

## The Quality of Life for Patients with Early Stage Prostate Cancer in Brachytherapy and Radical Prostatectomy Surgery

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### ABSTRACT

**Purpose:** The purpose of the study was to evaluate the quality of life (QOL) after open radical prostatectomy (ORP), laparoscopic radical prostatectomy (LRP) and brachytherapy (BT).

**Methods:** A longitudinal, descriptive, comparative design was conducted in southern Taiwan. A total of 49 prostate cancer patients treated with ORP, LRP and BT were recruited in this study. Data were completed at the following five time points: before treatment/baseline and at 1, 2, 3, and 8 months after treatment. The European Organization on Research and Treatment of Cancer quality of life (EORTC QLQ-C30) was used to assess the QOL in functional scales and global health status. The EROCT Prostate Cancer Module (QLQ-RP25) was used to measure the QOL in urinary symptoms. The generalized estimating equation (GEE) was used to analyze the different QOL values after three treatments within 8 months.

**Results:** There were no significant differences in the functional scales and global health status quality of life between the ORP and BT groups. Additionally, there were no significant differences between the LRP and BT groups in the functional scales and global health status. The QOL in urinary symptoms was worse in the ORP group at 1, 2, and 3 months, and it was worse in the LRP group at 1, 2, 3, and 8 months when the reference group was BT with the baseline time point.

**Conclusion:** Prostate cancer patients had similar QOL in functional scales and global health after three treatments. However, urinary symptoms were worse in the ORP and LRP groups of patients than in the BT groups.

### Keywords

Prostate cancer, Quality of life, Open radical prostatectomy, Laparoscopic radical prostatectomy, Brachytherapy.

### Introduction

Prostate cancer is the most common cancer and second leading cause of cancer deaths in men [1]. It is the 8th cancer cause of death for men in Taiwan [2]. The number of early-stage prostate cancer cases has increased due to widespread use of prostate-specific antigen (PSA) for detection [3]. The 5-year survival rate of early-stage prostate cancer patients after treatments is nearly 100% [1].

The approaches to treating localized prostate cancer include radical prostatectomy and brachytherapy [1]. These treatments

often impact patients' quality of life (QOL) due to side effects or complications, such as urinary difficulties [1]. The QOL after treatments also influences the choice of these prostate cancer treatments and may become a central focus when making treatment decisions for men with localized prostate cancer [4,5].

The studies related to the quality of life after prostate cancer treatment have been abundantly illustrated, but most of the method design approaches were cross-sectional, and few have explored the QOL after open radical prostatectomy (ORP), laparoscopic radical prostatectomy (LRP), and brachytherapy (BR) [3,6]. This study aimed to examine the QOL after open radical prostatectomy (ORP), laparoscopic radical prostatectomy (LRP), and brachytherapy (BR) within 8 months of treatment.

The stage of prostate cancer was classified by Tumor, Node and Metastases (TNM) and Gleason score [7,8]. Localized cancer and locally advanced cancer are the presence of limited cancer cells in the prostatic capsule and near the lymph node (T1-3, N0-1, M0) without spread to distant sites (M1) [7]. A Gleason score less than 7 presented better tumor prognosis than score over 7. Factors influencing QOL in patients with prostate cancer were age and PSA level. Kurian, Leader [9] found that prostate cancer patients with younger age had better QOL than older patients. Increase in PSA levels also reduced QOL [10].

## Methods

### Design

This was a longitudinal design survey with a descriptive and comparative study. Data were completed at the following five time-points: prior to treatment/baseline (T0), and 1st month (T1), 2nd month (T2), 3rd month (T3), and 8th month (T8) after treatment. This study was approved by the hospital's Medical Ethics Committee.

### Setting and Participants

The sample recruited patients from a hospital in southern Taiwan; those who had undergone one of three prostate cancer treatment strategies (ORP, LRP, or BT) were recruited into the study. The other included criteria were men with a diagnosis of cancer stage T1~4, N0-1, M0 according to the TNM classification [7] and who had not received any chemotherapy or hormone therapy.

Forty-nine participants were included in this study (participation rate = 85.96%). The reasons for withdrawing were dissatisfaction with treatment, too busy working, or family concerns. There was no significant difference between the participants who remained versus those who withdrew in this study in terms of their age, PSA (prostate-specific antigen), T stage and quality of life before treatment.

### Data collection

Face-to-face structured interviews were conducted to collect the

baseline data, which was followed by either a telephone or face-to-face interview for post-treatment follow-up; one registered nurse assisted with data collection.

The long term functional QOL and global health status was assessed using the Taiwanese version of the European Organization on Research and Treatment of Cancer Quality of Life Questionnaire EORTC QLQ-C30 (version3). The questionnaire was developed specially to measure the QOL in people with cancer. It has been used to evaluate QOL in patients undergoing prostate and bladder surgery in Taiwan [11]. Functional scales consisted of the following five functional scales: physical, role, emotional, cognitive and social functioning, which were ranked from 1 (not at all) to 4 (very much). The global health status involved a seven-point scale, ranging from 1 (very poor) to 7 (excellent). The reported reliability in a previous study based on Cronbach's  $\alpha$  was 0.91 [12]. In this study, Cronbach's  $\alpha$  for functional scales was 0.81.

QOL in urinary symptoms was evaluated by EROCT Prostate Cancer Module QLQ-RP25, which was developed to measure the side effects from different treatments for prostate cancer [13,14]. This scale is generally complemented by the QLQ-C30. Urinary symptoms consist of eight items with responses ranging from 1 (not at all) to 4 (very much). The Cronbach's  $\alpha$  in this study was 0.82.

The data from the EORTC QLQ C-30 and the Prostate Cancer Module QLQ -PR25 questionnaires were evaluated by linear transformation to obtain scores from 0-100. A higher score for the functional and global health status represents higher (better) functioning and quality of life. A higher score for the urinary symptom scale represents a higher (worse) level of the problem.

### Data analysis

Data analysis was conducted using Statistical Product and Service Solutions (SPSS), version 18.0 (IBM SPSS, New York, NY, USA). Descriptive statistics were performed with the Chi-squared tests or analysis of variance (ANOVA) to describe the profiles of participants and compare group differences in the demographic

Variable	ORP (n = 18)		LRP (n = 23)		BT (n = 8)		Statistics	p	
	M	SD	M	SD	M	SD			
Age	67.33	6.66	68.74	6.96	71.25	6.67	F = 0.92	0.404	
PSA	19.81	17.48	15.25	13.72	11.66	7.18	F = 0.99	0.377	
Gleason score	<7	8	44.44%	7	30.43%	4	50.00%	X <sup>2</sup> = 1.34	0.511
	≥7	10	55.56%	16	69.57%	4	50.00%		
Marital status	Married	1	5.56%	1	4.35%	0	0.00%	X <sup>2</sup> = 0.44	0.801
	Widower/Divorced	17	94.44%	22	95.65%	8	100.00%		
Clinical stage	T1	2	11.11%	6	26.09%	0	0.00%	X <sup>2</sup> = 10.40	0.109
	T2	12	66.67%	10	43.48%	6	75.00%		
	T3	4	22.22%	7	30.43%	1	12.50%		
	T4	0	0.00%	0	0.00%	1	12.50%		

**Table 1:** Demographic characteristics of the participants (N = 49).

T0, baseline, T1, 1 month post-treatment; T2, 2 months post-treatment; T3, 3 months post-treatment; T8, 8 months post-treatment; ORP, open radical prostatectomy; LRP, laparoscopic radical prostatectomy; BT, brachytherapy; and PSA, prostate-specific antigen.

data. The generalized estimating equations (GEEs) were used to test the difference in the treatment-by-time interactions with adjusted demographic characteristic factors.

## Results

### Participant Characteristics

A total of 49 participants completed the study in the following groups: ORP (n = 18), LRP (n = 23), and BT (n = 8). The mean age of the participants was 68.63 ± 6.80 years (ranging from 51 to 80). The mean prostate-specific antigen (PSA) level was 16.34 ± 14.51. There were no significant demographic or disease-related differences among the three treatment groups (Table 1).

### Evaluation of the QOL difference in treatments

There was no significant difference in T1, T2, T3 and T8 between ORP and BT or LRP and BT in the global health status when controlling for the age and PSA level (Table 2). The same result was observed in the functional scales (Table 3).

Variable	β	SE	Wald X <sup>2</sup>	p-value
Intercept	71.28	17.54	16.51	.000
Group (ORP) X time(T1)	-11.57	11.67	.98	.321
Group (ORP) X time(T2)	-3.19	12.19	.07	.793
Group (ORP) X time (T3)	-6.10	13.56	.20	.653
Group (ORP) X time (T8)	-11.23	11.40	.97	.325
Group (LRP) X time (T1)	-18.66	11.02	2.87	.090
Group (LRP) X time (T2)	-6.59	11.12	.35	.553
Group (LRP) X time (T3)	-9.19	13.34	.47	.491
Group (LRP) X time (T8)	-12.82	10.51	1.49	.223
age	-.13	.21	.38	.536
PSA	.12	.06	3.38	.066

**Table 2:** Generalized estimating equation (GEE) analysis longitudinal outcome of the global health status (N = 49).

SE: Standard Error; T0: baseline; T1: 1 month post-treatment; T2: 2 months post-treatment; T3: 3 months post-treatment; T8: 8 months post-treatment; ORP: Open Radical Prostatectomy; LRP: Laparoscopic Radical Prostatectomy; BT: Brachytherapy; and PSA: Prostate-specific Antigen; Reference group: BT; Reference time: T0.

Variable	β	SE	Wald X <sup>2</sup>	p-value
Intercept	92.43	8.88	108.40	.000
Group (ORP) X time (T1)	-3.65	6.52	.31	.576
Group (ORP) X time (T2)	-.38	7.04	.003	.957
Group (ORP) X time (T3)	.83	6.14	.018	.892
Group (ORP) X time (T8)	-6.91	7.26	.90	.342
Group (LRP) X time (T1)	-8.84	6.28	1.98	.160
Group (LRP) X time (T2)	-7.42	7.34	1.02	.312
Group (LRP) X time (T3)	-5.94	6.08	.95	.329
Group (LRP) X time (T8)	-12.55	7.13	3.10	.078
age	-.16	.11	1.93	.165
PSA	.08	.03	5.45	.020

**Table 3:** Generalized estimating equation (GEE) analysis longitudinal outcome of functional scales (N = 49).

SE: Standard Error; T0: baseline; T1: 1 month post-treatment; T2: 2

months post-treatment; T3: 3 months post-treatment; T8: 8 months post-treatment; ORP: Open Radical Prostatectomy; LRP: Laparoscopic Radical Prostatectomy; BT: Brachytherapy; and PSA: Prostate-Specific Antigen; Reference group: BT; Reference time: T0.

Adjusting for age and PSA, the change in the QOL in urinary symptoms was as follows. There was significant difference in T1 (β = 23.96, p = .029), T2 (β = 25.47, p = .016), T3 (β = 24.08, p = .010), but no significant difference in T8 (β = 21.01, p = .074) between ORP and BT. Comparing LRP and BT for urinary symptoms, there was a significant difference in T1 (β = 28.06, p = .011), T2 (β = 34.21, p = .001), T3 (β = 32.09, p < .01), and T8 (β = 28.62, p = .009) (Table 4).

Variable	β	SE	Wald X <sup>2</sup>	p-value
Intercept	45.80	20.36	5.06	.024
Group (ORP) X time(T1)	23.96	10.94	4.80	.029
Group (ORP) X time(T2)	25.47	10.54	5.84	.016
Group (ORP) X time(T3)	24.08	9.35	6.63	.010
Group (ORP) X time(T8)	21.01	11.76	3.19	.074
Group (LRP) X time(T1)	28.06	11.041	6.46	.011
Group (LRP) X time(T2)	34.21	10.45	10.72	.001
Group (LRP) X time(T3)	32.09	8.54	14.11	<.01
Group (LRP) X time(T8)	28.62	11.03	6.74	.009
age	.017	.24	.01	.946
PSA	-.054	.05	1.02	.312

**Table 4:** Generalized estimating equation (GEE) analysis longitudinal outcome of urinary symptoms (N = 49).

SE: Standard Error; T0: baseline; T1: 1 month post-treatment; T2: 2 months post-treatment; T3: 3 months post-treatment; T8: 8 months post-treatment; ORP: Open Radical Prostatectomy; LRP: Laparoscopic Radical Prostatectomy; BT: Brachytherapy; and PSA: Prostate-Specific Antigen; Reference group: BT; Reference time: T0.

## Discussion

This study compared the generic QOL for the three treatments using EORTC QLQ-C30 scales over an 8-month follow-up period. Compared with pretreatment, there were no significant differences in first month, second month, 3rd month and 8th month after ORP with BT treatments in the global health status and functional scale quality of life scores. There was no significant difference between the LRP with BT group within 8 months of treatment in the global health status and functional scale quality of life scores. Earlier studies have also demonstrated a similar result of a lack of significant difference in the generic QOL after radical prostatectomy and BT. Wyler, Engeler [3] performed a mail questionnaire study that revealed the absence of a significant difference in the global health and functional subscales within 5~12 months. Borchers, Kirschner-Hermanns [15] also reported no significant difference in the functional subscales in 12 months between radical prostatectomy and brachytherapy. Slight differences were also found in previous research. Hashine, Kusuhara [16] assessed the QOL by the Medical Outcomes Study 36-Item Short Form (SF-36) and found that there was no significant difference between

permanent prostate brachytherapy and radical prostatectomy in the general QOL within 12 months, except BT groups obtained better QOL scores than those for radical prostatectomy in the first month. Dragičević [17] also used SF-8 to assess the QOL and found no significant difference in these subscales between radical prostatectomy and permanent prostate brachytherapy within 1 year, but patients with brachytherapy had better QOL than those with radical prostatectomy at 1st month after treatment. One possible reason for these inconsistencies was that different instruments were used to measure the quality of life. This study conducted the EROCT QLQ C-30, while others conducted the SF-36 or SF-8. Moreover, lack of an analysis subscale in this study also contributed to differences in the results.

The QOL for urinary symptoms was evaluated using the EROCT QLQ -RP25 in this study. Compared with the BT group, the ORP patient group reported their worst urinary symptoms in the 1st, 2nd, and 3rd months. However, there was no significant difference in the 8th month between the BT and OPR groups. This study also demonstrated that the LRP group had worse urinary symptoms than the BT group in the 1st, 2nd, 3rd, and 8th months. The conclusion was similar in an earlier study that radical prostatectomy patients tended to report poorer urinary symptoms than BT patients [18]. Lin, Lin [6] performed a postal questionnaire survey on the QOL for men with prostate cancer after treatment and found that patients with brachytherapy reported better urinary function than did prostatectomy patients. Hashine, Kusuhara [16] also found permanent prostate brachytherapy resulted in a better urinary function quality of life at 1, 3, 6, and 12 months compared to radical prostatectomy.

Dragičević [17] found that patients with permanent prostate brachytherapy had better urinary function than those with radical prostatectomy in the 1st and 3rd months, but they had similar urinary function at the 6th and 12th months. Hashine, Kusuhara [19] found permanent prostate brachytherapy resulted in better urinary function at 1 and 3 months with similar urinary function at 6 and 12 months compared to radical prostatectomy. However, some studies with different results were also addressed as follows. Drummond, Kinnear [20] performed a study with postal questionnaires and found that there was no significant difference in the urinary symptoms between prostatectomy and brachytherapy in adjusted analysis. Possible reasons for the inconsistent results include that longitudinal analysis was used in this study, while cross-sectional analysis was used in previous research. Moreover, this study separately compared OPR, LRP and BT treatment rather than comparing radical prostatectomy and brachytherapy alone. Therefore, there are inconsistent results between this study and previous research.

### Study Limitations

The strength of this study was that it clearly compared three major treatments for early stage prostate cancer, ORP, LRP and BT, using a longitudinal design. However, there are some limitations in this study. First, a limited sample size was recruited for the BT group as a result of limited research funding and time. Only

8 participants were recruited in the BT group in this study, and sampling bias could not be excluded. The second limitation was that urinary incontinence and erectile difficulty were frequent side effects of radical prostatectomy and brachytherapy [1]. However, there were substantial missing data because patients were hesitant to answer questions about sexual function and pads that they used. Moreover, because participants were recruited from a single hospital, generalizability is limited.

### Conclusion

The patients with prostate cancer had similar QOL in the global health status and functional scales at the 8-month follow-up after three treatments. The ORP group patients reported worse urinary symptom quality of life scores than the BT group at 1, 2, and 3 months. The LRP group had worst urinary symptoms than the BT group at 1, 2, 3 and 8 months. A larger sample size should be used in future studies to generalize the research findings.

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