A NOVEL ACOUSTIC UROFLOWMETRY-BASED MOBILE APP VOIDING DIARY: COMPARISON WITH CONVENTIONAL PAPER-BASED VOIDING DIARY

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Hypothesis / aims of study

In our previous study, we introduced a smartphone-based uroflowmetry (UFM) device using acoustic analysis and reported a result comparable to that of contemporary office-based UFM. In the current study, we evaluated the usefulness of a novel acoustic UFM-based mobile app voiding diary (VD), which could record the voided volume automatically, by comparison with a conventional paper-based VD. We specifically focused on the (1) compliance and (2) correlation between the two methods in male patients with lower urinary tract symptoms and benign prostatic hyperplasia.

Study design, materials and methods

A total of 113 patients were included and screened between December 2019 and June 2020. Among them, 35 patients were excluded because they withdrew informed consent (n = 5), were females (n = 5), did not complete both VDs (n = 13), or had no app-supported smartphone (n = 12). Finally, 78 patients were enrolled, and a subsequent review of all data was performed. The analyzed data were as follows: (1) survey of convenience/satisfaction/preference comparing the two methods, (2) compliance regarding the completeness of both methods, and (3) the correlation of each metric (24-hour urine volume, nocturnal urine volume, nocturnal polyuria index, total number of voids, and the number of daytime voids, number of nocturnal voids, and maximal bladder capacity) between the two methods.

Results

The survey results of convenience, satisfaction, and preference were as follows. On a scale of 0 to 10, the ratings for all three questions were higher than 8 in the acoustic UFM-based mobile VD app, and the rating for the question on the overall preference of the method was as high as 9. We also found a good correlation between the two methods for nocturnal urine volume ($r = 0.55$, $p = 0.04$), nocturnal polyuria index ($r = 0.66$, $p = 0.23$), the total number of voids ($r = 0.9$, $p = 0.02$), number of nocturnal voids ($r = 0.83$, $p = 0.02$), and maximal bladder capacity ($r = 0.89$, $p = 0.04$) (Figure).

Interpretation of results

To the best of our knowledge, our acoustic UFM-based mobile VD app was the first portable device recording voided volume automatically. 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 [1]. The results showed an excellent correlation between acoustic and standard UFM with regard to maximum and average flow rates as well as voided volumes. In the current study, we expanded the research on VDs, and again confirmed the accuracy of the acoustic method. The current novel acoustic UFM-based mobile VD app could also provide longitudinal trends in the urodynamic parameters in a quantitative manner, which will be useful for healthcare providers and payers who need to pre-screen and monitor LUTS and BPH patients.

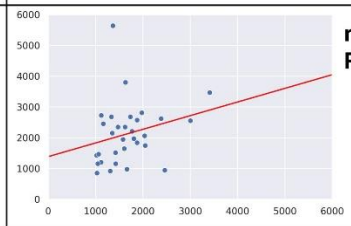
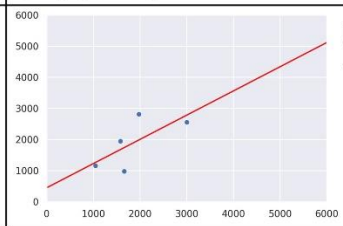
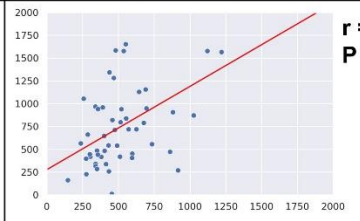
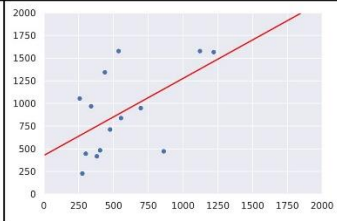
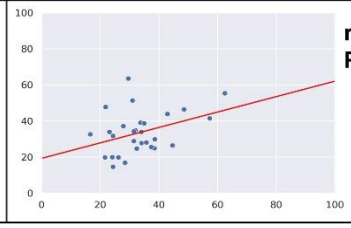
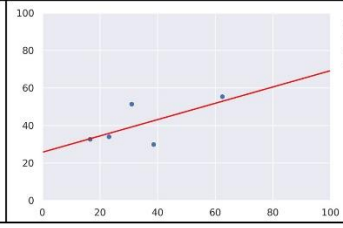
Concluding message

The acoustic UFM-based mobile VD app demonstrated favorable findings compared to the conventional paper-based VD. Future large-scale prospective studies are needed to further validate our results.

References:

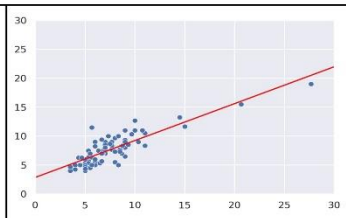
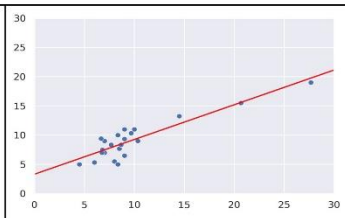
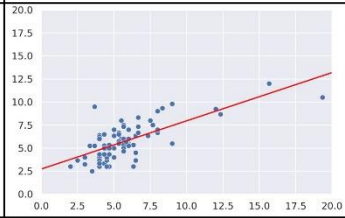
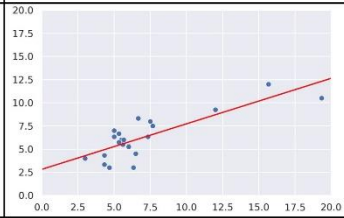
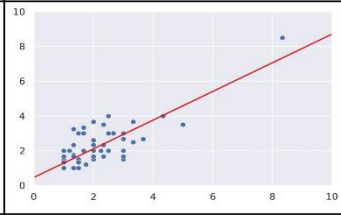
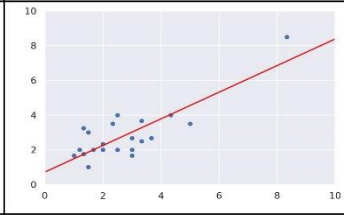
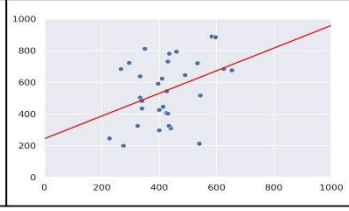
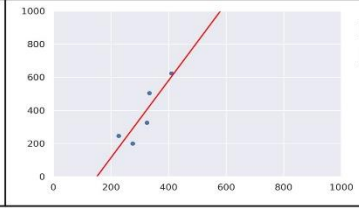
1. Lee YJ, Kim MM, Song SH, Lee S. A Novel Mobile Acoustic Uroflowmetry: Comparison With Contemporary Uroflowmetry. Int Neurourol J. 2021 Jan 4. doi: 10.5213/inj.2040250.125. Online ahead of print.

Figure 2. Scatter plot demonstrating correlation between conventional paper-based and acoustic uroflowmetry-based mobile app VD data regarding each metrics

	All patients (N=78)	Patients with good concordance only (N=24)
24 hour urine volume	 r = 0.25 P = 0.17	 r = 0.69 P = 0.2
Nocturnal urine volume	 r = 0.48 P < 0.001	 r = 0.55 P = 0.04
Nocturnal polyuria index	 r = 0.38 P = 0.04	 r = 0.66 P = 0.23

Pearson's correlation coefficient (PCC, r)

(continued)

Total number of voids	 r = 0.85 P < 0.001	 r = 0.9 P < 0.001
Number of daytime voids	 r = 0.72 P < 0.001	 r = 0.81 P < 0.001
Number of nocturnal voids	 r = 0.82 P < 0.001	 r = 0.83 P < 0.001
Maximal bladder capacity	 r = 0.38 P = 0.03	 r = 0.89 P = 0.04

Disclosures:

Funding N/A Clinical Trial No Subjects Human Ethics Committee Institutional Review Board (IRB) approval of Seoul National University Bundang Hospital (Approval number: B-1912/585-301) Helsinki Yes Informed Consent Yes

All Disclosures:

Specify source of funding or grant

N/A

Is this a clinical trial?

NO

What were the subjects in the study?

Human

Was this study approved by an ethics committee?

YES

Specify Name of Ethics Committee

Institutional Review Board (IRB) approval of Seoul National University Bundang Hospital (Approval number: B-1912/585-301)

Was the Declaration of Helsinki followed?

YES

Was informed consent obtained from the patients?

YES

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

NO