

## USEFULNESS OF PREOPERATIVE MRI AND POSTOPERATIVE URETHROCYSTOGRAPHY AS A PREDICTOR FOR EARLY RECOVERY OF URINARY INCONTINENCE AFTER ROBOT-ASSISTED RADICAL PROSTATECTOMY

### Hypothesis / aims of study

Robot-assisted radical prostatectomy (RARP) can achieve better functional recovery than conventional surgery, such as retropubic or laparoscopic radical prostatectomy (1). However, early urinary incontinence remains one of the most bothersome postoperative complications, even in RARP (2). The objective of this study is to predict early recovery of urinary incontinence after RARP using preoperative MRI and postoperative urethrocytography which are performed in all patients noninvasively.

### Study design, materials and methods

Between April 2014 and March 2016, 71 patients with localized prostate cancer underwent RARP in our hospital. MRI was performed preoperatively in all patients and urethrocytography was performed in all patients 1 week after RARP before urethral catheter removal. Patients answered the questionnaires about urinary incontinence at the time of outpatient visits, and followed for 6 months or more after RARP. Age, BMI, PSA, prostate volume, the length of membranous urethra and urethrocytography patterns were analysed. Prostate volume and the length of membranous urethra were measured via preoperative MRI. We categorized patients into 3 groups according to the length of membranous urethra: 0-10 mm, 10-15 mm and 15.1 mm-. Regarding to urethrocytography patterns, we focused on the contrast medium at bladder neck and membranous urethra, and noticed several patterns. We named the defect of contrast medium at membranous urethra as stop sign, and categorized patients into 3 grades according to the degree of defect. That is to say, no defect was grade 0, complete defect was grade 2, and grade 1 was between grade 0 and grade 2. Furthermore, we also named the difference in brightness of contrast medium between in bladder neck and in body bladder as contrast sign, and categorized patients into 3 grades. No difference was grade 0, obvious deference was grade 2, and grade 1 was between grade 0 and grade 2. Urinary incontinence was evaluated using the questionnaires about urinary incontinence.

### Results

The median age of patients was 67 years old (range 51-76). The median PSA, BMI, prostate volume and the length of membranous urethra was 7.4 ng/ml (range 4.1-35.5), 22.8 kg/m<sup>2</sup> (range 20.8-28.1), 30.0 cm<sup>3</sup> (range 14-67.2) and 12.3 mm (range 4.9-24.6), respectively. 62 patients were diagnosed as pathological T2 and 9 patients were T3. The median period of observation was 12 months (range 6-24).

In total, 24 patients (35%) recovered urinary incontinence and 35 patients (49%) used only one pad a day 6 months after RARP. A statistical analysis of the relationship between these parameters and urinary continence 6 months after RARP was performed. The median age of continent group (n=24) and incontinent group (n=47) was 69 and 67, respectively (p=0.68). While BMI, PSA and prostate volume were not significantly different between groups (p=0.20, 0.51 and 0.17, respectively), but significant differences in the length of membranous urethra (p=0.0015), stop sign (p<0.001) and contrast sign (p=0.047) were observed.

Moreover, we analysed in details about membranous urethra, stop sign and contrast sign. As a result, the longer the membranous urethra was, the better urinary incontinence was recovered (p-trend=0.0006) at 6 months after RARP. What is more, the higher grade of stop sign or contrast sign was, the earlier urinary incontinence was recovered. To reveal the meaning of stop sign and contrast sign, we analysed correlation between these parameters. The membranous urethra had a correlation with stop sign (p-trend=0.001), but not with contrast sign (p-trend=0.913).

### Interpretation of results

The length of membranous urethra, stop sign and contrast sign may be a promising predictor for early recovery of urinary incontinence after RARP. From our analysis, we assume that the length of membranous urethra reflects the physical length of sphincter muscle of urethra, and stop sign reflects the function of sphincter muscle of urethra. We also assume that contrast sign reflects the function of bladder neck. In that case, preoperative early intervention of pelvic floor training may be able to make a higher grade stop sign, and careful bladder neck sparing in operation may be able to make a higher grade contrast sign. To improve the QOL of patients after RARP, we should perform RARP with the understanding of the risk of urinary incontinence preoperatively. That allows us to understand the necessity of preoperative early intervention of pelvic floor training and the necessity of careful bladder neck sparing in operation.

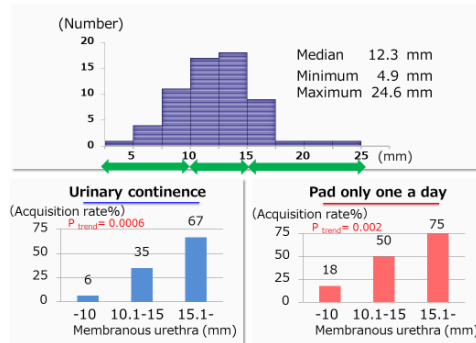
### Concluding message

Preoperative MRI and postoperative urethrocytography are useful as a predictor for early recovery of urinary incontinence after RARP. This is the first report about the importance of stop sign and contrast sign in urethrocytography.

## Relationship between parameters and urinary continence

| Parameter                          | Urinary continence |           | P value          |
|------------------------------------|--------------------|-----------|------------------|
|                                    | Yes (n=24)         | No (n=47) |                  |
| Age (year)                         | 69                 | 67        | 0.68             |
| BMI (kg/m <sup>2</sup> )           | 22.6               | 23.5      | 0.20             |
| PSA (ng/ml)                        | 7.3                | 7.5       | 0.51             |
| Preoperative MRI                   |                    |           |                  |
| Prostate volume (cm <sup>3</sup> ) | 26.1               | 32.3      | 0.17             |
| Membranous urethra (mm)            | 13.9               | 11.1      | <b>0.0015</b>    |
| Postoperative urethrocytography    |                    |           |                  |
| Stop sign (G0/G1/G2)               | 0/8/11             | 9/17/6    | <b>&lt;0.001</b> |
| Contrast sign (G0/G1/G2)           | 7/6/6              | 18/11/4   | <b>0.047</b>     |

## Membranous urethra



## References

1. Ficarra V, Novara G, Rosen RC, et al. Systematic review and meta-analysis of studies reporting urinary continence recovery after robot-assisted radical prostatectomy. *Eur Urol.* 2012; 62: 405-417.
2. Kojima Y, Hamakawa T, Kubota Y, et al. Bladder neck sling suspension during robot-assisted radical prostatectomy to improve early return of urinary continence: a comparative analysis. *Urology.* 2014; 83: 632-639.

## Disclosures

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