Original Article

Vesicourethral anastomosis after radical prostatectomy using the Capio suturing system

D. Hernández-Alcaraz*, P. Moreno-Arcas, E. Carmona-Campos and A. Castro-León

Urology Service, Hospital Comarcal de Antequera, Málaga, Spain

Keywords
Radical prostatectomy; Urinary continence; Vesicourethral reconstruction; Spain

Abstract
Background: Proper vesicourethral anastomosis after radical prostatectomy is fundamental for preventing urinary extravasations and subsequent strictures, as well as for achieving satisfactory continence. A simpler and more watertight suture was attempted through the Capio suturing system.

Methods: The 80 radical prostatectomies carried out at our service using the Capio suturing system for vesicourethral reconstruction are presented. In all patients the neurovascular bundle and bladder neck were spared. Six 2-0 sutures were used for the reconstruction and bladder catheter was maintained for 10 days.

Results: The mean surgery duration was 163 minutes from the time of skin incision to the placement of the final staple. The mean suturing time was 20 minutes and the mean urinary drainage volume was 100 cc the first day and 40 cc the second day; the fluid had serohematic characteristics. The drain was removed on the third day, if there were no complications. Mean hospital stay was 4 days. Continence rates in our case series were: 35% after bladder catheter removal; 61% at 3 months; and 91.7% at one year. The results regarding continence were similar to those described in the medical literature for this type of technique. The mean suturing time and hospital stay were lower, in relation to conventional suturing.

Conclusions: The Capio suturing system allows for simple and rapid vesicourethral sutures, obtaining good urethral realignment and reducing urinary leakage.

* Corresponding author at: Servicio de Urología, Hospital Comarcal de Antequera. Av. Poeta Muñoz Rojas, C.P. 29200, Málaga, España. Telephone: 69605 8697. Email: davidhauro@hotmail.com (D. Hernández-Alcaraz).
Introduction

The principal aim of radical prostatectomy is to eliminate the prostate tumor. Secondary aims paid attention to, in order of importance, are urinary continence and erectile dysfunction.

Vesicourethral anastomosis after radical prostatectomy is a simple procedure that can be difficult to perform in deep pelvses or when there is not much of a urethral stump. A well-performed suture is essential for preventing urinary extravasations and later strictures, as well as for obtaining good continence.

Urinary continence will depend on various factors such as neurovascular bundle and the bladder neck preservation, the size of the prostate, the experience of the surgeon, and the urinary extravasations.

Through our suturing system, we attempt to reduce the anastomosis operative time and urinary leaks; we have also compared our functional results with those found in the existing medical literature.

Methods

We present 80 radical prostatectomies performed at our Service using the Capio suturing system for vesicourethral reconstruction.

In all patients nerve bundles (when indicated) were spared, as was the bladder neck, with eversion of the mucosa at the level of the bladder neck.

We used the Capio suturing system for vesicourethral junction reconstruction. This instrument is a needle-driving device that is introduced into the urethra with the help of a bladder catheter. Once inside the urethra, by pressing the device’s upper button, the needle driver places a suture in the urethra from the inside outwards (fig.1).

The needle uses re-absorbable 2-0 suture and has a harpoon at the end that is introduced into the urethra; at the opposite end it has a cylindrical Tapercut® needle that is used to suture the bladder neck (figs. 2 and 3).

After placing 6 sutures at the level of the urethra, we could place the suture at the bladder neck from the inside towards the outside, by means of a conventional holder. We used a 20 Ch 2-way silicon catheter with a perforated tip (fig.4).

The bladder catheter was removed 10 days after the procedure, without imaging studies to confirm suture watertightness.

Results

The mean age of our patients that underwent radical prostatectomy was 59 years and the mean prostate-specific antigen (PSA) at the time of diagnosis was 7.39 ng/dL. The characteristics of our case series are described in table 1 and the clinical and pathologic stages are described in tables 2 and 3.

The mean surgery duration was 163 minutes, from the time of skin incision to the placement of the last staple. The mean suturing time was 20 minutes (defined as the first suture at the level of the urethra to the confirmation of watertightness).

The mean urinary drainage was 100 cc the first day and 40 cc the second day, this drainage had serohematic character. The drain was removed on the third day, if there were no complications or suspicion of urinary leakage.
The mean hospital stay of our patients was 4 days. Six cases of urinary leakage were detected within the first 48 hours (due to high drain output, with an increase in creatinine values); and one case of delayed urinary leakage at 7 days after hospital release, associated with bladder catheter manipulation and its obstruction due to coagulates. All cases were conservatively resolved.

The continence rates after bladder catheter removal in our case series were: 35%, after removal; 61% at 3 months, and 91.7% at one year (table 4). Continence was defined when the patient referred to having no urinary leaks or no drops of urine requiring a compress for protection.
Two percent of the patients presented with urethrovesical junction stricture that was resolved through endoscopic procedures.

**Discussion**

The main objective of radical prostatectomy is to eliminate the prostate tumor. Secondary objectives given attention, in order of importance, are urinary continence and erectile dysfunction.

Urinary continence after radical prostatectomy is generally good and varies depending on the experience and skill of the specialist. Surgeons that perform large numbers of radical prostatectomies obtain complete continence for more than 90% of the patients. The return to continence is associated with the patient’s age; if the patients are under the age of 50 years the continence rate is 95%, and if they are above the age of 70 years, it is 85%. The small number of patients that do not have a return to continence require the placement of a suburethral sling or an artificial urinary sphincter.\(^1\)

Regarding robotic surgery, the Vatikuti Urology Institute has published continence rates of 95.2% at 12 months, with 26% of the patients continent after bladder catheter removal, and 55% at 4 weeks after the procedure.\(^3\) Other authors have achieved continence rates after bladder catheter removal of 25% after removal, 32% at one month, and 76% at 9 months.\(^3\)

The surgical technique employed is fundamental for attaining correct continence and sparing the bladder neck improves this function.\(^4\) It was first described by Gaker et al. in 1996, and in 2004 they presented the results of a retrospective study on 275 patients. There was immediate total continence (without compress) after catheter removal in 36% of the patients, in 69% at 14 days, and in 78% at 7 weeks, compared with 1%, 6%, and 41% of the 80 patients that underwent the standard technique. In addition, they described a reduction in bladder neck strictures. Many articles have been published on this subject, with a wide variety of results and with different approaches.\(^5\)

Vesicourethral anastomosis after radical prostatectomy is a simple procedure that can nevertheless become difficult in deep pelvic cavities or when there is not much of a

---

**Table 1** Descriptive variables of the case series presented

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Typical deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>49</td>
<td>71</td>
<td>59.09</td>
<td>4.95</td>
</tr>
<tr>
<td>Prostate volume (cm³)</td>
<td>16.7</td>
<td>80.00</td>
<td>39.40</td>
<td>16.40</td>
</tr>
<tr>
<td>Hospital stay (days)</td>
<td>4.00</td>
<td>10.00</td>
<td>6.03</td>
<td>1.40</td>
</tr>
<tr>
<td>Operative time (min)</td>
<td>90</td>
<td>240</td>
<td>163.33</td>
<td>45.55</td>
</tr>
<tr>
<td>Gleason Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum</td>
<td>6(3+3)</td>
<td>7(3+4)</td>
<td>7(4+3)</td>
<td>8(4+4) 8(5+3)</td>
</tr>
<tr>
<td>Percentage</td>
<td>66.7</td>
<td>15.2</td>
<td>6.1</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Table 2** Clinical stage and percentage of cases

<table>
<thead>
<tr>
<th>Clinical stage</th>
<th>Percentage</th>
<th>Valid percentage</th>
<th>Accumulated percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1c</td>
<td>78.8</td>
<td>78.8</td>
<td>78.0</td>
</tr>
<tr>
<td>T2a</td>
<td>12.1</td>
<td>12.1</td>
<td>90.9</td>
</tr>
<tr>
<td>T2b</td>
<td>9.1</td>
<td>9.1</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3** Postoperative pathologic stage

<table>
<thead>
<tr>
<th>Pathologic stage</th>
<th>Percentage</th>
<th>Valid percentage</th>
<th>Accumulated percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2a</td>
<td>21.2</td>
<td>21.9</td>
<td>21.9</td>
</tr>
<tr>
<td>T2b</td>
<td>3.0</td>
<td>3.1</td>
<td>25.0</td>
</tr>
<tr>
<td>T2c</td>
<td>63.6</td>
<td>65.6</td>
<td>90.6</td>
</tr>
<tr>
<td>T3a</td>
<td>3.0</td>
<td>3.1</td>
<td>93.8</td>
</tr>
<tr>
<td>T3b</td>
<td>6.1</td>
<td>6.3</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4** Urinary continence rate

<table>
<thead>
<tr>
<th>Urinary continence</th>
<th>1.5 months</th>
<th>3 months</th>
<th>6 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35.0%</td>
<td>61.1%</td>
<td>80.0%</td>
<td>91.7%</td>
</tr>
</tbody>
</table>
urethral stump. A well-performed suture with mucosa-to-mucosa coaptation and a lack of tension in the urethrovesical suture are essential for preventing urinary extravasations and for attaining good continence.

There are numerous studies in the medical literature in which improvements in the suturing technique have been attempted, as well as those reporting on techniques that endeavor to optimize the urinary continence rate.

The continence rates described in the literature with this suture system are 86.6% after catheter removal, 90% at 1.5 months, and 98% at one year. The continence rates of our case series were somewhat lower after immediate catheter removal, and similar in relation to the other times. It should be kept in mind that the differences can be due to the multiple surgical techniques among centers, the diverse skills of the surgeons, and even on the definition given to continence.

The literature describes 4.6% cases of vesicourethral stricture at 8 weeks after bladder catheter removal that have been satisfactorily resolved through a single endoscopic procedure. In our case series 2% of the cases presented with stricture at 3 months after bladder catheter removal.

The literature also shows that the rates of urine leakage at the suture associated with a higher rate of incontinence and fibrosis of the anastomosis have gone down.

The urethrovésical suture time and the mean hospital stay were reduced with respect to conventional suture.

Conclusions

The Capio suturing system enables simple and rapid urethrovésical suture, obtaining good urethral alignment with a reduced number of urine leaks.

Financial disclosure

No financial support was received in relation to this article.

Conflict of interest

The authors declare that there was no conflict of interest.

References