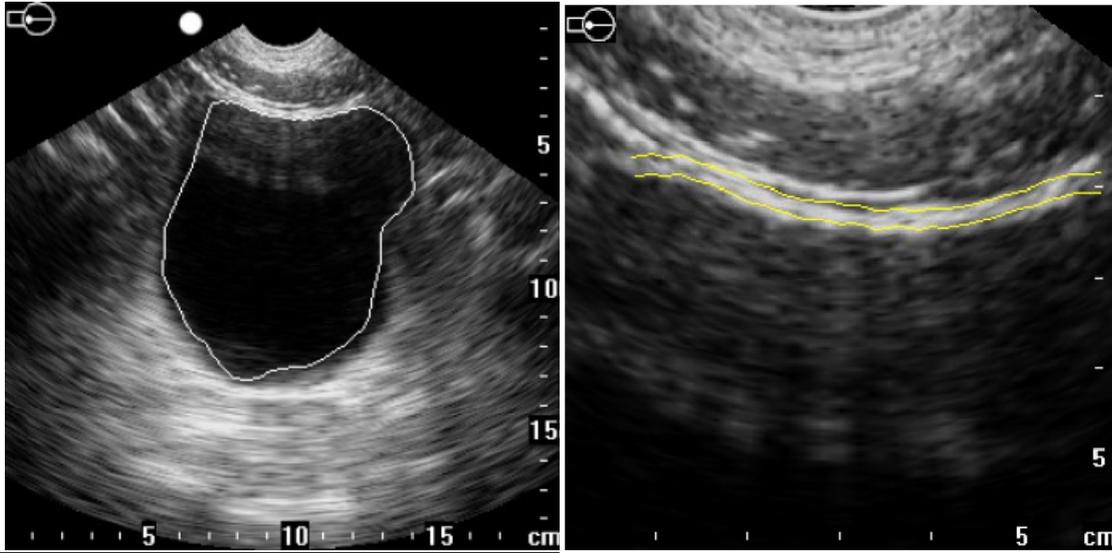


Figure 1: Bladder wall thickness measurement (image on the right side) of a male patient aged 35, at a volume of 385ml (image on the left side), estimated 2.1mm.

FUNDING: The portative ultrasound device BVM 6500 used in this study was supplied by ADS Verathon, Turkey.

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

HUMAN SUBJECTS: This study was approved by the Ege University Medical Faculty, Local Ethics Committee and followed the Declaration of Helsinki Informed consent was obtained from the patients.