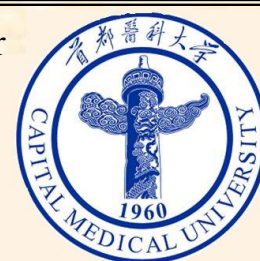


# 569: Measurements of Bladder Volume using Bladder Scanner and Intermittent Catheterization



Lingna Zhao, Limin Liao

Department of Urology, China Rehabilitation Research Center  
Department of Urology, Capital Medical University

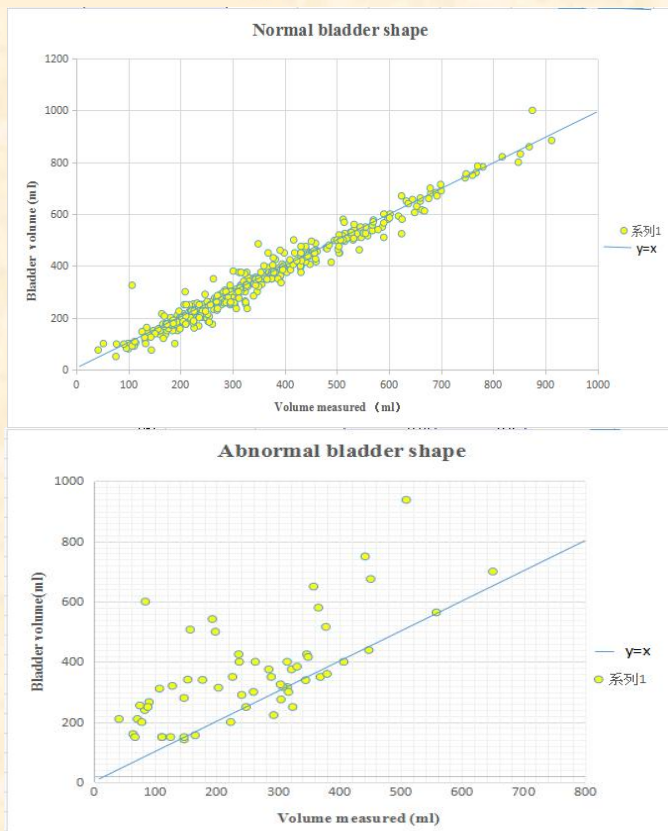


## OBJECTIVE

To compare the accuracy using the AvantSonic Bladder Scanner Z5 portable ultrasonographic device to measure bladder volume with measurement by intermittent catheterization (IC) in patients with neurogenic bladder.

## METHODS

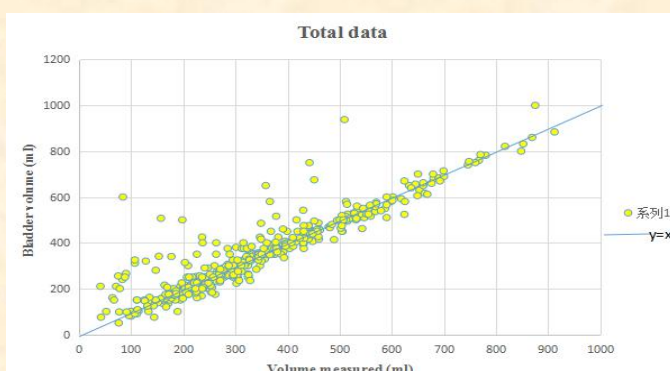
Prior to implementation of the study, nurses were trained in the use of the AvantSonic Bladder Scanner Z5 portable ultrasonographic device. Bladder volume in patients was assessed by a nurse with the scanner 3 times consecutively, and the median value was reported. A second nurse, blinded to the scanner result, then catheterized the patient's bladder. A third nurse, similarly blinded to the scanner result, measured the urine volume in a 500 mL or 1000 mL graduated cylinder and reported the value. A prospective comparison of the urine volumes assessed by ultrasound and measured by IC. Each patient served as her/his own control.



Correlation between catheterization and scan volume.

## RESULTS

In total of 31 patients with neurogenic bladder were repetitively assessed with the Bladder Scanner prior to IC between November 2017 and January 2018, and 369 pairs of data were obtained. The mean age of patients was 37.3 years (range 16 to 75). The median bladder volume measured using bladder scanner and IC was  $(359.9 \pm 8.5)$  mL and  $(339.2 \pm 8.5)$  mL, respectively. The mean difference was -21.0 mL. The correlation coefficient for volumes measured by scanning and catheterization was 0.934 (95% confidence interval: 14.6-26.8). The bladder volume obtained by ultrasound was not statistically different from that measured by IC ( $P > 0.05$ ). The median bladder volume of 329 pairs of data from 23 patients with normal bladder shape measured using bladder scanner and IC was  $(359.8 \pm 8.9)$  mL and  $(353.4 \pm 8.9)$  mL, respectively. The mean difference was -6.5 mL. The correlation coefficient for volumes measured by scanning and catheterization was 0.989 (95% confidence interval: 3.9-9.0). The bladder volume from patients with normal bladder shape obtained by ultrasound was also not statistically different from that measured by IC ( $P > 0.05$ ). The median bladder volume of 40 pairs of data from 8 patients with abnormal bladder shape after augmentation cystoplasty (AC) measured using bladder scanner and IC was  $(211.9 \pm 18.2)$  mL and  $(348.0 \pm 25.7)$  mL, respectively. The mean difference was 136.1 mL. The correlation coefficient for volumes measured by scanning and catheterization was 0.725 (95% confidence interval: 100.3-171.9). There was significant difference of bladder volume measured by portable bladder ultrasound and catheterization in patients with abnormal bladder shape after AC ( $P < 0.05$ ). Therefore, using the bladder scanner resulted in underestimation for patients with abnormal bladder shape after AC.



## CONCLUSIONS

This study showed that the AvantSonic Bladder Scanner Z5 offered an accurate and reliable alternative to catheterisation for estimating bladder volume. The accuracy is sufficient for most clinical purposes. The results also demonstrated bladder shape played a critical effect on the accuracy of measurement using the bladder scanner.

## REFERENCES

Marks LS, Dorey FJ, Macairan ML et al. Three-dimensional ultrasound device for rapid determination of bladder volume. *Urology*. 1997;50:341-348.