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*Original Article*

# Prospective Longitudinal Comparative Study of Health-Related Quality of Life in Patients Treated with Radical Prostatectomy or Permanent Brachytherapy for Prostate Cancer

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**To determine health-related quality of life (HRQOL) after radical retropubic prostatectomy (RRP) or permanent prostate brachytherapy (BT), third party-conducted QOL surveys were prospectively compared. Between 2004 and 2005, 37 patients underwent RRP and 36 were treated with BT. A QOL survey consisting of the Medical Outcomes Study 36-Item Short Form (SF-36), the University of California, Los Angeles, Prostate Cancer Index (UCLA-PCI) and the International Prostate Symptoms Score (IPSS) was completed prospectively by a research coordinator at baseline, and at 1, 3, 6 and 12 months after treatment. The RRP patients scored well in general QOL except at 1 month after surgery, with their mental health better than at baseline by 6 months after surgery. Disease-specific QOL in RRP patients received a low score at 1 month for both urinary and sexual function, though urinary function rapidly recovered to baseline levels. BT patient QOL was not affected by the therapy except in the IPSS score. However, general and mental health scores in BT patients were inferior to those in RRP patients. This prospective study revealed differences in QOL after RRP and BT. These results will be helpful in making treatment decisions.**

**Key words:** prostate cancer, radical prostatectomy, QOL, brachytherapy

Radical retropubic prostatectomy (RRP) is considered a standard, safe and effective treatment for localized prostate cancer. Prostate brachytherapy (BT) is also accepted as a treatment option for localized prostate cancer in selected patients. The outcomes of both of these treatments for low-risk localized prostate cancer are the same according to recently published retrospective studies [1, 2]. Therefore, the basis on which primary therapy is selected has shifted toward the consideration of health-related quality of life (HRQOL). In previous studies, few changes in general HRQOL after RRP or BT have been reported [3–6]. In contrast, reports show worse disease-specific QOL, with compromised bowel function and urinary irritative symptoms in the BT group, and urinary incontinence and sexual dysfunction in the RRP group [3, 6, 7]. Nevertheless, few studies have used a neutral third-party research

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coordinator with no bias toward either the patient or the clinician to compare RRP and BT outcomes. Some authors note that the method of data collection might cause a significant difference in reported QOL, with patients tending to minimize complications when speaking to their surgeons and the surgeon-interviewer, in turn, minimizing adverse outcomes [8, 9]. To avert this bias in the present study, we assessed HRQOL as reported by the patients directly to a research coordinator. Furthermore, in order to obtain the most objective information possible, the operating surgeons were not involved with any component of data acquisition or entry.

## Materials and Methods

Between January 2004 and March 2005, we obtained informed consent for this study from all 73 patients treated by either RRP (n=37) or BT (n=36) for localized prostate cancer in our institutes. The patients who underwent RRP or BT received standardized explanations of these treatments, including descriptions of the procedures, expectable benefits and possible complications [10], and each patient selected his own therapy without our recommendation as to which was better. The indications for RRP were age up to 75 years, T1 to T2, any Gleason score, and no limit on prostate-specific antigen (PSA) level. The nerve-sparing technique was performed if the patient wanted to preserve his sexual function. The indications for a nerve-sparing procedure depended on preoperative (number and Gleason score of the positive biopsy cores, PSA level and patient preference) and intraoperative factors, prioritizing cancer control. RRP was performed using Walsh's technique by 2 urologists or staff under their supervision. Both surgeons had considerable experience with the retropubic approach prior to the study.

The primary indication for BT was T1c to T2, a Gleason score of 6 or 7 (primary grade 3), and PSA under 10 ng/ml. Patients treated with BT received 145 Gy to the prostate with an I-125 seed using a modified peripheral loading technique via a transrectal ultrasound-guided transperineal approach [10]. During this study, we performed BT by the pre-planned method.

We assessed general HRQOL by the Medical Outcomes Study 36-Item Short Form (SF-36) [11], which covers 8 domains: 4 physical and 4 emotional. Prostate-specific HRQOL was assessed by the University of California, Los Angeles, Prostate Cancer Index (UCLA-PCI), a 20-item questionnaire that quantifies prostate cancer-specific HRQOL in 6 separate domains [12]. In addition, the International Prostate Symptom Score (IPSS) questionnaire was used to assess lower urinary symptoms. All patients were informed of their cancer diagnosis by their urologist before being asked to answer the HRQOL questionnaires by a research coordinator. Every patient who agreed to participate in this study received from the research coordinator a questionnaire, an informed consent form and a prepaid envelope in which to return the questionnaire to the third party. The questionnaires were administered at 5 points: the baseline survey was conducted within 1 week before surgery or the initiation of BT, and follow-up surveys were conducted at 1, 3, 6 and 12 months after treatment. All scales of the SF-36 and UCLA-PCI were linearly transformed to a scale of 0 (lowest) to 100 (highest).

Group comparisons were made using the Mann-Whitney *U*-test and the chi-square test. $P<0.05$ was considered to be significant. This study was approved by the Institutional Review Board of our hospital. Written informed consent was obtained from all patients before the initiation of treatment.

## Results

Surveys were returned by all patients. The average answer rate of each survey was 92.4% for RRP patients and 92.2% for BT patients. The median patient age was 67.0 years in both groups. There was no statistical difference in clinical stage or PSA level between the 2 groups. In contrast, the distribution of Gleason scores (higher than 7) between the groups showed a statistical difference. Neoadjuvant androgen deprivation therapy was performed in 13 patients from the BT group and in 3 from the RRP group. All of these patients discontinued hormone therapy after RRP or BT. Nerve-sparing surgery was performed in 13 patients. After 12 months, 3 RRP patients demonstrated biochemical recurrence (PSA above 0.2 ng/ml). No clinical recurrence occurred among any of the present patients (Table 1).

The longitudinal general HRQOL scores are shown

Table 1 Patient characteristics for a RRP and BT

| | RRP | BT | *p* value |
|---|---|---|---|
| No. pts | 37 | 36 | |
| Age (median) | 54–75 (67) | 53–76 (67) | 0.679 |
| Clinical stage | | | |
| T1 | 19 | 17 | 0.724 |
| T2 | 18 | 19 | |
| PSA (ng/ml)(median) | 1.796–27.44 (8.31) | 1.13–74 (7.73) | 0.213 |
| Gleason score | | | |
| 6 | 14 | 21 | |
| 7 | 18 | 7 | 0.031 |
| 8–9 | 5 | 8 | |
| Neoadjuvant hormone therapy | 3 | 13 | 0.004 |
| Nerve sparing | | | |
| yes | 13 | — | |
| no | 24 | — | |
| Recurrence at 12 months | 3 | 0 | 0.081 |

in Fig. 1. There was no significant difference in baseline QOL scores between the groups. In the RRP group, the QOL scores of role-physical functioning, body pain, social functioning and role-emotional functioning at 1 month were worse than the baseline scores, but recovered within 3 months, while mental health scores improved over the baseline after 6 months. In the BT group, QOL scores did not change. General health QOL scores at 12 months after treatment were significantly better in the RRP group than in the BT group.

The longitudinal results of the UCLA-PCI scores are shown in Fig. 2. There was no significant difference in baseline scores between the RRP and BT groups. In the RRP group, urinary, bowel, and sexual functioning were worse at 1 month after surgery. Although sexual function did not recover, urinary and bowel functions recovered to baseline after 3 months. In the BT group, changes in QOL scores were minimal and showed no statistical difference. At 1 month, urinary and sexual functions were worse in the RRP group than in the BT group. Urinary function returned to baseline at 3 months, though sexual functioning in the RRP group remained worse than that in the BT group.

Longitudinal IPSS scores are shown in Fig. 3. There was no difference in baseline scores between the 2 groups. Both groups showed worse scores than baseline at 1 month. Although the RRP group recovered to baseline at 3 months, the low scores in the BT group continued for 6 months with gradual recovery by 12 months.

## Discussion

Currently, the most common therapeutic options for localized prostate cancer are RRP, BT and external radiation (three-dimensional conformal radiation therapy [3-D CRT]), and the choice of treatment is based on the preference of the oncologist and/or patient. Each of these interventions has undergone significant refinement in the last 10 years and can independently achieve higher than 95% cancer-specific survival at 5 years after primary treatment in patients with low-risk cancer. The choice of treatment is a difficult one for both patients and oncologists, and QOL after treatment has become increasingly important in selecting treatment. Many investigators have reported comparative studies of QOL after these treatments [3, 6, 7, 13–15]; however, there have been few reports coordinated by a neutral third party standing in a neutral position between patient and clinician. Such a study would avert any bias caused by the tendency of patients to minimize complications when speaking to their surgeon or surgeon-interviewer. To the best of our knowledge, the present study is the first to make use of a research coordinator involved from study entry to data collection without involving the oncologist or operating surgeons. Although this is a small-number study, the present

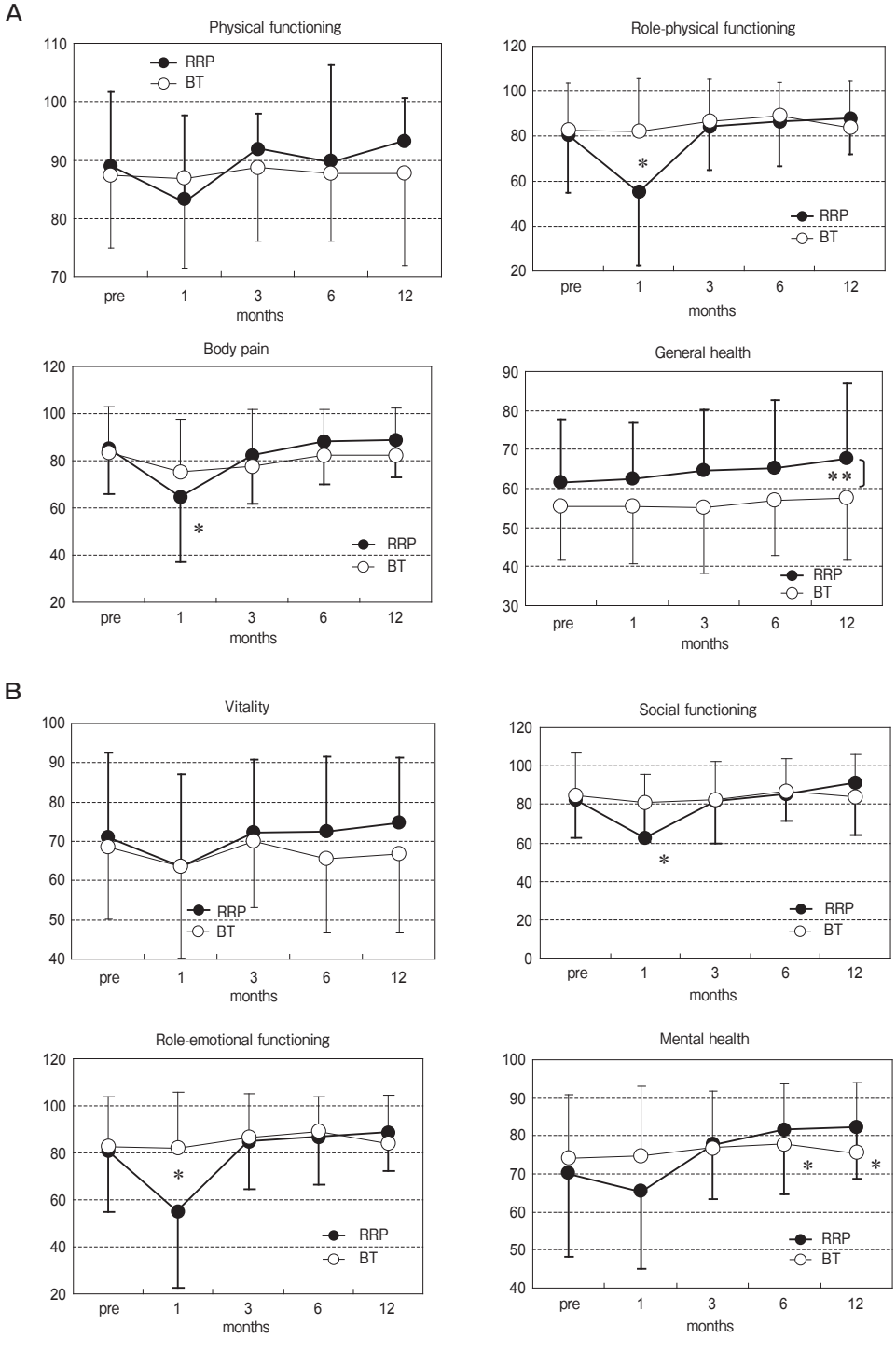


**Fig. 1** **A**, Longitudinal SF-36 scores in physical functioning, role-physical functioning, body pain and general health. Role-physical functioning and body pain scores were worse at 3 months after surgery than at baseline in the RRP group (*$p$ less than 0.05). The RRP group showed better general health scores than the BT group at 12 months after treatment (**$p = 0.031$); **B**, Longitudinal SF-36 scores in vitality, social functioning, role emotional functioning and mental health. Social functioning and role emotional functioning were worse at 3 months after surgery than at baseline in the RRP group. The RRP group showed better mental health scores than at baseline at 6 and 12 months after treatment (*$p$ less than 0.05).

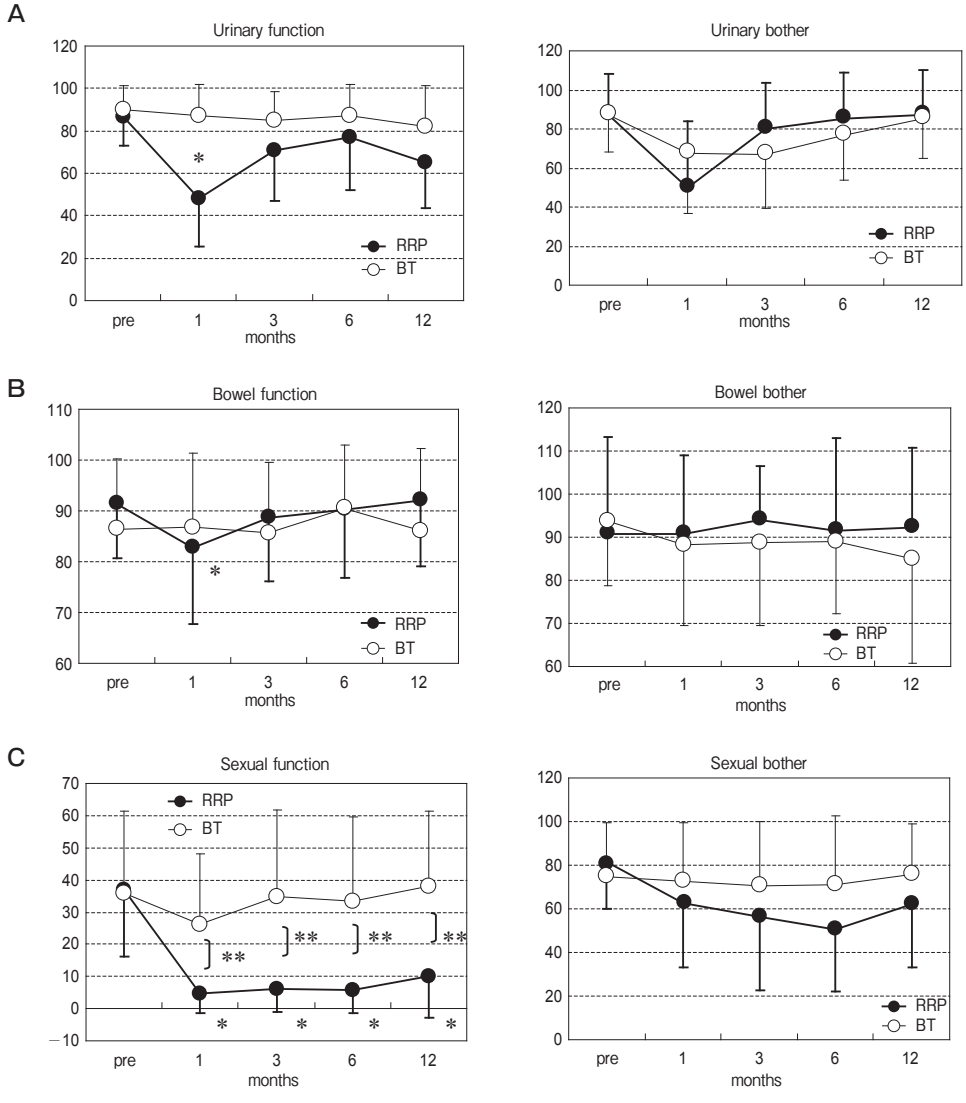


Fig. 2 **A**, Longitudinal UCLA-PCI scores in urinary function. In the RRP group, urinary function was worse than baseline at 1 month (*$p$ less than 0.05), but recovered to baseline after 3 months; **B**, Longitudinal UCLA-PCI scores in bowel function. In the RRP group, bowel function was worse than base line at 1 month (*$p$ less than 0.05), but recovered to baseline after 3 months; **C**, Longitudinal UCLA-PCI scores in sexual function. In the RRP group, bowel function was worse than baseline at 1 month (*$p$ less than 0.001) and remained worse after 12 months. In the BT group, changes in QOL scores were slight. Statistical differences between the RRP and BT groups were observed from 3 to 12 months after treatment (**$p$ less than 0.05).

results accurately reflect patient QOL after RRP or BT.

In comparison to other studies conducted by treatment providers, the present results for RRP patients were consistent for general QOL, which was good except at 1 month after surgery, and for mental health, which was better than baseline 6 months after surgery. Our results for disease-specific QOL in RRP patients also showed low scores at 1 month in urinary function and sexual function. However, urinary function recovered to baseline more rapidly than previously reported in Japanese patients [6, 7], despite diminished sexual functioning continuing to 12 months. Other investigators have reported [16, 17] that it may take 2 years or more for improvement in sexual function, even in patients who underwent nerve-sparing surgery. Thus, it can be concluded that RRP negatively affects sexual function for at least the first

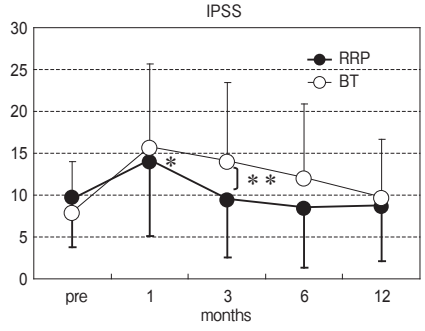


Fig. 3 Longitudinal IPSS scores. Both groups showed worse scores than baseline at 1 month (*$p$ less than 0.05), however, a significant difference was observed only at 3 months after treatment (**$p = 0.033$).

year after surgery, even if it rules out the possibility of influence by neo-adjuvant hormonal therapy in a few patients.

The QOL of our BT patients was not affected by the therapy except in the IPSS score. The general and mental health in patients treated by BT were inferior to those in patients treated by RRP. Patients treated by BT were perhaps not as satisfied as in prior reports [3, 6, 7, 13–15], but the difference between our findings and those reports may be due to our data collection technique. The present study is unique in creating a cohort design beginning before treatment with direct patient symptom reports using standardized questionnaire items collected by independent observers rather than by the treatment providers. Third-party data collection protects against any potential tendency to minimize symptoms when questioned directly by the treating physician. The BT group was inferior to the RRP group in both general and mental health, possibly due to urinary and bowel irritability. For the survey of disease-specific QOL, we used the UCLA-PCI. For urinary function, the UCLA-PCI focuses primarily on urinary incontinence. Therefore, urinary irritability might have been underestimated. Recently, the QOL survey changed from the UCLA-PCI to the Expanded Prostate Cancer Index Composite (EPIC) [18, 19]. The EPIC contains more questions concerning urinary and bowel function, including, for example, urinary and bowel irritation. The results from the EPIC emphasize urinary function. Frank *et al.* [20] report that radiation causes significantly worse bowel function and bother than RRP. Although RRP resulted in significantly worse urinary incontinence than BT in Frank's study, the opposite was true for urinary irritation. However, the superiority of sexual issues in the BT group in the first year after treatment is unquestionable even though sexual dysfunction is reported in long-term studies [21, 22].

The present study might have avoidable biases. For example, there may be a possible bias due to the influences of neo-adjuvant hormonal therapy and treatment explanations, which mention the possibility of incontinence in RRP, and dysuria in BT. Additionally, the pre-treatment explanations for the patients might also affect outcomes in such a QOL study since randomization is impossible. Furthermore, the present study had a short, 12-month observation period; QOL results may change during a longer follow-up. However, the changes and differences in QOL for the 12 months following surgery are clear.

Based on the present results, brachytherapy is recommended for patients with localized low-risk prostate cancer eager to maintain sexual function immediately after treatment. Nevertheless, although HRQOL in the early period after treatment is disturbed, RRP is still a standard treatment modality, even from the point of view of QOL.

The present results, therefore, are useful and provide important information when selecting the optimal treatment for localized prostate cancer, although long-term observations and further surveys remain to be conducted.

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