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Quality of micturition in male patients with orthotopic neobladder replacement

Abstract We evaluated the quality of micturition in patients with orthotopic neobladder replacement. In the present study, 58 patients who had undergone orthotopic neobladder replacement following cystectomy were enrolled. The quality of micturition was evaluated by means of uroflowmetry, a self-administered questionnaire and a 24-h frequency–volume chart. The questionnaire consisted of 26 questions concerning storage (9 questions), evacuation of urine (9), patient’s satisfaction with neobladder (3), limitations in daily life (3) and pain (2). In addition, 11 of the questions were followed immediately by a question concerning inconvenience to the patients. The mean follow-up period was 35 months (range 6–80). On uroflowmetry, the mean peak flow rate was 13.5 ml/s with a low average flow rate (mean: 5.7 ml/s), and the voiding time was considerably prolonged (mean: 70.2 s). According to the frequency–volume chart and questionnaire responses, although the frequency and tidal volume of micturition were normal, the majority of patients were conscious of retarded, intermittent, prolonged, and weak stream and of straining during voiding. Diurnal or nocturnal incontinence was noticed subjectively in as many as 69% of the patients. However, the degree of urine leakage was minimal. In spite of the fact that 66% of the patients replied that their micturition status was worse than before surgery and that 69% of the patients felt dissatisfied, the degree of inconvenience was low in every item and the limitations in daily life were minimal. Although micturition in patients with neobladder replacement appeared to be of lower quality than that in normal subjects and was considered by many to be unsatisfactory, most patients were able to adjust themselves to it without significant inconvenience.

Key words Urinary diversion · Neobladder · Bladder neoplasms · Micturition

Orthotopic neobladder replacement using bowel segments has been developed with the aim of improving the patient’s quality of life after cystectomy. The majority of patients can achieve good urinary continence and voluntary voiding via the urethra by abdominal straining [1–4]. Although a number of reports have demonstrated objective urodynamic findings of the neobladder concerning the function of storage and evacuation [1, 4, 5–9], the precise quality of micturition in those patients, especially based on a subjective assessment, has not been fully evaluated. We evaluated the quality of micturition in patients with orthotopic neobladder replacement by means of uroflowmetry, a frequency-volume chart and a self-administered questionnaire.

Patients and methods

In the present study, 58 male patients who had undergone neobladder replacement after cystectomy for bladder cancer were enrolled. Mean age of the patients was 61 years, ranging from 42 to 75 years. The follow-up period of the patients ranged from 6 to 80 months, with a mean of 35 months. For creating a neobladder, the Kock pouch was used in 26 patients, the Hautmann procedure in 28 patients, and the Mainz pouch in four. Evaluation of the micturition status was based on free uroflowmetry (maximum flow rate, average flow rate, residual urine volume and voiding time), a 24-h frequency–volume chart and a self-administered questionnaire. The questionnaire consisted of 26 questions concerning the storage, evacuation of urine, the patient’s satisfaction with the neobladder, the limitations in daily life, and the incidence of pain. The questions concerning the storage comprised 9 items: posture for micturition (standing or sitting), hesitancy (none, shorter than 10 s, 10–30 s or longer than 30 s before initiation of voiding), intermittency (none, only at the end of voiding, throughout voiding), Credé’s maneuver (performed or not), sense of residue (present or absent), force of stream (excellent, good, weak, dribbling). The questions for evacuation of urine also included 9 items: sense of
desire to void (none or abdominal fullness), presence of incontinence (absent or present), frequency of incontinence (day only, night only, or both day and night), grade of incontinence during the day (a few drops or underwear wetting), grade of incontinence at night (a few drops, underwear wetting, or bed wetting), wearing of a pad during the day (none or always for protection), wearing of a pad at night (none, always for protection, or always because of wetting) and awakening at night for urine evacuation (by themselves or by alarm clock). Each patient was asked for an evaluation of their postoperative micturition status and their satisfaction with the micturition status as compared with pre-operative micturition, or with ileal conduit. Three questions were asked concerning limitations in daily activity: limitations at work, in activities at home and in traveling. There were also questions regarding any pain related to the voiding or storage of urine.

In addition, 11 of the questions were followed immediately by a question concerned with incontinence to the patients. Incontinence was divided into 4 categories: not a problem, a bit of a problem, quite a problem, and a serious problem.

Results

Although 55 (94.8%) patients achieved voluntary voiding, three patients (5.2%) could not void and evacuated urine by intermittent catheterization. On uroflowmetry in the patients who could achieve voluntary voiding, the mean peak flow rate was 13.5 ± 7.5 ml/s (mean ± SD) with a low average flow rate (5.9 ± 3.9 ml/s), and the voiding time was prolonged (70.2 ± 63.7 s). Postvoid residue was 58.8 ± 75.0 ml. In terms of the incidence of evacuation difficulty on uroflowmetry (Table 1), 63.6% of the patients showed the maximum flow rate of less than 15 ml/s and 54.6% had residual urine of over 50 ml. The voiding time was longer than 30 s in 78.3% of the patients. Flow curves on uroflowmetry varied from patient to patient, and from normal pattern to intermittent voiding.

On the frequency–volume chart, the mean frequency of micturition during the day and night was 6.3 and 2.0 times, respectively. Mean tidal volume of voiding was 271 ml during the day and 263 ml at night. Thirteen patients (22.4%) needed intermittent self-catheterization to remove post-void residue. Twenty-four patients (43.6%) voided in the standing position, but 31 (56.4%) preferred to void in the sitting position because they found it easier.

On the assessment by item of the questionnaire concerning evacuation of urine (Fig. 1), the majority of the patients were conscious of hesitancy (61.8%), intermittency (85.5%), abdominal straining (81.8%) and reduced stream on voiding (78.2%), in a variety of degrees. The majority of the patients voided only by abdominal straining, but 23.6% of them needed to use Credé's maneuver. Although 94.8% of the patients answered that the voiding time was much prolonged, the majority of them had no residual sense.

The results of the questionnaire concerning the storage of urine were shown in Fig. 2. A normal desire to void was absent in all patients, but 79.3% of them realized the filling of the bladder as abdominal fullness. Forty patients (69.0%) reported incontinence, with 7.5% only during the day, 60% only at night and 32.5% both during the day and night. However, the leakage during the day was minimal, and 70.0% of the incontinent patients reported that the leakage only consisted of a few

**Table 1** Incidence of evacuation difficulty on uroflowmetry

<table>
<thead>
<tr>
<th>Maximum flowrate (ml/s)</th>
<th>Incidence</th>
<th>Residual urine (ml)</th>
<th>Incidence</th>
<th>Voiding time (s)</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤10</td>
<td>32.7%</td>
<td>≥100</td>
<td>18.2%</td>
<td>≥60</td>
<td>52.7%</td>
</tr>
<tr>
<td>10 &lt; 15</td>
<td>30.9%</td>
<td>50 &lt; 100</td>
<td>36.4%</td>
<td>30 &lt; 60</td>
<td>25.5%</td>
</tr>
<tr>
<td>≥15</td>
<td>36.4%</td>
<td>≤50</td>
<td>45.4%</td>
<td>≤30</td>
<td>21.8%</td>
</tr>
</tbody>
</table>