156

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RESULTS IN 522 PATIENTS ASSESSED IN A "FLOW-CLINIC"

Aims of Study

The results of a single uroflowmetry (UF) can be adversely affected by factors such situational nervousness, inadequate bladder filling and various artefacts. The aim of this study was to assess the role of multiple uroflowmetries performed in the same session ("flow-clinic").

Methods

From October 2001 to March 2002, 522 subjects were prospectively evaluated in a "flow-clinic" by means of multiple UF studies for lower urinary tract symptoms (LUTS) or to assess post-operative results. A brief urological history of every patient was taken by the same physician (E.R.). Uroflowmetries were performed using a Medtronic Uroflowmeter Urodyn 1000. All patients were asked to drink 500 ml of water in an hour and to perform a maximum of three consecutive UF's in the same session, with a normal desire to void. After each study, the post-void residual urine was measured with a Bladder-scan®. The results were statistically evaluated by means of the Wilcoxon test, the Friedman test and the t test, using SPSS software.

Results

137/522 subjects (27%) performed only one UF, 315 subjects (60%) did two UF's, and 68 subjects(13%) performed three UF tests. The results obtained in the 383 subjects who performed >/-2 flows are presented. The mean time elapsed between the first and second UF was 50 minutes, and 102 minutes between the first and third. In the first UF, 123 subjects (32%) voided a volume inadequate for the reliable evaluation of the test (i.e. < 150 mL or > 500 mL). Of these, 67% voided an adequate amount at the second flow. Among the subjects who performed 3 UF's, an unsuitable voided volume at the first and second UFM was found in 12/68 patients (17.6%). Of these, 10/12 (83.3%) voided an adequate amount at the third UFM. The shape of the flow-curve was normal in 206/383 patients (54%) at the first flow, 199/383 patients (52%) at the second test and 31/68 at the third (46%). Among the subjects with a clearly irregular flow shape (fluctuating or intermittent) at the first flow, only 16% showed a regular shape at the second UF. Among the subjects who performed 3 UF tests, in 35/68 cases (51.4%) the shape of the first and second flow was irregular. Of these, only in 5/35 patients (14.2%) was the shape of the third flow normalised. Overall, PVR was significantly less at the second UF compared to the first UF. In particular, at the first flow, a significant PVR (>/- 100 mL) was found in 130/383 subjects (34%); of these, only in 60% (78/130) did the second flow show a significant PVR. PVR was higher at the third UFM compared to the first and second UFM. Table 1 shows the Maximum Flow (Qmax), Mean Flow (Qave), and the post-void residual volume (PVR) at the first, second and third UF.

UROFLOW VARIABLES	***I UF Mean (SD)*** **(n=383)**	***II UF Mean (SD)*** **(n=383)**	***III UF Mean (SD)*** **(n=68)**	**P I UFM vs. II UF**	**P I UFM vs. III UF**	**P II UFM vs.III UF**
Qmax (mL/s)	16.25±9.1	16.12±8.3	13.37±6.1	n.s.	n.s.	n.s.
Qave (mL/s)	8.57±5.2	8.39±4.6	7.12±3.3	n.s.	n.s.	n.s.
PVR$^{\Psi}$ (%)	22.8±18.7	20±18.2	30.3±22.7	<0.000	n.s.	0.015

Table 1: Flow parameters in the first, second and third studies.
$^{\Psi}$ Post voiding residual calculated as percentage of bladder volume

Conclusions

The majority of patients performed at least 2 uroflow studies in the same session. The mean time between each UF was less than 1 hour; therefore, about 2 hours were needed to complete 3 studies. The Voided Volume was inadequate for interpretation in more than 30% of the subjects at the first UF, but an adequate Voided Volume was achieved in almost all the subjects with a second or third UF (more than 90%). The flow shape did not change significantly between the first and those that followed. The PVR decreased significantly in many subjects (41%) at the second UF, but not at the third UF. The increase in PVR after the third flow, without an increase of the voided volume, is not clear.
In conclusion, by assessing the voiding pattern with multiple UF's in a "flow-clinic" it is possible to increase the diagnostic power of the test. More than 30% of the studies, if performed as a single UF, would have been unreliable because of an inadequate volume voided. This figure changed to as low as 10% after two or three

UF's.
The PVR significantly decreased at the second UF. Multiple testing did not significantly affect the Qmax, Qave, or the shape of the curve. The mean time needed to perform 3 UF's did not exceed two hours. The current study shows that the "flow clinic" is a helpful, cost-effective way of assessing patients with LUTS.