

Identification of factors associated with the onset of stress urinary incontinence and urgency urinary incontinence after robot-assisted radical prostatectomy and their application to distinguish between them

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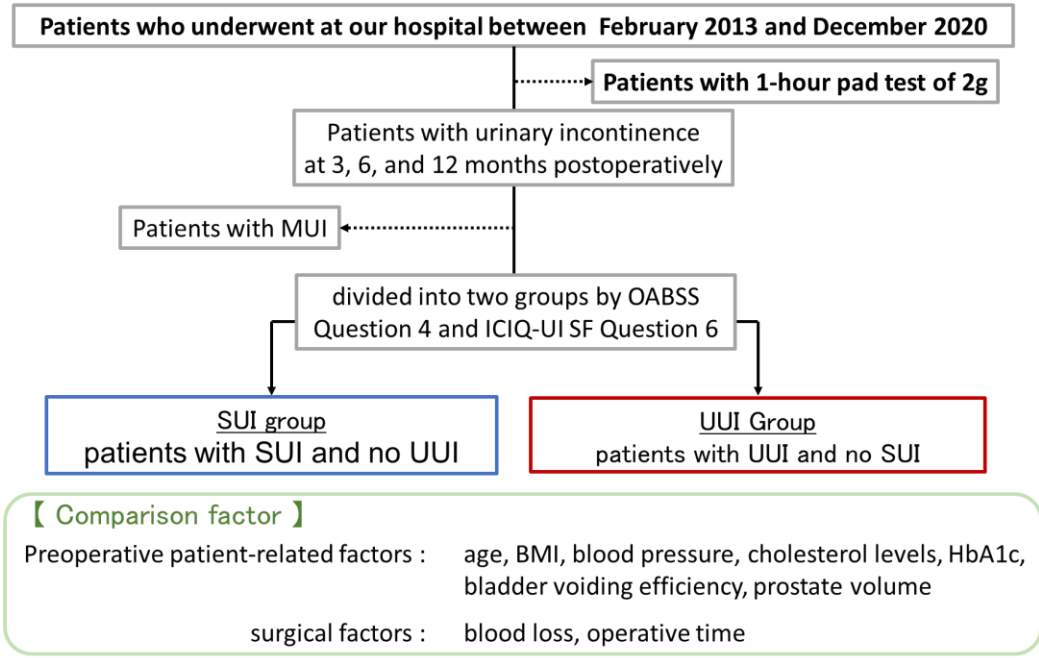
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【aims of study】

Longevity with localized prostate cancer has been achieved, and the contribution of robot-assisted radical prostatectomy (RARP) to cancer control is evident. The next step to investigate in the treatment of localized PCa is improvement of the quality of life (QOL) after RARP. Urinary incontinence is a significant complication after robot-assisted radical prostatectomy (RARP) and cause QOL deterioration. Postoperative urinary incontinence includes not only stress urinary incontinence (SUI) but also urgency urinary incontinence (UUI). The appropriate treatment approaches differ between SUI and UUI. In this study, we evaluated factors related to the onset of SUI and UUI after RARP in order to find factors useful for distinguishing between them.

【materials and methods】

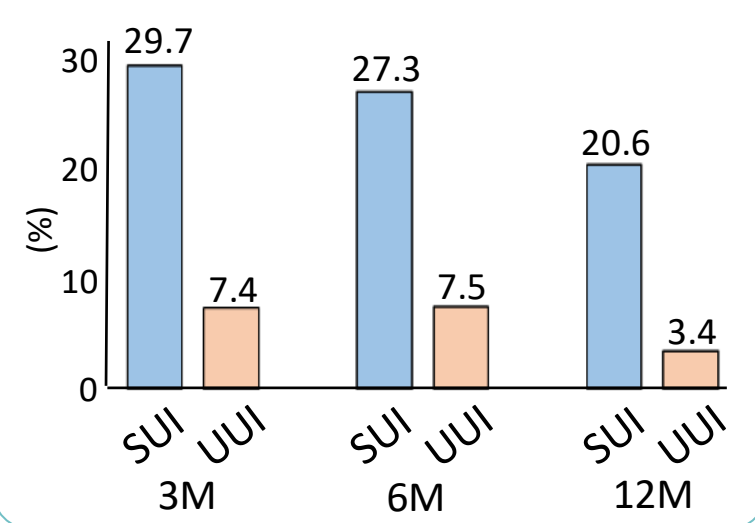
Patients who underwent RARP at our hospital between February 2013 and December 2020 were included in this study. Patients with 1-hour pad test of 2g ≤ were excluded. At 3, 6, and 12 months after RARP, these patients were divided into two groups by OABSS Question 4 and ICIQ-UI SF Question 6: SUI group (patients with SUI and no UUI) and UUI group (patients with UUI and no SUI). Preoperative patient-related factors (age, BMI, blood pressure, cholesterol levels, HbA1c, bladder voiding efficiency (BVE), prostate volume) and surgical factors (blood loss, operative time) were compared between the two groups. Nonparametric test was used for continuous variables. P-values of <0.05 were considered to be statistically significant.



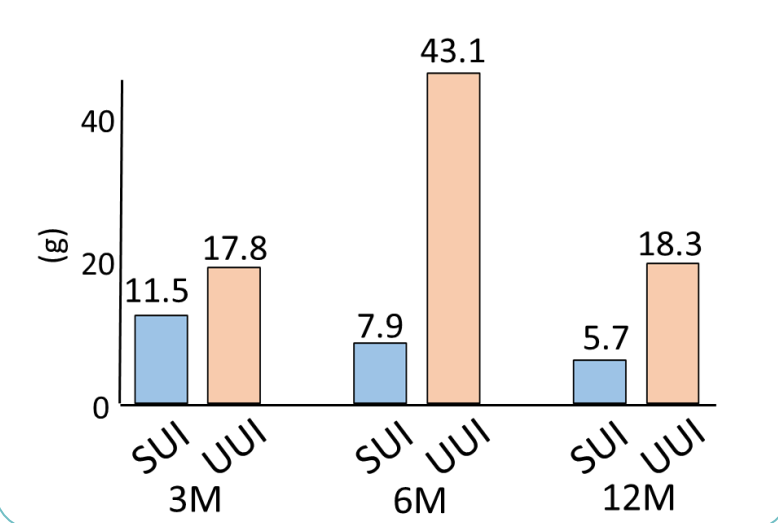
【Results】

The proportion of patients in the SUI and UUI groups at 3, 6, and 12 months postoperatively showed a decreasing trend over time in both groups. The volume of urinary incontinence measured by the 1-hour pad test was consistently higher in the UUI group than in the SUI group.

The trend in the proportion of SUI/UUI patients among RARP patients

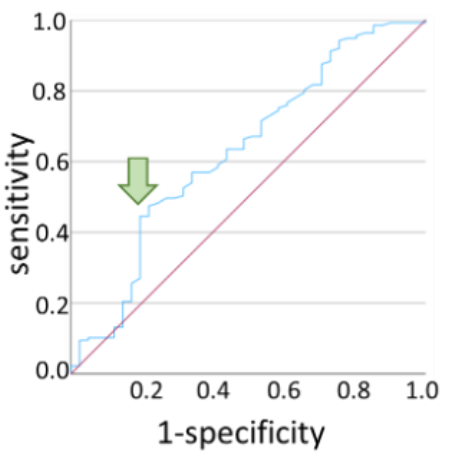


The trend in urinary incontinence volume measured by the 1-hour pad test



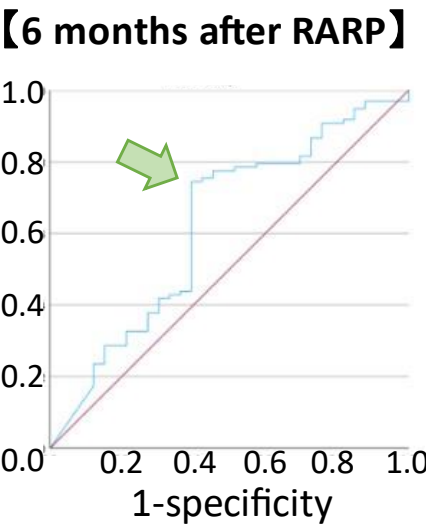
At 3 months postoperatively, the BMI was significantly higher in the SUI group (n=225) than in the UUI group (n=56) (SUI group vs UUI group: $24.3 \pm 2.9 \text{ kg/m}^2$ vs $22.9 \pm 3.1 \text{ kg/m}^2$, $p=0.04$). The BMI cut-off value of 24.35 kg/m^2 offered optimal accuracy in receiver operating characteristics (ROC) analysis (AUC=0.630; sensitivity 47.4%, specificity 78.0%). At 6 months and 12 months after RARP, the preoperative voiding efficiency was significantly lower in the UUI group (n=26) compared to the SUI group (n=156) (6 months: $85.2 \pm 14.8 \%$ vs $81.0 \pm 14.7 \%$, $p=0.04$; 12 months: $86.1 \pm 12.4 \%$ vs $78.6 \pm 11.5 \%$, $p=0.03$). The preoperative voiding efficiency cut-off values were 82.5% at 6 months after RARP (AUC=0.622; sensitivity 74.5%, specificity 60.6%) and 71.1% at 12 months after RARP (AUC=0.715; sensitivity 95.3%, specificity 44.4%), offering optimal accuracy in ROC analysis.

ROC curve
Preoperative BMI as a predictor for distinguishing between SUI and UUI at 3 months after RARP

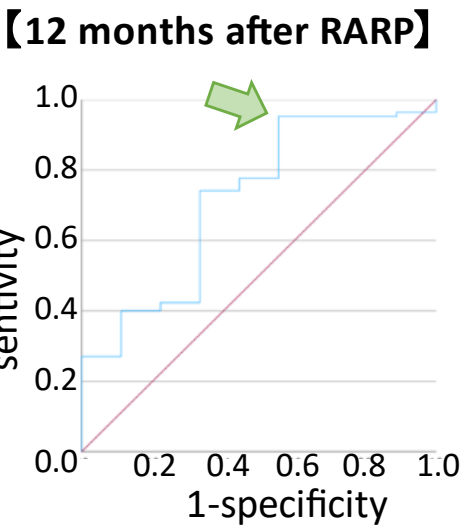


Cut off value:	24.4
Preoperative BMI	
AUC	0.63
Sensitivity	47.4 %
Specificity	78.0 %

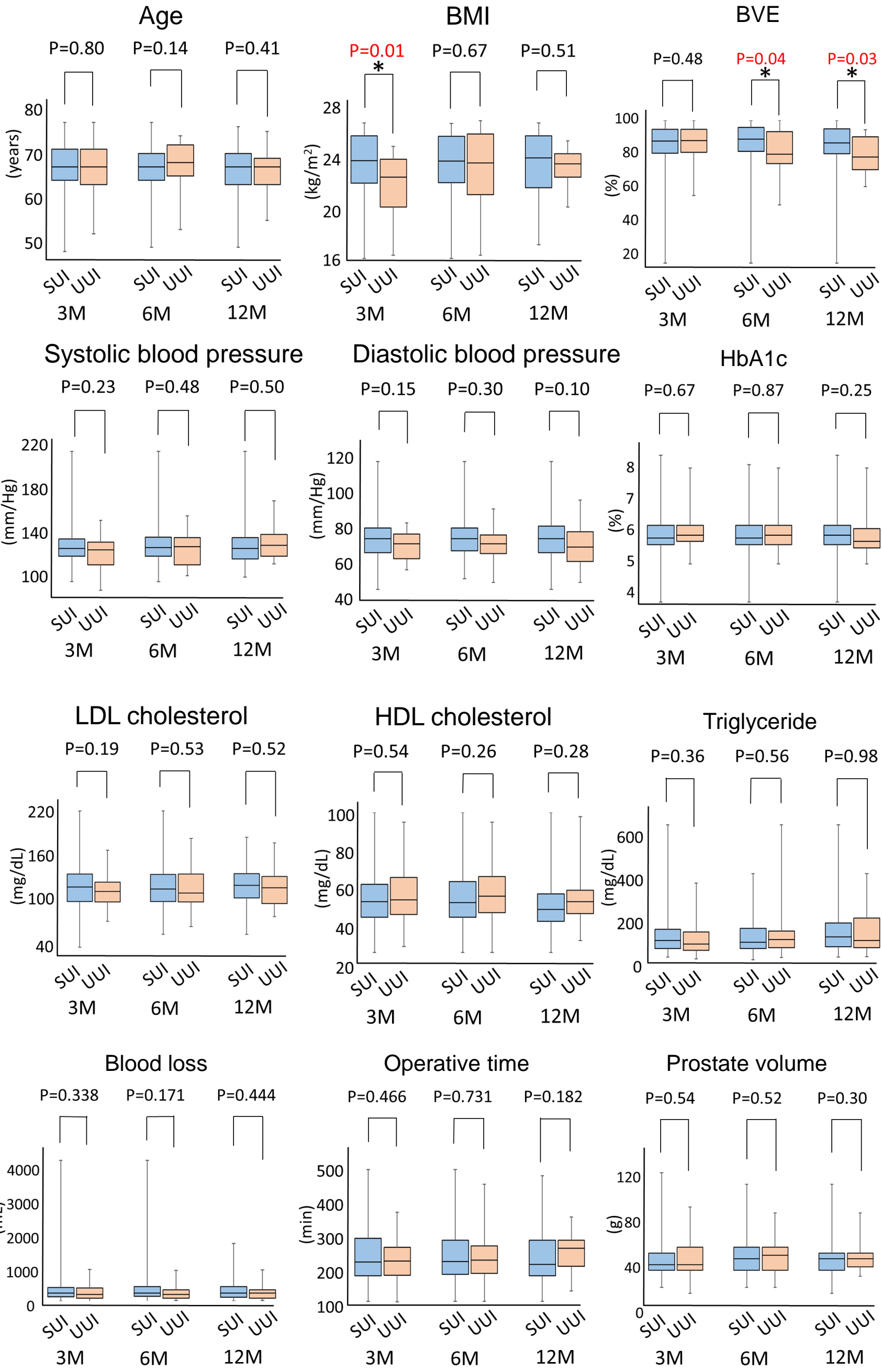
ROC curve
Preoperative BVE as a predictor for distinguishing between SUI and UUI



Cut off valule:	82.5%
Preoperative BVE	
AUC	0.62
Sensitivity	74.5 %
Specificity	60.6 %



Cut off valule:	71.1%
Preoperative BVE	
AUC	0.72
Sensitivity	95.3 %
Specificity	44.4 %



There were no significant differences in preoperative age, blood pressure, cholesterol levels, HbA1c, prostate volume, surgical blood loss, and operative time between the two groups.

【Interpretation of results】

We demonstrated that at 3 months after RARP, if patients who had a preoperative BMI $\geq 24.35 \text{ kg/m}^2$ experienced urinary incontinence, the incontinence was more likely due to SUI than UUI. In the early postoperative period, obesity is thought to elevate intra-abdominal pressure, leading to the inability of the surgically damaged urethral sphincter and pelvic floor muscles to withstand it, thereby triggering SUI. Additionally, at 6 months and 12 months after RARP, if patients with a preoperative voiding efficiency less than 82.5% and 71.1%, respectively, experience urinary incontinence, it is more likely attributed to UUI rather than SUI. As time elapses after RARP, tissue recovery from surgical trauma takes place, leading to a reduction in the surgical impact. This highlights the significance of preoperative lower urinary tract function, contributing to the onset of UUI.

【Conclusions】

Preoperative BMI and preoperative voiding efficiency may be useful in distinguishing between SUI and UUI after RARP-related urinary incontinence, leading to select appropriate treatment.