Voiding dysfunction after vaginal prolapse surgery: etiology, prevention and treatment

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How long should urinary bladder catheterisation be continued after vaginal prolapse surgery?

A Randomised Controlled Trial comparing routine prolonged catheterisation and prolonged catheterisation on indication after vaginal prolapse surgery.

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Chapter 2

Abstract

Objective: To determine whether prolonged urinary bladder catheterisation after vaginal prolapse surgery is advantageous.

Design: Randomised Controlled Trial.

Setting: A large training hospital in the Netherlands.

Population: Patients undergoing anterior colporraphy.

Main outcome measures: Need for recatheterisation, urinary tract infection, mean duration of catheterisation and hospital stay.

Materials and Methods: One hundred patients were included. Patients were randomised into two groups. In one group (n= 50), a transurethral catheter was in place for four days post-operatively and removed on the fifth post-operative day. In the other group (n= 50), catheterisation was not prolonged and the catheter was removed the morning after surgery. Residual volumes after removal of the catheter were measured by ultrasound scanning. Where residual volumes of >200 mL were found the patient was recatheterised for three more days. Urinary cultures were taken before removal of the catheter. Six patients were excluded: four in the standard prolonged catheterisation group and two in the not prolonged catheterisation group.

Results: Residual volumes exceeding 200 mL and need for recatheterisation occurred in 9% in the standard prolonged catheterisation group versus 40% of patients in the not prolonged catheterisation group (OR 0.15, 95% CI 0.045-0.47). Positive urine cultures were found in 40% of cases in the standard prolonged catheterisation group compared with 4% in the not prolonged catheterisation group (OR 15, 95% CI 3.2-68.6). Mean duration of catheterisation was 5.3 days in the standard prolonged catheterisation group and 2.3 days in the not prolonged catheterisation group (P < 0.001). Mean duration of hospitalisation was 7 days in the standard prolonged catheterisation group and 5.7 days in the not prolonged group (P < 0.001).

Conclusion: The disadvantages of prolonged catheterisation outweigh the advantages, therefore, removal of the catheter on the morning after surgery may be preferable and longer term catheterisation should only be undertaken where there are specific indications.
Introduction

In the Netherlands, it is common to maintain drainage of the bladder with a urethral catheter for longer periods after anterior colporrhaphy. A national questionnaire regarding practice in training hospitals revealed that the mean duration of catheterisation in 24 protocols is 3.7 days. In our hospital, the routine catheterisation period is four days. The reason for this standard procedure is the belief that overfilling of the bladder after prolapse surgery might have a negative influence on surgical outcome. However, there is no evidence in the literature to support this view. In one study of 50 patients, the number of post-operative voiding problems appeared to be equal between two groups of one and three days of prolonged catheterisation, respectively.1 In our routine practice, the actual proportion of patients requiring prolongation of catheterisation remains unknown. Moreover, bladder catheterisation increases the occurrence of urinary tract infections1,2 and is likely to have a negative impact on the wellbeing of patients after surgery and to prolong hospital stay.3 We therefore examined whether prevention of bladder overfilling can be achieved without prolonged catheterisation. We designed a randomised controlled trial where the standard, prolonged catheterisation was compared with short term catheterisation.

Materials and Methods

In daily practice, 5–10% of patients, treated with our standard prolonged catheterisation, require a second period of catheterisation because of a residual volume of more than 200 mL. We estimated that this number might increase to 30% if the catheter was removed on the morning after surgery. In our power calculation, the two-group equivalence test was therefore used, assuming that the number of patients who would need recurrent catheterisation could increase to 50%. The significance was assumed with a P value of 0.05. Therefore, according to this power calculation, we needed to recruit 100 patients. The study design was approved by the institutional medical ethical committee. Between February 2000 and July 2001, a total of 100 consecutive patients were included after giving informed consent. Prior to surgery, urine samples were taken in the operating theatre for sedimentation. Patients with samples showing signs of a urinary tract infection pre-operatively, defined as having more than 10 white blood cells per high power field and significant microscopic bacteriuria (one per high power field) in the urine sediment, were excluded.

All patients had a transurethral Foley catheter (Charrière 14) inserted in the operating theatre immediately after surgery. Prolapse surgery was performed by experienced gynaecologists. At admission to the ward, patients were randomised by the use of closed non-diaphane envelopes, into either standard prolonged catheterisation, or no prolonged catheterisation.
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In the standard prolonged catheterisation group, the catheter was removed on the morning of the fifth post-operative day. In the not prolonged catheterisation group, the catheter was removed on the morning after surgery. Before removal of the catheter, a urine sample was taken for culture. A urinary tract infection was defined as the presence of $>10^5$ colony forming units/mL in the culture. Urinary bladder volumes after voiding were measured using an ultrasound scanner (type DxU BVI 3000) within 8 hours after removal of the catheter. All patients with imminent overfilling, defined as a post-voiding residual volume of 200 mL or more, had another transurethral catheter inserted for a period of three days (recatheterisation). The above protocol was repeated after removal of this second catheter.

Nominal results were tested using $\chi^2$ analysis. Differences in mean for two groups with continuous or interval/ratio variables were tested using a Student’s t test.

Results

One hundred patients were included in this study. Age, the type of surgery and mean operating time did not differ significantly between the two groups (Table 1).

Table 1: baseline characteristics

<table>
<thead>
<tr>
<th></th>
<th>Standard prolonged catheterisation (n=46)</th>
<th>Not prolonged catheterisation (n=48)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at time of surgery</td>
<td>66 (66, 37-87)</td>
<td>67 (67, 36-86)</td>
</tr>
<tr>
<td>No. of interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APC</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>APC &amp; vaginal hysterectomy</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>AC</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Operating time (min.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total group</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>APC</td>
<td>54 (50, 30-90)</td>
<td>56 (50, 25-110)</td>
</tr>
<tr>
<td>APC &amp; vaginal hysterectomy</td>
<td>85 (90, 45-105)</td>
<td>91 (90, 60-160)</td>
</tr>
<tr>
<td>AC</td>
<td>43 (35, 30-60)</td>
<td>35 (38, 20-45)</td>
</tr>
</tbody>
</table>

Values within parentheses are median and range.

APC: anterior and posterior colporrhaphy. AC: anterior colporrhaphy.

In the standard prolonged catheterisation group, four patients were excluded: two patients underwent posterior colporrhaphy only and two patients had signs of an underlying urinary tract infection. In the not prolonged catheterisation group, two patients were excluded because of signs of a urinary tract infection (Fig. 1).
Figure 1: Flow of patients through the study

A significantly higher number of post-voiding residuals of greater than 200 mL were found in the not prolonged catheterisation group (Table 2) compared with those in the standard prolonged catheterisation group (OR 0.15, 95% CI 0.045–0.47).

Table 2: Outcome measures. Values in parentheses are in %.

<table>
<thead>
<tr>
<th></th>
<th>Standard prolonged (n=46)</th>
<th>Not prolonged (n=48)</th>
<th>OR 0.145 ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. patients requiring repeated catheterisation</td>
<td>4 (9%)</td>
<td>19 (40%)</td>
<td></td>
</tr>
<tr>
<td>Mean catheterisation days per patient</td>
<td>5.3</td>
<td>2.3</td>
<td>p-value &lt; 0.001</td>
</tr>
<tr>
<td>Urinary tract infections</td>
<td>18 (40%)</td>
<td>2 (4%)</td>
<td>OR 14,786 ²</td>
</tr>
<tr>
<td>Mean hospital stay in days</td>
<td>7.0</td>
<td>5.7</td>
<td>p-value &lt; 0.001</td>
</tr>
</tbody>
</table>

95% Confidence Interval
¹ = 95% CI 0.045 – 0.472
² = 95% CI 3.187 – 68.595

Nineteen out of 48 (40%) patients in the not prolonged catheterisation group and 4 out of 46 (9%) in the standard prolonged group required repeat catheterisation. After removal of the second catheter, post-voiding residuals were less than 200 mL in all patients in the standard prolonged catheterisation group. In this group, one patient required catheterisation for a third time, however, this patient was excluded from
analysis because of an underlying urinary tract infection at inclusion. Two patients in the not prolonged catheterisation group had residuals more than 200 mL after recatheterisation, which was not significant. Despite the higher number of recatheterisations in the not prolonged catheterisation group, the mean duration of catheterisation was still significantly shorter (Student’s t test, \( P < 0.001 \)). In the standard prolonged catheterisation group, the occurrence of urinary infections was significantly higher (OR = 15, 95% CI 3.2–68.6). The mean duration of stay was 1.3 days shorter in the not prolonged catheterisation group (Student’s t test, \( P < 0.001 \)).

**Discussion**

Prolonged catheterisation after vaginal prolapse surgery is believed to prevent voiding problems post-operatively. Catheterisation is therefore routinely prolonged in Dutch training hospitals. In this study, abandoning prolonged catheterisation led to a tenfold reduction of urinary tract infections. However, a higher number of residual volumes requiring recatheterisation were found in the experimental, short catheterisation group. Although this seems to be an unfavourable outcome, the mean number of catheterisation-days was lower and the majority of patients (60%) in the short duration catheterisation group did not require prolongation of catheterisation. Furthermore, hospital stay was reduced significantly in the experimental, short duration catheterisation group. A further reduction of hospital stay might be expected once the staff becomes more familiar with the new policy. Although not measured in the present study, we would expect patient satisfaction to increase with routine short duration catheterisation post-prolapse surgery. Additionally, this shorter period of catheterisation was preferred by the nursing staff. Further research work is required to identify specific factors that increase the risk for recatheterisation and whether medication might influence the rate of recatheterisation.
Optimising duration of standard prolonged catheterisation

References