

COMPARISON BETWEEN BLADDERSCAN, REAL-TIME ULTRASOUND AND SUPRAPUBIC CATHETERISATION IN THE MEASUREMENT OF FEMALE RESIDUAL BLADDER VOLUME: A PROSPECTIVE STUDY

Hypothesis / aims of study

The measurement of residual urine is an essential part of the management of many uro-gynaecological patients such as patients with voiding difficulties before or after surgical intervention, patients with neurogenic bladders or dysfunctional voiding. Bladder residual volume has been historically measured by urethral or suprapubic catheterisation and is still considered as the gold standard. However, this method can be uncomfortable and create complications. Alternative non-invasive methods of calculating bladder volumes are therefore desirable and real-time ultrasound is quick, repeatable and accurate for this purpose. Bladderscan however, has an advantage on real-time ultrasound scan that it does not require specialist training, it is simple and easy to use and cost effective as well. It is extremely portable and therefore readily available for use in a busy out-patient setting. This study was therefore carried out to compare Bladderscan, real-time ultrasound scan and suprapubic catheterisation in the measurement of female residual bladder volume.

Study design, materials and methods

Ethical approval was obtained for this study and informed consent was obtained. Twenty-six postoperative gynaecological patients were recruited into the study. All women had had a suprapubic catheter inserted at the time of surgery. Three days post operatively, the catheter was clamped and the bladder allowed to fill naturally. When the women felt a desire to void, they were placed into the supine position and a real-time sector scanning using regular abdominal 3.5MHZ transducer [SSD – 900: Aloka] obtaining transverse and longitudinal views of the bladder was performed. The volume – estimated formula used was by Hakenberg et al 1983 (1)

i.e. $H \times DI \times W \times 0.63$

After obtaining the real-time ultrasound measurements, bladder volume was measured by the Bladderscan™ (BVI 3000: DxU). The catheter was then unclamped and the volume was measured in millilitres (ml) using a graduated cylinder.

Results

All methods showed similar degree of accuracy in quantifying bladder volumes. There was a strong ($r = 0.972$) positive linear association between the three variables of real-time ultrasound scan, Bladderscan and suprapubic catheterisation in the population.

Concluding message

In conclusion, this study has shown that all above methods have similar results in the measurement of female residual bladder volume, but portable ultrasound such as Bladderscan has advantages in routine gynaecological practice.

References

1. Hakenberg OW, Ryall RL, Langlois SI, Marshal VR. The estimation of bladder volume by sonovystography. Journal of Urology 1983; 130: 249-251.