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UROFLOWMETRY IN HEALTHY WOMEN: A SYSTEMATIC REVIEW

Hypothesis / aims of study
Uroflowmetry is a widely used diagnostic test in urology practice. Despite extensive research on the diagnostic application of uroflowmetry in men, few studies are available in women. Moreover, research in women is limited by a lack of absolute values defining normal limits (1) and lack of data on the incidence of an abnormal shape of the curve in healthy women.
The aim of the present study is to investigates data on reference values of uroflowmetry parameters and the shape of the curve in healthy women based on a systematic review of the literature.

Study design, materials and methods
A search was made in the International Continence Society standardization articles, PubMed, Embase and the Cochrane Library (from inception to 27 February 2014). Studies on uroflowmetry in healthy women were included. The selected articles were examined using a critical appraisal process based on the QUADAS-2 tool and the Critical Appraisal Skills Program

Results
The search resulted in a total of 20,921 articles. After following a selection procedure, 16 articles were included in the present review. Risk of bias of the individual studies is summarized in a critical appraisal.
Mean values of uroflowmetry parameters in healthy women (mean age 37.1 years) were: voided volume (VV) 338 mL (SD 161), maximum flow rate (Qmax) 23.5 mL/s (SD 10), average flow rate (Qave) 13 mL/s (SD 6), postvoid residual (PVR) 15.5 mL (SD 25), voiding time (VT) 29 sec (SD 17), and time to maximum flow rate (time to Qmax) 8 sec (SD 6).
A normal shape of the uroflowmetry curve was seen in 70-80% of the flows. Qmax was dependent on VV, there is a plateau after a VV of 700 followed by a decline in Qmax. There was no clear relationship between Qmax and age, and no correlation between parity and Qmax.

Interpretation of results
The present review describes the mean values of the uroflowmetry parameters. These values give an impression of uroflowmetry parameters in healthy women and its variation. In daily practice, this helps to interpret uroflowmetry outcomes in female patients. A significant relation was found between Qmax and VV. We found no relation between parity and Qmax.
Less data were available on the shape of flow curves, even though knowledge on these curves is important to judge whether or not a flow curve can be considered normal. Only a few studies reported on the frequency of different shapes of the curves in healthy women; unfortunately, these studies did not use a standardized way of interpreting the shape of the curve. Also, individual variation in the shape of the curve and the influence of age on uroflowmetry parameters were not well addressed.
Because VV appears to influence Qmax, it is important to keep this in mind when interpreting the results of patient outcomes. Further research is needed to determine the importance of repeated uroflowmetry measurements and the influence of age on uroflowmetry results. Also, automated assessment of the shape of the flow curve is recommended.

Concluding message
Data on uroflowmetry parameters in healthy women were examined by reviewing the literature and calculating mean values in uroflowmetry parameters. Qmax appeared to be dependent on VV and, probably, also on age. There was no correlation between parity and Qmax. No conclusion can be drawn about intrapersonal variation in the shape of the curve. Better definition of the shape of flow curves in women is recommended.

References
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Disclosures