Factors Associated With Treatment Satisfaction After Robot-assisted Radical Prostatectomy

TOMOMI NAKAGAWA, YOSHIFUMI KADONO, RENATO NAITO, HIROAKI IWAMOTO,
HIROSHI YAEHASHI, MASASHI IJIMA, SHOHEI KAWAGUCHI, TAKAHIRO NOHARA,
KAZUYOSHI SHIGEHARA, KOUJI IZUMI and ATSUSHI MIZOKAMI

*Department of Integrative Cancer Therapy and Urology,
Kanazawa University Graduate School of Medical Science, Kanazawa, Japan*

Abstract. *Background/Aim:* To evaluate the chronological changes in health-related quality of life and treatment satisfaction after robot-assisted radical prostatectomy (RARP). *Patients and Methods:* A total of 196 patients were included, and treatment satisfaction was evaluated using the Expanded Prostate Cancer Index Composite (EPIC) score before and at 1, 3, 6, and 12 months after RARP. *Results:* At 12 months after RARP, 64.8% of patients were satisfied. On the contrary, 4.6% of patients were dissatisfied at 12 months after RARP. In a multivariate analysis, only urinary bother of EPIC was significantly associated with satisfaction at 12 months after RARP ($p=0.025$, odds ratio=1.029). *Conclusion:* Treatment satisfaction with RARP was generally acceptable from 1 to 12 months after surgery and did not change over time. Urinary bother was associated with satisfaction at 12 months after RARP. Compared with the objective 24-hour pad test, questionnaires answered subjectively were more associated with satisfaction.

The incidence of prostate cancer has been increasing worldwide; however, the mortality rate is not extremely high (1). Because such a condition can be detected at an early stage via screening and the proportion of patients with localized prostate cancer is high, most patients undergoing local treatment live for a long time after treatment (2). Radical prostatectomy (RP) is a treatment option for localized prostate cancer. In particular, robot-assisted RP

(RARP) is being increasingly used worldwide due to its reduced learning curve as a result of technical advances, including three-dimensional visualization and use of dedicated robotic instruments (3); therefore, postoperative health-related quality of life (HRQOL) after RARP must be considered.

Urinary incontinence (UI) and erectile dysfunction (ED) are the major problems after RP; thus, specific questionnaires, such as the International Consultation on Incontinence Questionnaire Short Form (ICIQ-SF) for UI (4) and the 5-item version of the International Continence Society (IIEF-5) for erectile dysfunction (5), are used for evaluations. Considering these main problems after RP, prostate cancer-specific HRQOLs have been evaluated using the UCLA Prostate Cancer Index (6) and Expanded Prostate Cancer Index Composite (EPIC) questionnaire (7). EPIC is a well-established instrument used for assessing HRQOL after prostate cancer treatment. Moreover, it has been validated and translated into various languages, including Japanese (8). Such an instrument has a questionnaire for treatment satisfaction. In this study, EPIC was used to evaluate chronological changes in HRQOL and treatment satisfaction after RARP. Furthermore, several studies about patient satisfaction have shown that factors such as urinary and sexual dysfunction are associated with post-treatment satisfaction (9-12). Moreover, in this study, factors affecting treatment satisfaction were evaluated using the EPIC score, ICIQ-SF score, 24-hour pad test, and perioperative parameters.

Patients and Methods

Study population. The data of patients who underwent RARP at our hospital from March 2012 to December 2016 and were followed-up 12 months after surgery were analyzed. The patients were required to complete the EPIC questionnaire before and after surgery, and those with inadequate clinical data or incomplete questionnaires were excluded. The study protocol was approved by the Institution's Ethics Committee [approval number: 2011-100 (1174)], and informed consent was obtained from each patient.

Correspondence to: Yoshifumi Kadono, MD, Ph.D., Department of Integrative Cancer Therapy and Urology, Kanazawa University Graduate School of Medical Science, 13-1 Takara-machi, Kanazawa, Ishikawa 920-8640, Japan. Tel: +81 762652393, Fax: +81 7623442631, e-mail: yskadono@yahoo.co.jp

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The patients started pelvic floor exercises 1 month after surgery, and such exercises were continued until urinary continence was achieved (13). Prostate-specific antigen (PSA) levels were measured before treatment, and the Gleason score was determined during prostate biopsy. For a subjective evaluation, the Japanese version of the ICIQ-SF (14) and questionnaires regarding daily pad use were administered to the patients; the answers of the 24-hour pad test were obtained for objective evaluation. The latter was performed three times. Firstly, we provided patients with a platform scale and instructed them to weigh each pad before and after use; secondly, we calculated the difference between the two weights. The overall 24-hour pad test results were defined as the average increase in pad weight over the three tests (15). The 24-hour pad tests were performed before and 12 months after RARP. For all patients, RARP was performed using a conventional transperitoneal approach with double-layered posterior reconstruction, as described previously (16).

Measurement of HRQOL. The patients were routinely scheduled to visit our hospital before and at 1, 3, 6, and 12 months after RARP. During each visit, they were instructed to complete the Japanese version of the EPIC and ICIQ-SF questionnaires and to write down their answer regarding pad usage per day. The EPIC questionnaire comprises 50 questions and is divided into four domains: urinary, bowel, sexual, and hormone, each composed of function and bother subscales. Furthermore, with regard to the urinary domain, function and bother can be integrated to score two symptoms of urinary incontinence and urinary irritation/obstruction (7). The summary and subscale scores of the four domains were calculated and converted to a scale of 0-100, with higher scores representing better HRQOL (7). Overall treatment satisfaction was determined using a single question: "Overall, how satisfied are you with the treatment you received for your prostate cancer?" Overall satisfaction was measured using five scales ranging from "extremely dissatisfied" to "extremely satisfied." Patients who were satisfied or extremely satisfied with their treatment for prostate cancer were classified as satisfied. We adopted the Japanese version of EPIC (iHope International, Kyoto, Japan) (8).

Statistical analysis. Categorical variables were used to calculate the incidence and percentage of each factor, and all continuous variables are presented as medians with range. The Mann-Whitney *U*-test was used to compare hormone function and bother of patients with/without androgen deprivation therapy (ADT). The correlations between each variable were calculated using Spearman's rank correlation. For each domain, the EPIC subscales before RARP and at 1, 3, 6, and 12 months after RARP were compared and analyzed using paired *t*-test. Univariate and multivariate logistic regression analyses were performed to identify factors associated with overall satisfaction at 12 months after RARP. All data analyses were performed using the Statistical Package for the Social Sciences software for Windows (SPSS Inc., Chicago, IL, USA), and those with $p < 0.05$ were considered statistically significant.

Results

A total of 203 consecutive patients who underwent RARP were included; however, seven patients did not complete all the questionnaires. Therefore, 196 patients were finally evaluated. The characteristics of the patients, perioperative

Table I. Demographic characteristics of the study population (N=196).

Variable	Value
Age, years	
Median (range)	66.0 (50-76)
Body mass index, kg/m ²	
Median (range)	23.4 (17.4-31.1)
Initial PSA level, ng/ml	
Median (range)	6.34 (1.8-36.7)
Biopsy Gleason score, n (%)	
6	68 (34.7%)
7	85 (43.4%)
8	32 (16.3%)
9-10	11 (5.6%)
Clinical T stage, n (%)	
T1	43 (21.9%)
T2	144 (73.5%)
T3	9 (4.6%)
D'Amico risk, n (%)	
Low	58 (29.6%)
Intermediate	76 (38.8%)
High	62 (31.6%)
NADT, n (%)	
No	164 (83.7%)
Yes	32 (16.3%)
Preoperative pad use/day, n (%)	
0	194 (99.0%)
1	2 (1.0%)
Preoperative 24-hour pad test, g	
Median (range)	0 (0-31)
Preoperative ICIQ-SF score	
Median (range)	0 (0-11)
Nerve-sparing procedure	
None	31 (15.8%)
Unilateral	128 (65.3%)
Bilateral	37 (18.9%)
Surgical time, min	
Median (range)	237.5 (138-398)
Console time, min	
Median (range)	185 (102-352)
Removed prostate weight, g	
Median (range)	38.0 (15-87)
Pad use/day at 12 months, n (%)	
0	128 (65.3%)
1 security liner	28 (14.3%)
1	24 (12.2%)
>2	16 (8.2%)
24-h pad test at 12 months, g	
Median (range)	1 (0-192)
PSA at 12 months, n (%)	
Recurrence	12 (6.1%)

PSA: Prostate-specific antigen; NADT: neoadjuvant androgen deprivation therapy; ICIQ-SF: International Consultation on Incontinence Questionnaire-Short Form.

parameters, and 24-hour pad test result are summarized in Table I. None of the patients had RARP complications greater than grade III according to the Clavien classification (17). Of the 12 patients with PSA recurrence at 12 months

Figure 1. Chronological changes in mean scores for each domain of the Expanded Prostate Cancer Index Composite after robot-assisted radical prostatectomy (RARP). A: Urinary function and bother. B: Urinary incontinence and irritation/obstruction. C: Bowel function and bother. D: Sexual function and bother. E: Hormonal function and bother.

after RARP, three and seven received salvage ADT 3-6 and 6-12 months after RARP, respectively, and one patient underwent radiation therapy to the pelvic space 9 months after RARP. Chronological changes in each component of the EPIC score are shown in Figure 1. Urinary function, bother and incontinence worsened after RARP, and although

the scores gradually recovered, they did not return to the preoperative level until 12 months after RARP (Figure 1A and B). Urinary irritation/obstruction, bowel function and bowel bother worsened 1 month after RARP. However, the scores gradually returned to the preoperative level (Figure 1B and C). The sexual function score was low before RARP,

Figure 2. Chronological changes in the mean score for overall satisfaction of the Expanded Prostate Cancer Index Composite (EPIC) after robot-assisted radical prostatectomy and the proportion for each answer.

and continually worsened after RARP (Figure 1D). Moreover, the sexual bother score was low, but not as low as the sexual function score, and it further decreased after RARP. However, the decrease was not as low as that of the sexual function score (Figure 1D). The hormone function and bother scores worsened 1 month after RARP but had improved significantly 12 months after RARP (Figure 1 E). A total of 32 patients received neoadjuvant ADT. The mean scores of hormone function for non-neoadjuvant ADT and neoadjuvant ADT groups were 90.5 and 80.7, respectively ($p<0.001$), and the mean scores of HB for non-neoadjuvant ADT and neoadjuvant ADT were 95.6 and 91.5, respectively ($p<0.001$). Ten patients received salvage ADT after PSA recurrence at 12 months after RARP. The mean scores of hormone function for non-salvage ADT and salvage ADT groups were 92.5 and 81.5 ($p<0.001$), respectively, and the mean scores of hormone bother for non-salvage ADT and salvage ADT were 97.0 and 91.7 ($p<0.001$), respectively.

The chronological changes in overall satisfaction after RARP are shown in Figure 2, and no significant difference was found over time. At 12 months after RARP, approximately 64.8% of the patients were satisfied, including those who selected “Extremely satisfied” and “Satisfied.” Univariate and multivariate logistic regression analyses were performed to identify factors associated with the selection of “Extremely satisfied” or “Satisfied” 12 months after RARP (Table II). In the multivariate analysis, the factors with $p<0.1$ in the univariate analysis were selected; however, the factor with the lowest p-value was selected among the factors with high correlation coefficient. The correlation coefficients of urinary function with bother, and with ICIQ-SF total score,

and of urinary bother with ICIQ total score were high ($r=0.572$, -0.843 , and -0.658 , respectively; $p<0.001$). Hormone function and bother had a high correlation coefficient ($r=0.698$, $p<0.001$). In the multivariate analysis, urinary bother was significantly associated only with satisfaction at 12 months after RARP. On the contrary, at 12 months after RARP, 4.6% of the patients were dissatisfied, including those who selected “Dissatisfied” or “Extremely dissatisfied.” The factors affecting dissatisfaction were analyzed; however, no significant factors were identified (data not shown).

Discussion

The present study showed the chronological changes in HRQOL and treatment satisfaction before and after RALP using EPIC and assessed the factors affecting treatment satisfaction. To the best of our knowledge, this is the first study to evaluate the factors affecting treatment satisfaction using multiple items, including each EPIC score, ICIQ-SF score, perioperative parameters, and objective 24-hour pad test result. In addition, our cohort only included Japanese patients.

The chronological changes in individual urinary and bowel components of EPIC in this study were similar to those of previous reports (11, 18-21). The preoperative sexual function score of our cohort was about one-third to half of those of other reports, and it significantly decreased after RARP. The preoperative sexual bother score was almost similar to that of other reports, and a minimal decrease in sexual bother score was observed after RARP. However, it

Table II. Univariate and multivariate logistic regression analyses to identify factors associated with overall satisfaction 12 months after robot-assisted radical prostatectomy.

Factor	Univariate analysis	Multivariate analysis	
	<i>p</i> -Value	OR (95%CI)	<i>p</i> -Value
Age, years	0.648		
Body mass index, kg/m ²	0.794		
Initial PSA level, ng/ml	0.502		
D'Amico risk			
Low	Reference		
Intermediate	0.937		
High	0.771		
Nerve-sparing procedure			
None	Reference		
Unilateral	0.965		
Bilateral	0.128		
Weight of the removed prostate, g	0.741		
ICIQ-SF total score at 12 months	0.005		
24-h pad test at 12 months, g	0.266		
PSA recurrence at 12 months			
No	Reference	Reference	
Yes	0.094	0.470 (0.135-1.637)	0.236
EPIC domain subscale at 12 months			
Urinary			
Function	0.02		
Bother	0.003	1.029 (1.004-1.054)	0.025
Bowel			
Function	0.048	1.021 (0.985-1.058)	0.263
Bother	0.642		
Sexual			
Function	0.094	1.023 (0.992-1.055)	0.152
Bother	0.277		
Hormone			
Function	0.054		
Bother	0.045	1.013 (0.995-1.075)	0.66

CI: Confidence interval; EPIC: Expanded Prostate Cancer Index Composite for Clinical Practice; ICIQ-SF: International Consultation on Incontinence Questionnaire-Short Form; OR: odds ratio; PSA: prostate-specific antigen.

was higher than that of other reports (18-20). Japanese men have reported lower sexual function scores at baseline than American men, and American men are less likely to improve scores for sexual bother after RP than Japanese men (22). Ethnicity may be a contributing factor for sexual function and bother. Approximately 38.6% of patients experienced fatigue caused by ADT (23); therefore, neoadjuvant and salvage ADT may affect hormone function and bother before and 12 months after RARP. A total of 32 (16.3%) patients received neoadjuvant ADT, and 12 months after RARP, 10 patients received salvage ADT in this cohort. In this study, the mean hormone function and bother scores for non-neoadjuvant and neoadjuvant ADT groups before RARP were 90.5 and 80.7 ($p<0.001$) and 95.6 and 80.5 ($p=0.007$), respectively. The mean hormone function scores for non-salvage ADT and salvage ADT groups at 12 months after RARP were 92.5 and 81.5 ($p<0.001$), respectively.

Moreover, the mean hormone bother scores for non-salvage and salvage ADT groups at 12 months after RARP were 97.0 and 91.7 ($p=0.063$), respectively. However, the hormone function and the hormone bother were not significant factors for overall satisfaction 12 months after RARP (Table II).

At 1 month after RARP, 63.7% of the patients were satisfied with the treatment, including those who selected "Extremely satisfied" or "Satisfied." Moreover, 64.8% of the patients were satisfied at 12 months after RARP. Chronological changes in overall satisfaction were not observed in this study. Our results for the proportion of patients who were satisfied with treatment and the chronological changes after RARP were practically similar to those of previous reports (10, 11). The correlation coefficient of the following combinations was high: urinary function and urinary bother of EPIC, urinary function of EPIC and ICIQ-SF total score, and urinary bother of EPIC

and ICIQ-SF total score (15); therefore, urinary bother with the lowest p-value in the univariate analysis was adopted in the multivariate analysis to identify factors associated overall satisfaction 12 months after RARP. However, the ICIQ-SF total score, which was adopted in the multivariate analysis, rather than urinary bother, was a significant factor (odds ratio=0.92, 95% confidence interval=0.856-0.994; $p=0.035$), and urinary function, rather than urinary bother, had a tendency for association. However, the result was not significant (odds ratio=0.92, 95% confidence interval=0.999-1.038; $p=0.069$). ICIQ-SF is a simple questionnaire compared with EPIC; therefore, ICIQ-SF might be convenient to use for the evaluation of urinary incontinence status to assess for satisfaction among patients undergoing RARP (4). In previous reports, only subjective questionnaires were used to evaluate the association between urinary incontinence and treatment satisfaction (10, 11, 24, 25); therefore, the 24-hour pad test was adopted for the objective evaluation of urinary incontinence to assess for treatment satisfaction in this study. Results showed that the 24-hour pad test was significantly associated with ICIQ total score ($r=0.622$, $p<0.001$), urinary function, ($r=-0.608$, $p<0.001$), and urinary bother ($r=-0.425$, $p<0.001$). However, the 24-hour pad test was not significantly associated with treatment satisfaction. The results of the 24-hour pad test vary widely and are not always consistent with the subjective evaluation results, such as those obtained using questionnaires or answers regarding daily pad use (15).

Treatment satisfaction depends on subjective feelings; therefore, the subjective evaluation using questionnaires was associated with overall satisfaction after RARP in this study. On the contrary, at 12 months after RARP, approximately 4.6% of the patients were not satisfied with the treatment, including those who selected "Dissatisfied" or "Extremely dissatisfied." A higher PSA level concern based on preoccupation with PSA was also associated with regret among the long-term survivors of localized prostate cancer (26). The causes of dissatisfaction were analyzed in that study; however, the definite causes were not identified. Overall satisfaction after RARP in Asians was considerably lower than that of Westerners, who were more concerned about sexual function (10, 11, 20, 22). In relation to this, the factors affecting satisfaction or regret after RARP may include not only the outcomes of the treatment but also race, nationality, personality, and expectation of the treatment. A previous report that assessed the independent predictors of satisfaction and regret after retropubic RP and RARP has shown that patients who underwent RARP are more likely to regret and feel dissatisfied possibly due to higher expectations of the outcomes of innovative procedures (24). The lack of informed decision-making is highly associated with regret because treatment for localized prostate cancer is the patient's preference (26). If patients are properly counseled before

surgery, they have more realistic expectations. In addition, adequate counseling about urinary and sexual dysfunction and PSA recurrence rates after RARP might contribute to improving posttreatment satisfaction. In addition, perioperative and postoperative adverse events were associated with poorer HRQOL and treatment satisfaction (25, 27).

The present study had some limitations. Firstly, the duration of follow-up was not sufficient to evaluate long-term results, and functional outcomes were found to have changed 5 years after surgery in several studies (9, 28, 29). In addition, some studies have shown that 83% of patients still prefer re-surgery despite urinary incontinence within 1-3 years after RP and 53% of patients with urinary incontinence choose other treatments over 5 years after surgery (30). This indicates that longer follow-up can change satisfaction and its associated factors. Secondly, social background was not considered in the analysis of overall satisfaction after RARP. This was a prospective study conducted on a series of consecutive cases at a single institution; thus, we believe that it is of value. Despite the short follow-up period, the data obtained in this study might be significant as changes in HRQOL are most significant within 1 year after surgery. The findings are also valuable in terms of the consistency and quality of data because the study only included patients who completed the questionnaire at all timepoints. Nonetheless, further multicenter, randomized studies with longer follow-up must be conducted to confirm the results of our study.

Conclusion

Treatment satisfaction with RARP was generally acceptable from 1 to 12 months after surgery, and did not change over time. The EPIC urinary bother and ICIQ-SF total scores were associated with satisfaction 12 months after RARP. Compared with the objective 24-hour pad test, questionnaires answered subjectively were more associated with satisfaction.

Conflicts of Interest

All Authors declare that they have no conflicts of interest in regard to this study.

Authors' Contributions

Tomomi Nakagawa: Data collection, article drafting; Yoshifumi Kadono: Conception and design, data analysis, article revision; Renato Naito: Data collection, article revision; Hiroaki Iwamoto: Data collection, article revision; Hiroshi Yaegashi: Data collection, article revision; Masashi Iijima: Data collection, article drafting; Shohei Kawaguchi: Data analysis, article drafting; Takahiro Nohara: Conception and design, article revision; Kazuyoshi Shigehara: Data analysis, article revision; Kouji Izumi: Data analysis, article revision; Atsushi Mizokami: Conception and design, article revision.

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