# VALIDATION OF MOBILE APPLICATION MEASURING VOIDED VOLUME: A PILOT PROSPECTIVE STUDY

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## Hypothesis / aims of study

Comparing urine flow tests performed at the clinic with the actual urination at home, there can be a mental burden and straining of urine that can affect the test results. In particular, it was confirmed that the amount of urination during a urine flow test can be increased if there is mental motivation as a factor that cannot be ignored, especially the psychological state. Therefore, the behavior of urination may vary according to various situations, especially the psychological state of the patient, so the results should be interpreted in consideration of the fact that various results may be shown during the urine. The need for a comfortable, convenient, and even portable, home-based device has led to the development of novel uroflowmetry technology. These advancements include soundbased uroflowmetry, optical uroflowmetry, and video-based voiding devices. This study aimed to evaluate the accuracy and reliability of a new smartphone-based acoustic voiding volume measurement application compared to conventional ultrasound bladder volume scanner.

## Study design, materials and methods

A total of 12 subjects from September 2020 to March 2021 were prospectively enrolled with informed consent to compare novel acoustic voiding volume measurement to conventional ultrasound bladder volume scanner. 2 subjects were excluded their measurement do not meet our standard of sound quality (i.e. voiding in environment with very loud fan noise, voiding to the wall, door slams). Finally, 10 patients with 50 voiding measurements were included for analysis. The value measured before urination by bladder scanner (A), the value measured after urination by bladder scanner (B), and the value of voided volume measured by smartphone-based acoustic voiding volume measurement mobile application (C) were compared between the 2 techniques. Reliability and accuracy of the voided volume results were compared using Pearson correlation coefficient, and student t-test, respectively.

## Results

10 healthy volunteers were included in the study. Median age was 53.5. Median values of uroflowmetry proflile are as follows: Qmax: 16.3mL/s, Voided volume: 256.8mL, and postvoid residual urine: 7.5mL. Voided volume between the 2 techniques revealed strong visual correlation ($r = 0.71$, $p = 0.02$). When compared to conventional uroflowmetry. When analyzed separately for each individual, each participant showed stronger correlation (range: 0 59-1.00).

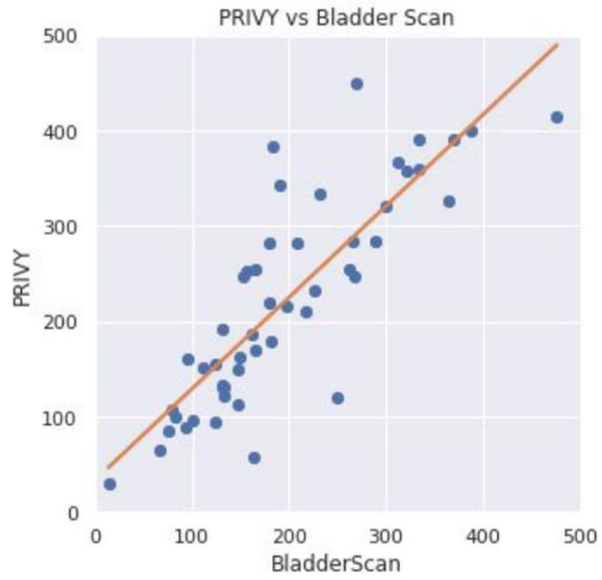
## Interpretation of results

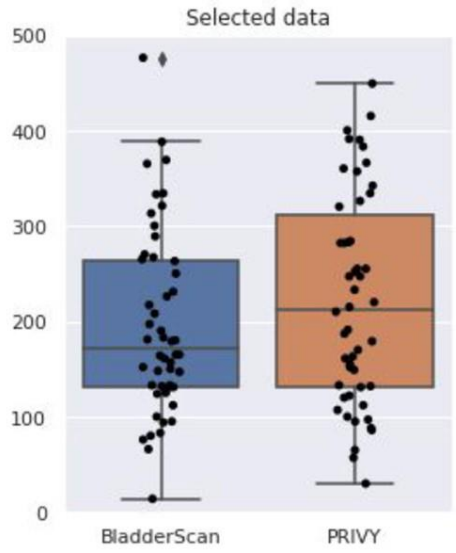
Authors evaluated to see how much the absolute value of the difference between A and B is consistent with C. In our previous study, we introduced a smartphone-based UFM device using acoustic analysis and reported a result comparable to that of contemporary office-based UFM. The current novel acoustic voided volume measurement mobile application can alleviate patients' mental burden to void well in the clinic and check real-time status of voiding whenever they hope. Our results showed a strong correlation between acoustic and standard bladder scanner regarding real voided volume.

**Concluding message**

The acoustic voiding volume measurement application can take over the role of traditional bladder scan resulted from our validation. Through comparison of bladder scan measurements before and after urination, it was confirmed that the urine volume measurement using the smartphone PRIVY application was accurate. PRIVY application can be a breakthrough that can lower the barriers to entry to health management of patients' urination. Further large-scale studies will further increase the credibility of our results.

**Keywords:** Clinical Trial, New Devices, Prospective Study, Quality of Life (QoL), Voiding Dysfunction

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Clinical Trial Yes

Public Registry No

RCT No

Subjects Human

Ethics Committee Seoul National University Bundang Hospital

Helsinki Yes

Informed Consent No

All Disclosures:

Specify source of funding or grant

None

Is this a clinical trial?

YES

Is this study registered in a public clinical trials registry?

NO

Is this a Randomised Controlled Trial (RCT)?

NO

What were the subjects in the study?

Human

Was this study approved by an ethics committee?

YES

Specify Name of Ethics Committee

Seoul National University Bundang Hospital

Was the Declaration of Helsinki followed?

YES

Was informed consent obtained from the patients?

NO

Is the primary author eligible for the ESSITY Sponsored Toileting and Containment Care Abstract Award?

NO

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