180: Comparison of Real-Time Bladder Sensation in Non-Invasive Accelerated Hydration and Urodynamics in Individuals Without Urinary Urgency

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Table 1. Participant Information

N = 12	Mean ± SEM
Age (years)	26.8 ± 7.1
BMI (kg/m²)	26.2 ± 4.7
Sex	33.3%F, 66.7%M
Race/Ethnicity	50% Asian, 25% Caucasian, 16.7% African American, 8.3% Hispanic

BMI = Body Mass Index. F = Female, M = Male.

Figure 1: Sensation meter was placed in a holding arm attached to the urodynamic chair for UDS studies (left) and was placed on a mayo stand for hydration studies (right).

Figure 2: %Sensation as a function of %Capacity. A) Without ultrasound. B) With ultrasound. No significant differences were found between the urodynamic fill and either hydration fill both with and without ultrasound.

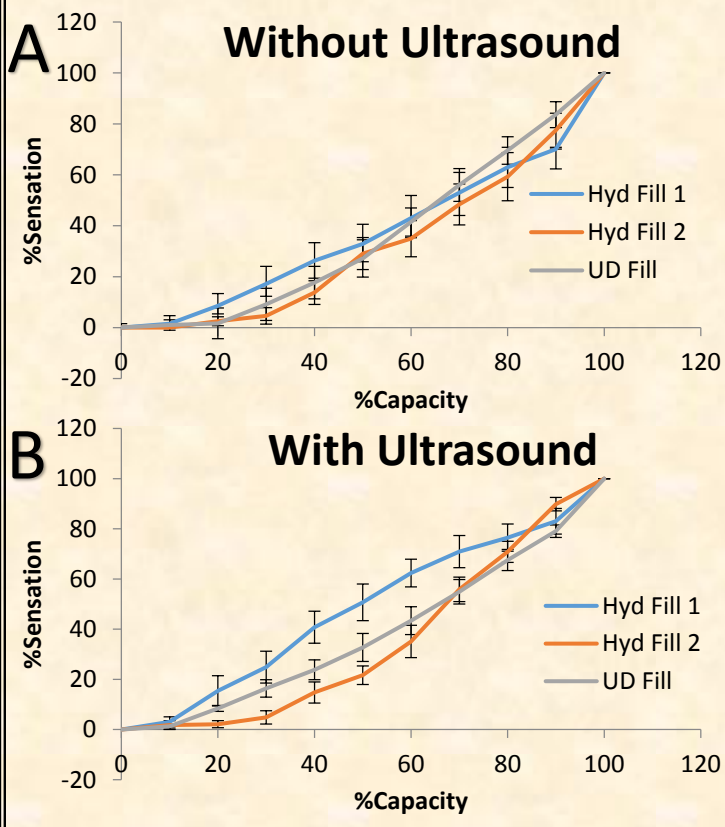
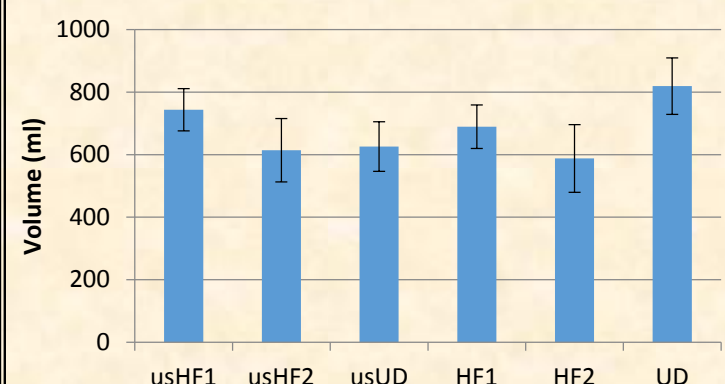


Figure 3. Total volumes of fills with and without ultrasound. Key: us = ultrasound, H = hydration, F1= fill1, F2 = fill2, UD = urodynamics. There were no significant differences in volume based on ANOVA.



Study Aims and Hypothesis

The urodynamic study (UDS) is standard for characterizing bladder sensation but is limited by lack of standardization, non-physiological fill rates, invasiveness, and patient discomfort. We have previously published a non-invasive accelerated hydration protocol to assess bladder sensation using a sensation meter (Fig. 1) and ultrasound to bypass these limitations. The aim of this study is to compare bladder sensation patterns obtained from accelerated hydration to bladder sensation obtained from UDS in individuals with normal bladder function.

METHODS

Individuals without symptoms of urinary urgency underwent a repeated accelerated hydration protocol performed on two separate visits one week apart. One visit was performed using ultrasound imaging every five minutes and ultrasound was not used on the other visit. Participants drank 2L of Gatorade-G2® as quickly as possible and subsequently completed two fill-void cycles while recording real-time bladder filling sensation (0-100% sensation) on the sensation meter (Fig. 1). At a later date, participants underwent a repeat-fill urodynamic protocol. The first fill was done without ultrasound and was used to establish cystometric capacity. For this fill, the infusion rate was set at 10%/min of the maximum voided volume recorded on a three day bladder diary. The second fill was done with ultrasound every 60 seconds with the infusion rate set at 10% cystometric capacity/min defined by the first fill. All participants recorded real−time sensation using the sensation meter to allow comparison of real-time sensation during urodynamic and hydration fills in the same individuals.

RESULTS

Participant characteristics are shown in Table 1. Real-time %sensation-%capacity curves were generated and can be seen in Figure 2. The hydration and urodynamic fills without ultrasound are shown in Fig 2A. Fills with ultrasound are shown in Fig. 2B. No significant differences were found between hydration fill 1, hydration fill 2, and urodynamics without the use of ultrasound. Likewise, no significant differences were found between hydration fill 1, hydration fill 2, and urodynamics with the use of ultrasound. Voided volumes at the end of each fill were measured and are presented in Figure 3. No significant differences were found between hydration and urodynamics performed either with or without ultrasound.

CONCLUSIONS

As demonstrated in this study of normal individuals (without symptoms of urinary urgency), accelerated hydration produced similar real-time bladder sensation patterns as compared to urodynamics with or without the use of bladder ultrasound. This consistency highlights the potential value of accelerated hydration to evaluate bladder sensation and volumes in a completely non-invasive fashion, Future studies are required to see if similar sensation patterns are also identified in individuals with urgency and other forms of voiding dysfunction.