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Short- and long-term reproducibility of cystometry

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Summary. We investigated 8 male patients, age 28–51 years, mean 35, with symptoms of bladder neck dysfunction by means of repeated water-cystometry. We made four cystometries with different patient positions and filling rates followed by a further two cystometries after an interval of 8 days. We found no difference in bladder volumes at first sensation and maximal capacity between the different investigations, irrespective of patient position and filling rate. It was concluded that data obtained by water cystometry may be regarded as absolute.

Key words: Bladder neck dysfunction – Cystometry – Reproducibility

Introduction

Cystometry, whether done with water or carbon dioxide as infusion medium is one of the most common investigations in urology. However, its reproducibility is rather scanty investigated and therefore apart from being a diagnostic means of disclosing neurogenic bladder dysfunction its value as absolute measure is still questioned.

It has been shown earlier that 4 consecutive cystometries with different filling rate and with the patient sitting as well as lying during the investigation resulted in greater volumes at first sensation and maximal capacity from the first to the fourth cystometry, regardless of the chosen sequence of patient position and filling rate [4]. Others have found contradictory results in similar investigations, with decreased capacity [2] as well as unchanged [1, 3] after repeated cystometries.

The present study was designed to evaluate the result of consecutive cystometries, repeated after 8 days.

Patients and methods

Eight male patients with age from 28 to 51 years, mean 35, were referred to urodynamic investigation because of symptoms of bladder neck dysfunction. After informed consent they underwent two cystometric investigations with an interval of eight days. At the first session 4 consecutive cystometrograms were performed and patient position and filling rates are indicated in Table 2. At the second session 8 days later the patient had 2 cystometrograms (Table 2).

The investigations were carried out transurethrally with an 8F filling catheter and a 5F catheter for pressure measurements. We used body temperature saline as filling medium. Bladder pressure, rectal pressure and resulting detrusor pressure were registered continuously by a DISA 2100 urodynamic unit and a Siemens Elema ink recorder.

The data were analysed statistically by Wilcoxon signed rank test. Significance was judged at the 5 per cent level.

Results

Table 1 shows the result of the first cystometry of each session, carried out with an interval of 8 days. The observed reduction in volume at first sensation and maximal capacity were not statistically significant.

Table 2 shows the result of the investigation after 6 cystometrograms, of which 2 were made 8 days after the initial four. There was no correlation between

Table 1. Result of the first cystometry of each session, performed with an interval of 8 days. Patient supine, filling rate 60 ml/min. The observed reduction in first sensation and maximal capacity is not statistically significant

	First sensation, ml mean (range)	Max. capacity, ml mean (range)
Session no. 1	286 (200–550)	503 (290–820)
Session no. 2	263 (100–630)	441 (280–690)

Table 2. Result of 6 cystometries, four at the first investigation and two at the second investigation eight days later. The observed variation is not statistically significant

	First sensation, ml mean (range)	Max. capacity, ml mean (range)
Cystometry no. 1 L 60 Patient lying, filling rate 60 ml/min	286 (200–550)	503 (290–820)
Cystometry no. 2 L 120 Patient lying, filling rate 120 ml/min	313 (100–560)	513 (330–730)
Cystometry no. 3 S 60 Patient sitting, filling rate 60 ml/min	328 (110–655)	483 (300–675)
Cystometry no. 4 S 120 Patient sitting, filling rate 120 ml/min	255 (100–645)	525 (280–705)
Cystometry no. 5 L 60 Patient lying, filling rate 60 ml/min	263 (100–630)	441 (280–690)
Cystometry no. 6 L 120 Patient lying, filling rate 120 ml/min	339 (120–575)	476 (200–665)

patient position, filling rate and resulting measurements. Further, the results at the first and second session were not different.

Discussion

Earlier investigations of the reproducibility of cystometry have shown conflicting results. Soerensen et al. showed that 4 consecutive cystometries resulted in increased volumes at first sensation and maximal capacity between the first and fourth cystometry regardless of patient position and filling rate. It was concluded that the difference was caused by patientadaptation to accept greater volumes [4]. Others have under similar circumstances found unchanged volumes [1, 3], or, using carbon dioxide as filling - medium, have found reduced capacity, presumably caused by the local irritating effect of the filling medium [2].

In the present study we found that the volumes of first sensation and maximal capacity were unchanged after consecutive cystometries, irrespective of filling rate and patient position. Further, we found no difference between cystometries performed with an interval of 8 days.

The conflicting results with respect to the findings of Soerensen et al. [4], may in part be explained by the difference in patient material, as the investigation procedure was similar. Our patients were young males with symptoms of bladder neck dysfunction, but without organic urethral stenosis, while Soerensen et al. used consecutively referred patients of both sexes irrespective of cause for referrel.

Another obvious difference was the number of patients in this study. However, we did not find it reasonable to submit patients to a unnecessary, invasive investigation, unless they were fully prepared to cooperate, so it was not possible to achieve a larger study within a given time.

In conclusion we have shown that bladder volume at first sensation and maximal capacity, using saline as filling medium, is independent of patient position and filling rate, and that the result is reproducible in repeated investigations within 8 days. This has the important implication that volumes at first sensation and maximal capacity may be regarded as absolutes, and consequently results found e.g. in pharmacologic studies may be ascribed to the drug in question, as adaptation did not seem to occur during this investigation.

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