Impact of the endorectal ultrasound probe on uroflow parameters in males

F.M. Solivetti ^{a,*}, G. Coscarella ^a, G. Dirozzi ^a, P.L.O. Valverde ^b,
M.A. Cerreto ^c, F. Pesce ^d

^a Department of Radiology, The Dermosyphilopathic Hospital of St. Maria and St. Gallicano, Istituti Fisioterapici Ospitalieri (IFO), Rome, Italy

^b Department of Medical Physics, IRCCS Istituto Regina Elena, Istituti Fisioterapici Ospitalieri (IFO), Rome, Italy

^c Department of Urology, University of Verona, Italy

^d Department of Neuro-Urology, Spinal Cord Injury Center CPO, Rome-Ostia, Italy

KEYWORDS

Transrectal
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Abstract *Objectives:* The aim of this study was to test the null hypothesis that the presence in the rectum of an endorectal ultrasound probe during transrectal voiding ultrasonography (TRVUS) would have no significant effect on uroflowmetry parameters.

Patients and methods: We studied 43 randomly selected men undergoing TRVUS of the prostate for non-neurogenic lower urinary tract symptoms. Uroflowmetry was performed immediately before and during the TRVUS. Results were compared with a paired Student's *t* test; the null hypothesis was confirmed by *p* values >0.05.

Results: Forty patients were able to void with the endorectal probe inserted, and 95% described this micturition as representative of their usual voiding behavior. No significant statistical difference was found between uroflowmetry parameters before and during TRVUS, confirming our null hypothesis.

Conclusion: Our data suggest that uroflowmetry in combination with TRVUS can be a reliable tool for evaluating disorders of micturition in males, at least in selected cases.

Sommario *Obiettivi:* Valutare l'effettivo impatto della sonda endorettale biplana sui parametri uroflussimetrici del maschio.

Pazienti e metodi: Abbiamo studiato 43 pazienti, scelti a random, giunti alla nostra osservazione per disturbi non neurogeni del basso apparato urinario. L'uroflussimetria è stata effettuata subito prima e nel corso dell'ecografia transrettale. I risultati ottenuti, senza e con sonda ecografica, sono stati comparati con il test del T di Student e la nulla ipotesi era confermata dal valore di *p* > 0.05.

Risultati: Quaranta pazienti sono stati in grado di effettuare la prova e 95% di essi hanno confermato di tipo standard le minzioni effettuate nel corso dell'indagine; non sono state osservate differenze tra i parametri uroflussimetrici ottenuti senza e con sonda endorettale ecografica.

* Corresponding author. Via Città della Pieve 19 – 00191 Roma, Italy.
E-mail address: solivetti@ifo.it (F.M. Solivetti).

hypothesis that TRVUS would not significantly affect normal free flow. The null hypothesis was considered confirmed at $p > 0.05$, and statistical comparisons were made using the paired Student's t test.

Results

Of the 43 men enrolled, 40 (93%) were able to void during the transrectal ultrasonographic examination. In all 40 studies, the voided volume was sufficient to allow reliable analysis of the uroflow parameters (i.e., at least 150 mL) [9].

Thirty-eight of the 40 men (95%) considered the micturition that occurred during transrectal ultrasonography to be representative of their usual voiding behavior.

Table 1A shows the mean differences between uroflow-metric parameters obtained during micturition with and without the endorectal probe in these 38 subjects. Table 1B gives the range of the values of the uroflow parameters.

No significant difference was found between values recorded before and during TRVUS, thus confirming our null hypothesis.

Discussion

To the best of our knowledge, this is the only study published in the recent years that evaluated the use of simultaneous TRVUS and free flowmetry, with in-depth analysis of the effect of the endorectal ultrasound probe on the voiding performance. This effect of the rectal probe was shown to be negligible and statistically non-significant. Previous studies have produced somewhat different results, but most of these were evaluating the use of US video urodynamics (which involves the constant presence of a transurethral catheter) [3,4,6,7]. In other cases, the two diagnostic procedures were evaluated separately [2], and in one study, the two procedures were used simultaneously, but no attempt was made to compare voiding performance with and without the rectal probe [10]. Therefore, these findings cannot be compared with those that emerged from our study.

Our results indicate that combined use of uroflowmetry and TRVUS can be a simple, useful tool for evaluating dysfunctional voiding in men. Tosaka et al. in 1997 [2] clearly demonstrated that assessment of the voiding phase with transrectal US is characterized by high sensitivity, specificity, and accuracy. In all patients with morphological

Table 1B Range of values recorded for uroflow parameters with and without the transrectal probe in situ

	Uroflow parameters ^a			
	$Q_{\max}$, mL/s	Q_{ave} , mL/s	$tQ_{\max}$, s	Acc, m/s ²
With endorectal probe	7–38	3–21	1–42	1–18
Without endorectal probe	9–42	5–21	3–63	1–8

^a $Q_{\max}$ – maximum flow; Q_{ave} – mean flow; $tQ_{\max}$ – time to $Q_{\max}$; Acc – acceleration of flow.

changes during micturition at TRVUS and abnormal uroflowmetry findings, video urodynamics confirmed the presence of lower urinary tract dysfunction. Unfortunately, a significant number of patients in this series had voiding abnormalities on TRVUS, but their uroflowmetry parameters were normal, suggesting that the rectal probe may have interfered to some extent with the voiding reflex [2]. However, the latter hypothesis has never been confirmed with comparison studies.

Although our study included a relatively small number of subjects, the results suggest that the presence of the endorectal ultrasound probe has a very limited, non-significant effect on micturition during transrectal ultrasonography. Therefore, in terms of cost-effectiveness, there seems to be no reason to perform TRVUS and uroflowmetry as separate procedures. Combining the two not only saves time, it also gives the examiner real-time access to a more complete body of data, which can be used to decide whether the patient really needs a more exhaustive video urodynamic evaluation. This combined approach can play an important role in the initial management of selected cases of male micturition disorders. Its advantages include low costs, the absence of ionizing radiations, minimal invasiveness, and it is well accepted by almost all patients.

Conclusions

Transrectal ultrasonography during spontaneous micturition seems to have no significant effect on uroflowmetry parameters. The combined use of uroflowmetry and transrectal ultrasonography could be a useful option for the diagnostic work-up of male patients with lower urinary tract dysfunction. Its advantages include low costs, acceptable repeatability, reliability, and good patient tolerability. It may, however, be too demanding for routine use in all cases of LUTS seen in a busy Ultrasonography Unit, but it could be reserved for a selected group of patients. The characteristics of this group remain to be defined in future studies.

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Table 1A Differences in uroflow parameters obtained during micturition with and without the endorectal probe in situ

Uroflow parameters ^a	Mean difference ^b	SD	95% CI	p -Value
$Q_{\max}$, mL/s	–0.73	5.3	–3.3 to 1.8	0.55
Q_{ave} , mL/s	–0.94	4.6	–3.2 to 1.3	0.38
$tQ_{\max}$, s	–7.84	23.5	–19.2 to 3.4	0.16
Acc, m/s ²	1.9	4.6	–0.4 to 4.3	0.10

^a $Q_{\max}$ – maximum flow; Q_{ave} – mean flow; $tQ_{\max}$ – time to $Q_{\max}$; Acc – acceleration of flow.

^b Mean value obtained with the probe in the rectum minus mean value obtained in the absence of the endorectal probe.

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