Utility of ultrasound of the upper urinary tract in elderly men with indicators of obstructive symptoms or abnormal flow: how often can silent hydronephrosis be detected in general practice?

ThHAM van der Waart, H Boender*, C van de Beek*, GGMC Wolfs, RA Janknegt* and JA Knottnerus


**Background and objective.** While the prevalence of hydronephrosis is very low in obstruction studies, a prevalence of 3–13% is reported for patients with an obstruction who are listed for prostatectomy. In order to evaluate the usefulness of transabdominal ultrasound in primary care, we determined the occurrence of hydronephrosis in males with symptoms of urinary obstruction in a general practice setting.

**Method.** A micturition questionnaire (a modified Boyarsky) was sent to all men of 55 years or more who were registered in 10 general practices in Maastricht, and was followed by an examination at their general practice. Men with obstructive symptoms and/or with a free-flow abnormality were examined in the hospital with transabdominal ultrasound in order to detect dilatation of the upper urinary tract. This ultrasound was repeated approximately 15 months later.

**Results.** At the first measurement, none of the examined men (n = 178) had hydronephrosis, and this was still the case for 94 men 15 months later.

**Conclusion.** Renal ultrasound is not necessary in general practice for men with uncomplicated obstructive complaints.

**Keywords.** Abnormal urinary flow, silent hydronephrosis, transabdominal ultrasound, urinary obstruction.

---

**Introduction**

A frequent reason for performing transabdominal ultrasound is to detect (silent) hydronephrosis in men with obstructive micturition complaints. However, while such symptoms are highly prevalent among elderly men (22%), there is little information available about the occurrence of dilatation of the upper urinary tract in primary care patients with obstructive micturition symptoms. Reporting about hydronephrosis in patients with benign prostatic hyperplasia (BPH) has been limited mainly to patients listed for an operation. Recently Koch et al. have studied 556 men with BPH and/or obstructive micturition problems referred to the urologist, and found dilatation of the renal pelvis in 2.5% of subjects. Ultrasound of the kidneys is indicated only in patients with a high serum-creatinine and/or post-void residual volume. The prevalence of hydronephrosis is 0.20% in obduction studies, whereas the prevalence is 3–13% in patients with obstruction listed for prostatectomy.

In order to evaluate the utility of making a transabdominal ultrasound in unselected symptomatic patients in general practice, we studied the ultrasound findings in elderly men with obstructive symptoms or free-flow abnormalities in a primary care setting within the context of the Maastricht BPH study.
Methods

The natural course of obstructive micturition symptoms in a male population aged 55 years and older was studied in a general practice setting in the Maastricht BPH study. A transabdominal ultrasound was made during the second measurement in all men with a symptom score of 16 or more and/or an abnormal flow, and during the first measurement in all urologically examined men. Transabdominal ultrasound was repeated during the follow-up measurement in all these men approximately 15 months later.

All measurements included a questionnaire, using the following questions: frequency during daytime, nocturia, impairment of the size and force of the urinary stream, urinary hesitancy, terminal dribbling, incomplete emptying, straining or pushing to start urinary flow (modified Boyarsky), an examination by their GP, including a physical examination, a blood test and a free-flow test using the computerized DUC protocol developed by Rollema et al.5

Subjects who had had a lower urinary tract operation before they filled in the questionnaire and men with a fully explanatory diagnosis for micturition problems were excluded from further examination. All other men were invited for examination by their GP. All men with a symptom score of 16 or more (modified Boyarsky) or with an abnormal uroflowmetry DUC result were considered for urological examination. There was also a check at this stage that all men with an explanatory diagnosis for their micturition problems (and/or known to the urologist) were excluded. All other men were invited to come to the academic university hospital for further examination.

The urological examinations included an ultrasound of the prostate, a pressure-flow study,6 digital rectal examination (DRE) by the urologist, a free flow with an ultrasound of the bladder for residue and an ultrasound of the kidneys. The latter was made by one practitioner (HB) who is specially trained in making abdominal ultrasound (Pie Medical scanner 250, model 48250, serial number 0320; probe, 3.5 M Hz, model number 41041).

Results

Of 183 subjects with an abnormal symptom score or an abnormal flow, 178 had abdominal ultrasound during the second measurement. The mean age of this group was 66.8 years (SD 5.5); 83 had an abnormal flow (47%), 28 a high symptom score (16 or more) (16%), 18 (10%) had a combination of abnormal flow and a high symptom score, and 49 (27%) had neither a high symptom score nor abnormal flow at this measurement, although in the first measurement these men were symptomatic and/or had an abnormal flow.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Ultrasound of the kidneys: results in 178 men with obstructive symptoms and/or abnormal flow in the second measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left kidney (n = 178)</td>
</tr>
<tr>
<td>Cyst</td>
<td>16a</td>
</tr>
<tr>
<td>Anatomic disorder</td>
<td>0</td>
</tr>
<tr>
<td>Lithiasis</td>
<td>1</td>
</tr>
<tr>
<td>Parenchymal disorder</td>
<td>1</td>
</tr>
<tr>
<td>Dilatation</td>
<td>1c</td>
</tr>
<tr>
<td>Solid disorder</td>
<td>0</td>
</tr>
</tbody>
</table>

a Mean size: 4.0 cc (min. 1.0, max. 7.8).
b Mean size: 4.2 cc (min. 1.5, max. 9.4).
c After repeated ultrasound, the kidney was found to be normal.

The mean height of the right kidney was 104 mm (SD 15) and of the left 110 mm (SD 13). Only one of these 178 men had a clinical suspicion of dilatation of the upper urinary tract. Repeated ultrasound indicated that the kidneys and urinary tract were normal in this patient. The ultrasound findings are presented in Table 1. The creatinine value ranged from 50 to 163 mol/l (mean 95 mol/l, SD 20). The residual volume varied between 0 to 750 cc (mean 92 cc, SD 134), as measured by ultrasound after free-flow registration.

Ninety-four of 178 men had two ultrasounds of the kidneys; again, no dilatation of the upper urinary tract was observed (Table 2). The mean height of the right kidney was 108.3 mm (SD 10.4 mm, min. = 80, max. = 134), and of the left 108.2 mm (SD 11.3 mm, min. = 70, max. = 142). The visualization of the right kidney was good in 89.5% of subjects, in the rest moderate, of the left one good in 83.8%, moderate in 11.3% and bad in 4.2%.

The creatinine value ranged from 53.0 mol/l to 182.0 mol/l (mean 97.0 mol/l, SD 21.4).

Discussion

Most hydronephrosis studies are carried out in a selected population. In agreement with earlier studies, small percentages of hydronephrosis were found in these studies. Koch et al.3 found dilatation of the renal pelvis in 2.5% and renal cysts in 11.7% of 556 subjects. However, most articles are written about both men
and women and do not provide sex-specific prevalence rates. Courtney et al. studied male-referred patients, of whom 7.6% were found to have hydronephrosis.

Symptoms lasting for more than 1 year, complaints of enuresis, history of repeated urinary tract infections, a palpable bladder or urinary retention, fatigue and hypertension are suggestive of renal failure. Koch et al. concluded that renal ultrasound is indicated only in patients with a high serum creatinine level and/or post-void residual volume. We found no dilatation of the kidney independent of a high creatinine level, post-void residual volume or flow-pressure abnormalities in our study.

Although GPs may be afraid to miss hydronephrosis, the risk of missing this diagnosis appears to be very small in a primary-care-setting population.

Since we found no dilatation cases among 178 patients with symptoms and/or flow abnormalities, including 94 who had a follow-up measurement after approximately 15 months, we feel that there is no justification for routine ultrasound in patients with uncomplicated obstruction in a general practice setting.

This conclusion lends support to the recommendation made in the Guidelines "Micturition problems in elderly men" of the Dutch College of General Practitioners (NHG). 8

Acknowledgements

We thank Marga van der Aa, Research Assistant, for her help. Financial support was provided by The Netherlands Organisation for Scientific Research (NWO Grant 900-715-159) and Merck, Sharp & Dohme, Europe.

References