



## ORIGINAL ARTICLE

# Urodynamic assessment of bladder and urethral sphincter function before and after robot-assisted radical prostatectomy<sup>☆</sup>

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### KEYWORDS

Urodynamic study;  
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Urinary incontinence;  
Bladder dysfunction;  
Voiding dysfunction

### Abstract

**Introduction:** Affectation of the bladder after open prostatectomy is demonstrated. Decrease in bladder capacity and bladder compliance, detrusor hyper- or hypo-activity and voiding dysfunction are observed. We propose to investigate the effects of robotic surgery on bladder and sphincter function through the comparative study of preoperative and postoperative urodynamic values 3 months after prostatectomy.

**Material and methods:** Prospective study of 32 consecutive patients undergoing robotic prostatectomy. They all underwent urodynamic study one month before the intervention and 3 months after the radical prostatectomy.

**Results:** Twenty-five percent of patients undergoing robotic prostatectomy showed detrusor hyperactivity accompanied by a decrease in bladder compliance of 30.2 to 21.8 ml/cmH<sub>2</sub>O. Urethral profile showed diminished functional length of 67 to 44 mm and decreased maximum urethral pressure of 48.5 to 29.3 cmH<sub>2</sub>O. After robotic prostatectomy 21.8% of patients had detrusor hypoactivity, obstruction decreased between 28.1 and 12.5%.

**Conclusions:** Decreased bladder compliance, detrusor hypo- or hyperactivity and obstruction improvement observed in the study of the flow pressure have been associated with sphincter involvement. It is part of the complex of lower urinary tract dysfunction that occurs after robotic prostatectomy.

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**PALABRAS CLAVE**

Estudio urodinámico;  
 Prostatectomía radical asistida por robot;  
 Incontinencia urinaria;  
 Disfunción vesical;  
 Disfunción de vaciado

## Valoración urodinámica de la función vesical y esfinteriana antes y después de la prostatectomía radical asistida por robot

**Resumen**

**Introducción:** Está demostrada la existencia de una afectación vesical tras la prostatectomía abierta en relación con la disminución de la capacidad vesical y la acomodación, la hiperactividad o la hipoactividad y la disfunción de vaciado. Comparando el estudio urodinámico preoperatorio con el realizado a los 3 meses tras la prostatectomía, nos proponemos investigar el impacto de la cirugía robótica sobre la función vesical y la esfinteriana.

**Material y métodos:** Hemos evaluado de forma prospectiva a 32 pacientes que de manera consecutiva han sido intervenidos de prostatectomía robótica. A todos estos pacientes se les ha realizado un estudio urodinámico un mes antes de la intervención y otro a los 3 meses tras la prostatectomía radical.

**Resultados:** Hemos detectado una hiperactividad del detrusor en un 25% tras la prostatectomía robótica con una disminución de la acomodación vesical de 30,2 a 21,8 ml/cmH<sub>2</sub>O. En el perfil uretral hemos encontrado una disminución de la longitud funcional uretral de 67 a 44 mm y de la presión uretral máxima de 48,5 a 29,3 cmH<sub>2</sub>O. La hipoactividad se ha demostrado en el 21,8% de los pacientes y la obstrucción ha disminuido del 28,1 al 12,5% tras la prostatectomía robótica.

**Conclusiones:** La disminución de la acomodación vesical, la hiperactividad o hipoactividad detrusoriana y la mejoría de la obstrucción en el estudio de presión-flujo se asocian a la afectación esfinteriana formando parte de un síndrome complejo de disfunción del tracto urinario inferior que aparece tras la prostatectomía robótica.

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**Introduction**

Urinary incontinence (UI) is a postoperative complication of robot assisted radical prostatectomy (RARP) that has a significant impact on the quality of life of these patients.<sup>1</sup> UI is the major lower urinary tract disorder, but not the only, after radical prostatectomy. A relationship between bladder disorder and open prostatectomy has been proved. There is a reduction in bladder capacity and compliance, bladder over- and hypo-activity and emptying dysfunction.<sup>2-5</sup> These findings can be present before surgery or appear de novo as consequence of denervation and devascularization of the bladder, long time infravesical obstruction evolution or because the patients develop new voiding patterns.<sup>6</sup> The proper way to assess objectively these findings is by urodynamic study (US) at 3 months, because the changes are not significant from this period.<sup>2</sup>

Laparoscopic radical prostatectomy does not avoid bladder injury but it is associated with less impairment than open surgery, without differences in post-operative urethral function.<sup>7</sup> Undoubtedly, several factors like surgeon and surgical technique have an important impact on functional outcomes and in recovery of urinary continence. Thus, less incontinence rates, statistically significant, have been achieved with robotic surgery in comparison with conventional laparoscopic surgery.<sup>8</sup>

We propose to investigate the effects of robotic surgery on bladder and sphincter function comparing preoperative urodynamic study with the study at 3 months after prostatectomy.

**Material and methods**

Thirty-two consecutive patients undergoing robotic prostatectomy in our service between October 2011 and June

2012 have been assessed prospectively. One month before surgery, urodynamic study has been performed for each patient and a second US at 3 months after radical prostatectomy. The Ethic Committee of our center approved the study and all patients provided written informed consent.

Preoperatively, all patients were incontinent with an ICIQ-SF score of 1 (ICIQ-SF Spanish version).<sup>9</sup> Pelvic floor exercises and habitual physical activity, before and after surgery, were recommended to all patients.

Preoperative variables analyzed were: age, comorbidities – measured with Charlson comorbidity index (CCI) and with CCI age-adjusted –, body mass index (BMI), lower tract urinary symptoms assessed with IPSS questionnaire, sexual function assessed by IIEF-5 questionnaire, prostatic volume measured by transrectal ultrasound, preoperative PSA, Gleason score and clinical stage.

The same RARP technique has been performed by 3 specialists in robotic surgery: descending approach, intraperitoneal, with bladder release and extraperitoneal access to Retzius' space. Periprostatic fat is removed and endopelvic fascia is opened. In all cases, bladder neck sparing has been tried. After the bladder neck is dissected, retrovesical space is exposed, vas deferens is properly identified and cut and seminal vesicles are completely released. Following, through interfascial approach bilateral neurovascular bundles are released. After dissection and ligation of Santorini complex, urethra is cut, preserving the maximum possible length of the urethral stump in order to preserve external sphincter function. Urethrovesical anastomosis is performed using Van Velthoven technique (running suture).<sup>10</sup>

Finally, leakage test is carried out in order to verify the proper urethrovesical anastomosis, followed by a drainage placement and removal of the surgical specimen. At the end of the surgery, a 20 Ch Foley catheter is placed and

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