

**EVALUATION OF INFRAVESICAL  
OBSTRUCTION USING ULTREASONIC  
MEASUREMENT OF THE BLADDER WEIGHT**

Thesis

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By

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## **SUMMARY**

The urinary bladder serves the dual function of storage and periodic expulsion of urine. Three sets of paired nerves; the sympathetic, parasympathetic, and the somatic control the bladder and the associated muscular structures concerned in the process of micturition. The three sets of nerves contain both sensory and motor fibers.

Urodynamic study is a diagnostic tool for the identification and measurement of physiologic and pathologic parameters involved in the storage, transportation and evacuation of urine. The goal of urodynamic study is to identify and quantitative the causative factors that contribute to voiding dysfunction whether it is a problem of storage or emptying.

Urodynamics are the gold standard in the diagnosis of infravesical obstruction but the clinical value of urodynamic investigations in daily practice has been criticized because urodynamics remain invasive, time consuming and expensive.

Infravesical obstruction, which is due to benign prostatic hyperplasia in more than 80% of the cases, results in detrusor hypertrophy, which is related to the amount of the work performed by the bladder and it depends on the degree of obstruction. Although obstruction results in bladder hypertrophy, the simple measurement of bladder wall thickness is not an adequate predictor

**of bladder outlet obstruction because it is highly dependent on the degree of bladder filling. On the other hand ultrasound estimated bladder weight is not affected by the change in the bladder volume.**

**The aim of the present study is to evaluate the value of ultrasound estimated bladder weight in diagnosis of infravesical obstruction.**

**To accomplish this aim, 46 patients were selected among the patients admitted in the Urology Department complaining of lower urinary symptoms. They underwent physical examination, laboratory tests, ultrasonic measurement of bladder weight and pressure flow studies. Also the study included 12 men as a normal control. Of the 46 patients 42 men (91.3 %) (Group O) had infravesical obstruction. Presenting disorder in these 42 patients was benign prostatic hyperplasia in 38 patients (90.5%), prostate cancer in 2 patients (4.75 %) and stricture urethra in 2 patients (4.75 %). The remaining 4 patients (8.7%) (Group NO) had moderate to severe urinary symptoms and were proved to have no infravesical obstruction according to the pressure flow studies. There were no statistically differences in age between the free groups.**

**The main presenting symptoms were those of prostatism with weak stream of urine outflow being the commonest symptom. There were other presentations in the form of increased frequency of micturition, urgency, burning micturition and haematuria.**

**In the 58 men the ultrasound estimated bladder weight ranged from 18-180 gms. In the obstructive group the ultrasound estimated bladder weight ranged from 33-180 gms. (average  $72.83 \pm 35.87$ ). In the non-obstructive group the ultrasound estimated bladder weight ranged from 29-45 gms (average  $37.25 \pm 8.42$ ). In the control group the ultrasound estimated bladder weight ranged from 18-45 gms (average  $31.75 \pm 7.90$ ). There is a significant difference in the ultrasound estimated bladder weight between the obstructive group and the control group ( $p < 0.001$ ).**

**In the obstructive group the Abrams-Griffiths number ranged from 45-127 (average  $67.80 \pm 9.21$ ). In the non-obstructive group the Abrams-Griffiths number ranged from 32- 38 (average  $35.25 \pm 2.50$ ). In the control group the Abrams- Griffiths number ranged from 27-39 (average  $31.58 \pm 3.26$ ). There is a significant difference in the Abrams-Griffiths number between the obstructive group on one side and the control group & the non-obstructive group on the other side ( $p < 0.001$ ).**

**The results of this study is used to draw the receiver operator characteristic curve analysis in order to determine the ultrasound estimated bladder weight cutoff value for prediction of infravesical obstruction.**

**The curve demonstrated that the most suitable ultrasound estimated bladder weight cutoff value was 45gms for predicting**

**infravesical obstruction with a diagnostic accuracy 86%**

**The total number of patients with ultrasound estimated bladder weight of 45 gms or more was 38 patients. Two out of these 38 patients were without infravesical obstruction according to the pressure flow studies.**

**The total number of patients with ultrasound estimated bladder weight less than 45 gms was 20 patients. Six out of these 20 patients were with infravesical obstruction according to the pressure flow studies.**

**In this study, 10 patients (17.2%) mainly from the obstructive group suffered from complications due to urodynamic investigations in the form of urinary tract infection, urinary retention and haematuria.**

**Since ultrasound estimated bladder weight correlated significantly with this Abrams-Griffiths number as shown in this study, it can be used as a reliable tool for evaluating the degree of infravesical obstruction.**

## **CONCLUSION**

**The ultrasound estimated bladder weight is a reliable tool for predicting infravesical obstruction especially if the ultrasound estimated bladder weight is so much elevated above the cutoff value. Considering its non-invasiveness and easy use at the bed side, ultrasound estimated bladder weight is promising as an auxiliary technique but it requires further follow up to determine whether it can replace the pressure flow studies.**