

DOES BLADDER SHAPE ON CYSTOURETHROGRAPHY PREDICT STORAGE FUNCTION OF THE BLADDER AND POST-OPERATIVE URINARY INCONTINENCE IN PATIENTS UNDERGOING LAPAROSCOPIC RADICAL PROSTATECTOMY?

Aims of study

Urinary incontinence is a distressing complication associated with radical prostatectomy for prostate cancer and impairs quality of life of patients after surgery. Two etiologic factors have been indicated in occurrence of postoperative urinary incontinence: impairment of the sphincteric function of the urethra and the storage function of the bladder. However, with the advance of operative techniques to preserve the function of the urethral sphincter, especially in laparoscopic radical prostatectomy, the storage function of the bladder after surgery might become a primarily important factor associated with post-operative urinary incontinence.

Cystourethrography (CUG) is a simple and noninvasive test sometimes performed after surgery to assess leakage at the vesicourethral anastomosis. With a hypothesis that bladder shape on post-operative CUG could predict the storage function of the bladder and thus continent status after surgery, we evaluated the relationship of the bladder shape with the bladder function on urodynamic study and post-operative occurrence of urinary incontinence.

Materials and methods

The analysis was conducted in 88 patients who underwent laparoscopic radical prostatectomy for prostate cancer through a retroperitoneal approach between January 2003 and January 2005. In our institution, CUG is routinely performed 3 to 5 days after radical prostatectomy by instilling 100 ml of contrast medium into the bladder through a urethral catheter to assess the condition at the vesicourethral anastomosis. We analyzed the bladder shape on CUG and assessed the relationship between the bladder shape and the subsequent occurrence of urinary incontinence after surgery. On the front view of CUG, we calculated the aspect ratio of the bladder (length/width) by measuring the distance between the bladder walls in each direction on the film (Fig. 1).

In addition, we evaluated the relationship between the aspect ratio of the bladder and the bladder function assessed in terms of urodynamic parameters comprising bladder compliance, maximum cystometric capacity (MCC) in 61 patients who underwent urodynamic study before and after laparoscopic radical prostatectomy. In the present study, urinary incontinence in the patients was defined as the use of more than one pad per day for coping with urine leakage.

Results

At one month after surgery, 53 patients (mean age : 66.0 years old) acquired continence, while 35 patients (mean age : 67.0 years old) had persistent urinary incontinence. The mean aspect ratio of the bladder in the patients with urinary incontinence was 1.49 ± 0.33 (mean \pm SD), which was significantly higher ($p < 0.001$, Wilcoxon signed-rank test) than that of patients without urinary incontinence (mean aspect ratio 1.08 ± 0.21). Figure 2 reveals the distribution of the aspect ratio of each patient with or without urinary incontinence, indicating that patients with urinary incontinence tended to have a higher ratio than those without urinary incontinence.

We classified 61 patients who underwent urodynamic study before and after laparoscopic radical prostatectomy into two groups, 28 patients with bladder aspect ratio more than 1.2 (group A) and 33 patients with the ratio of less than 1.2 (group B). Incontinence rate of group B was 74%, which was significantly higher than that of group A (35%). Urodynamic study revealed that bladder compliance was lower and maximum cystometric capacity was smaller in group A than in group B after surgery, although there was no significant difference in both parameters before surgery between the two groups (table 1).

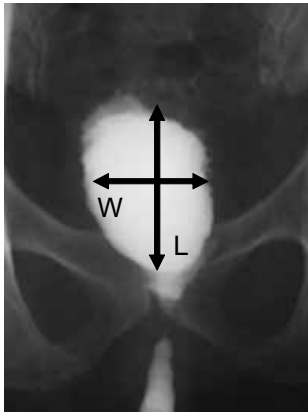
Interpretation of results

In the assessment of the bladder shape on post-operative CUG, high aspect ratio appeared to reflect the impaired storage function of the bladder in terms of low bladder compliance and bladder volume. The clinical observation, that the patient group with post-operative urinary incontinence had higher aspect ratio than the group without incontinence and that all patients with urinary incontinence showed aspect ratios of greater than 1.0, indicated that the assessment of the bladder shape could have a predictive value of post-operative urinary incontinence.

Concluding message

Assessment of the bladder shape on CUG during the early postoperative periods could predict the functional status of the bladder and subsequent occurrence of urinary incontinence after radical prostatectomy. A high aspect ratio revealed by postoperative CUG would be related to subsequent occurrence of urinary incontinence and impairment in storage function of the bladder on post-operative urodynamic study.

Fig.1 Calculation of aspect ratio of the bladder on CUG



aspect ratio: length (L) / width (W)

Fig.2 Comparison of aspect ratios between continent and incontinent after surgery

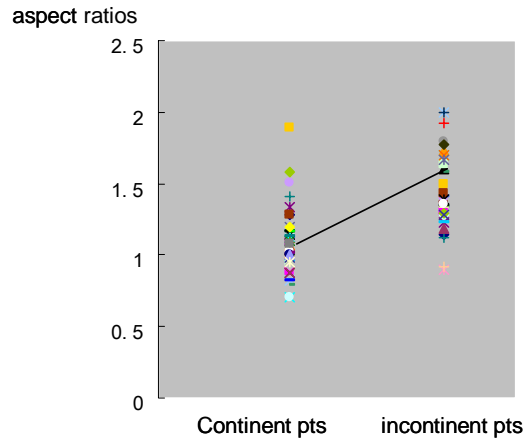


Table 1

the relationship between the bladder shape and the bladder function on urodynamic study.

	group A (mean)	group B (mean)	p value
Pre-op bladder compliance	54.8ml/cmH2O	62.5ml/cmH2O	ns
Pre-op MCC (max.cystometric capacity)	252ml	258ml	ns
Post-op bladder compliance	22.9ml/cmH2O	42.7ml/cmH2O	<0.01
Post-op MCC	222ml	256ml	<0.01

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CLINICAL TRIAL REGISTRATION: This clinical trial has not yet been registered in a public clinical trials registry.

HUMAN SUBJECTS: This study was approved by the Nagoya University ethics committee and followed the Declaration of Helsinki. Informed consent was obtained from the patients.