276
Akaihata H[1], Haga N[1], Hata J[1], Kushida N[1], Aikawa K[1], Kojima Y[1]
1. Fukushima medical university

THE PREOPERATIVE SERUM LOW DENSITY LIPOPROTEIN CHOLESTEROL / HIGH DENSITY LIPOPROTEIN CHOLESTEROL RATIO IS A USEFUL PREDICTOR OF LOWER URINARY TRACT DYSFUNCTION AFTER ROBOT-ASSISTED RADICAL PROSTATECTOMY

Hypothesis / aims of study
The operative procedure of radical prostatectomy, even in robot-assisted radical prostatectomy (RARP), impairs the anatomical and functional structure of the bladder and consequently induces lower urinary tract dysfunction (LUTD). The prognostic factors for postoperative LUTD are unknown. On the other hand, dyslipidemia appears to contribute to lower urinary tract symptoms[1]. It is possible that dyslipidemia affects bladder function after radical prostatectomy. Recently, attention has focused on the low density lipoprotein cholesterol (LDL-C) / high-density lipoprotein cholesterol (HDL-C) ratio as a predictor of cardiovascular disease (CVD). It has been demonstrated that the LDL-C/HDL-C ratio more accurately predicts CVD risk than LDL-C or HDL-C levels[2]. The aim of this study was to determine whether preoperative dyslipidemia contributes to LUTD after RARP and can be used to predict LUTD after RARP by evaluating the association between the preoperative triglyceride (TG), LDL-C, and HDL-C levels and the LDL-C/HDL-C ratio and the changes in urodynamic parameters before and one month after undergoing RARP.

Study design, materials and methods
Patients with localized prostate cancer who underwent RARP in our hospital between February 2013 and April 2014 were included in this study. LDL-C and HDL-C levels were measured before RARP. Urodynamic studies were performed before and one month after RARP. The associations between the preoperative LDL-C and HDL-C levels and the LDL-C/HDL-C ratio and the changes in urodynamic parameters before and one month after RARP were prospectively analyzed. The Schäfer nomogram contraction was used to evaluate the changes in bladder contraction before and one month after RARP. All values are expressed as mean ± standard deviation. P-values of <0.05 were considered significant.

Results
A total of 44 patients (age 65.5 ± 4.7 years) entered the study. The preoperative IPSS (8.0 ± 6.5) and QOL index (2.8 ± 1.3) were moderate. The prostate volume was 35.3 ± 15.1 mL. Before RARP, the TG was 151.5 ± 74.8 mg/dL, the LDL-C was 104.7 ± 30.8 mg/dL, the HDL-C was 56.3 ± 20.5 mg/dL, and the LDL-C/HDL-C ratio was 2.0 ± 0.8. The preoperative postvoid residual urine volume was 36.6 ± 77.4 mL (Table 1). The LDL-C/HDL-C ratio was significantly higher in patients whose volume at first desire to void was decreased than in the other patients (2.3 ± 0.8 vs 1.7 ± 0.5, P=0.026). Receiver-operating characteristic (ROC) analysis showed a cut-off value of 2.1 for the LDL-C/HDL-C ratio (sensitivity, 62.5%; specificity, 58.8%; area under the curve (AUC), 0.692). The LDL-C/HDL-C ratio was significantly higher, and the HDL-C was significantly lower in patients whose bladder contraction was reduced (LDL-C/HDL-C ratio: 2.3 ± 0.8 vs 1.6 ± 0.8, P=0.019; HDL-C: 50.8 ± 8.5 vs 66.9 ± 31.3, P=0.029). ROC analysis showed cut-off values of 1.7 for the LDL-C/HDL-C ratio (sensitivity, 80.0%; specificity, 66.7%; AUC, 0.723) and 48.5 for HDL-C (sensitivity, 78.6%; specificity, 54.2%; AUC, 0.714). The LDL-C/HDL-C ratio tended to be higher in patients whose volume at strong desire to void was decreased as compared with the other patients (2.3 ± 0.8 vs 1.8 ± 0.5, P=0.085) (Figure 1).

Interpretation of results
An elevated LDL-C/HDL-C ratio before RARP decreased volume at first desire to void after RARP, and preoperative low HDL-C and elevated LDL-C/HDL-C ratio reduced postoperative bladder contraction. This result suggested that dyslipidemia may decrease bladder capacity and impair bladder smooth muscle contraction after RARP. This result might indicate that the LDL-C/HDL-C ratio more accurately predicts LUTD after RARP than TG, LDL-C, or HDL-C levels.

Concluding message
Dyslipidemia may be one cause of LUTD after RARP. The preoperative LDL-C/HDL-C ratio appears to be a useful predictor of LUTD after RARP.
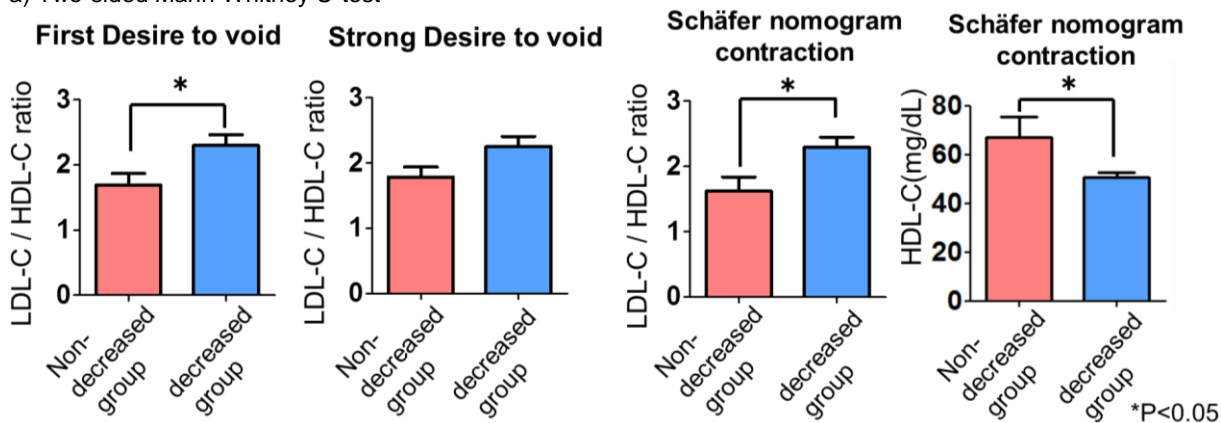
Table 1. Urodynamic findings

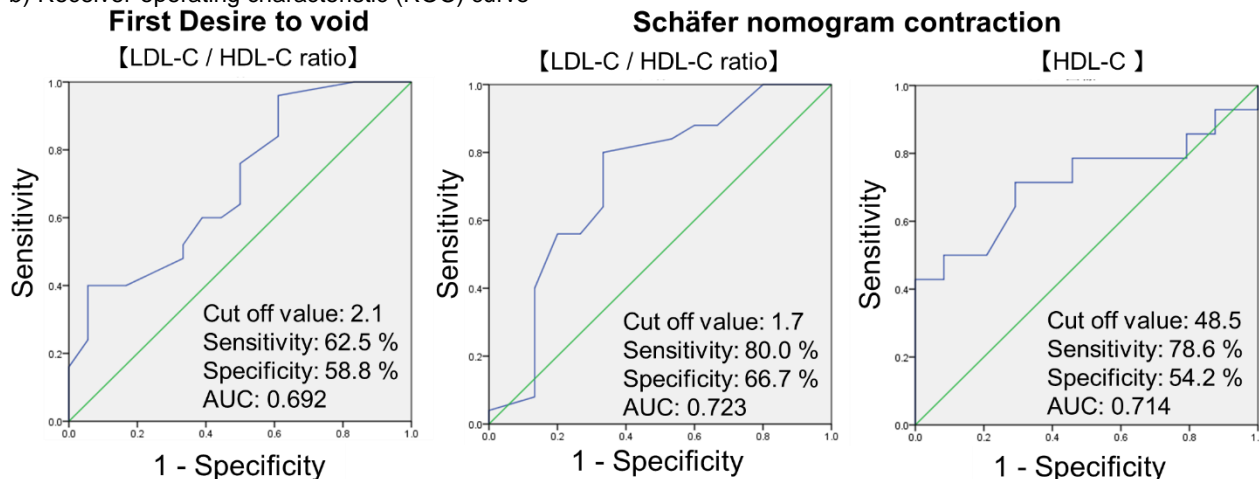|		Before RARP	1 month after RARP
First Desire to void (mL)		139 ± 67 (25-318)	104 ± 51 (23-238)
Strong Desire to void (mL)		277 ± 112 (115-580)	198 ± 74 (62-348)
Bladder compliance (mL/cm H_2O)		36.0 ± 30.4 (5.5-165.0)	27.0 ± 28.1 (5.7-180.0)
Detrusor overactivity	Negative	6 (13.6 %)	3 (6.8 %)
	Positive	38 (86.4 %)	41 (93.2 %)
Maximum flow rate (mL/sec)		11.4 ± 5.0 (2.1-23.5)	11.3 ± 5.5 (3.4-25.0)
Voided volume (mL)		281 ± 101 (69-480)	270 ± 102 (118-633)
Postvoid residual urine volume (mL)		37.0 ± 77.0 (0-330)	3.8 ± 9.1 (0.0-32.0)
Schäfer nomogram contraction	W-,W+,N-	31 (70.4 %)	39 (88.6 %)
	N+, ST	13 (29.6 %)	5 (11.4 %)
Schäfer nomogram obstruction	0,1	36 (81.8 %)	39 (97.7 %)
	3,4,5	8 (29.6 %)	1 (2.3 %)

Continuous data are presented as mean ± standard deviation (range)
and discrete data as numbers of patients (%)

Figure 1. Univariate analysis
a) Two-sided Mann-Whitney U-test

b) Receiver-operating characteristic (ROC) curve

First Desire to void 【LDL-C / HDL-C ratio】
Cut off value: 2.1
Sensitivity: 62.5 %
Specificity: 58.8 %
AUC: 0.692

Schäfer nomogram contraction 【LDL-C / HDL-C ratio】
Cut off value: 1.7
Sensitivity: 80.0 %
Specificity: 66.7 %
AUC: 0.723

【HDL-C 】
Cut off value: 48.5
Sensitivity: 78.6 %
Specificity: 54.2 %
AUC: 0.714

References
1. Martin S, et al: Risk factors for progression or improvement of lower urinary tract symptoms in a prospective cohort of men. J Urol. 2014 Jan;191(1):130-7.

2. Kannel et al: Risk stratification of dyslipidemia: insights from the Framingham Study. Curr Med Chem Cardiovasc Hematol Agents. 2005 Jul;3(3):187-93.