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PREVALENCE AND PREDICTIVE FACTORS OF DE NOVO DETRUSOR UNDERACTIVITY AFTER ROBOT-ASSISTED RADICAL PROSTATECTOMY

Hypothesis / aims of study

Radical prostatectomy (RP) damages the anatomical and functional structure of bladder and consequently induces postoperative not only urinary incontinence but also impaired detrusor contractility. The reported prevalence of detrusor underactivity (DU) after retropubic RP (RRP) ranges from 25% to 34%, but the incidence and predictive factors of de novo DU after RRP has remained unknown. This prospective study compares urodynamic parameters and detrusor function in patients before and one month after undergoing robot-assisted RP (RARP) and determines the prevalence and predictive factors of de novo DU arising in patients during the early postoperative period after RARP.

Study design, materials and methods

Urodynamic parameters were compared before and one month after RARP in 63 patients (mean age, 66.8 ± 4.7 years). DU was defined as a maximum flow rate (Qmax) of ≤ 15 mL/s and detrusor pressure at Qmax (PdetQmax) ≤ 25 cmH20 during attempted voiding[1)]. The incidence of pre- and post-operative DU was initially assessed and then predictive factors of postoperative DU were determined using univariate and multivariate logistic regression analyses. The factors comprised patient characteristics (age, body mass index, prostate volume, etc.), operative factors (surgical duration, estimated blood loss, nerve-sparing, etc.) and pre-operative urodynamic study (UDS) parameters (maximum bladder capacity, bladder compliance, detrusor overactivity, Qmax, PdetQmax, bladder contractile index (BCI), etc.).

Results

Preoperative and postoperative DU at one month after RARP were detected in one (1.6%) and 24 (37.5%) patients, respectively. Univariate analysis selected preoperative Qmax ($p = 0.02$), PdetQmax ($p = 0.04$) and BCI ($p < 0.01$) as predictors of postoperative DU (univariate odds ratios; 0.83, 0.97 and 0.94, respectively). Multivariate analyses of factors identified as significant in univariate analyses associated only preoperative BCI with postoperative DU ($p < 0.01$; multivariate odds ratio: 0.94) (Table 1). A cutoff value of 101.3 offered the optimal accuracy in receiver operating characteristics analysis (Figure 1). Patient characteristics and operative factors were not significantly associated with postoperative DU in both univariate and multivariate analyses.

Interpretation of results

DU patients were increased to 24 patients immediately after RARP from one patient preoperatively. Besides, BCI were decreased postoperatively, in both DU and non-DU group. Therefore, in addition to preoperative bladder contractile force, surgical operation itself is also considered to be involved in a decrease of bladder function immediately after surgery. Detrusor nerves are reported to be abundantly located dorsal to bladder neck around ureterovesical junction[2)]. Hence, when the transection of the bladder neck at RRP, there is a possibility that damage the detrusor nerves innervating around dorsal bladder neck. Therefore, the partial denervation of detrusor nerves due to surgical operation induces a decrease of postoperative bladder contractile force. Especially, patients with lower bladder contractile force preoperatively have a predilection to develop DU as a synergistic effect of surgical operation.

Concluding message

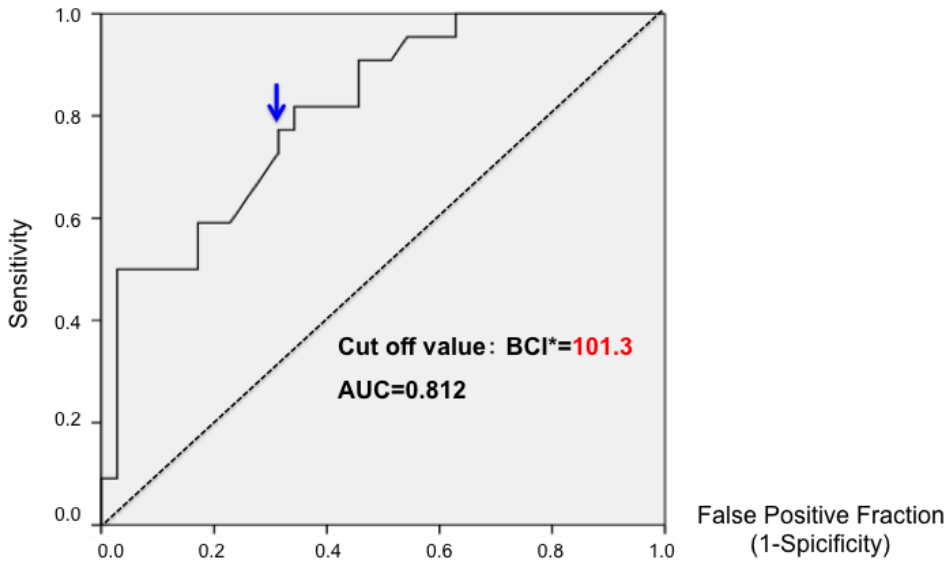
A comparatively high prevalence of de novo DU was observed in patients at 1 month after RARP bladder, which may have been due to bladder denervation during surgery. Preoperative BCI is the most important factor for predicting early postoperative DU after RARP.

Table 1. Univariate and multivaluate logistic regression analyses

	Univariate model		Multivariate model	
	OR (95% CI)	p	OR (95% CI)	p
maximum bladder capacity	0.99(0.99-1.00)	0.31	-	-
bladder compliance	0.99(0.98-1.02)	0.88	-	-
DO	0.22(0.03-1.98)	0.18	-	-
Qmax	0.83(0.07-0.94)	0.02	1.07(0.83-1.38)	0.60
PdetQmax	0.97(0.93-1.00)	0.04	0.99(0.94-1.04)	0.60
BCI	**0.94(0.91-0.97)**	**<0.01**	**0.94(0.91-0.98)**	**<0.01**
postvoiding residual volume	1.01(0.99-1.02)	0.40	-	-
BOO index	0.99(0.96-1.01)	0.30	-	-

OR: odds ratio, CI: confidence interval, DO: detrusor overactivity, Qmax: maximum flow rate
PdetQmax: detrusor pressure at Qmax, BCI: bladder contractile index
BOO index: bladder outlet obstruction index

Figure 1. Receiver operating characteristics (ROC) curve –preoperative BCI as predictive factors of de novo DU-



*BCI: bladder contractile index

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