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A Review of Quality of Life Following Treatments for Localized Prostate Cancer

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1. Introduction

Recently, a number of alternative, less invasive treatments have been developed for patients with localized prostate cancer, who are not indicated for surgery, or who do not want to experience the potential side effects of surgery. Laparoscopic radical prostatectomy, robotic assisted laparoscopic radical prostatectomy (RALP), 3-dimensional conformal radiotherapy (3D-CRT), brachytherapy, intensity-modulated external beam radiotherapy (IMRT), high-intensity focused ultrasound (HIFU) and cryoablation of the prostate have all been applied to treat this group of patients.

QOL measurements for prostate cancer therapy have become an essential component of clinical trial evaluations, and should be integrated into comprehensive cancer care. Health-related QOL (HRQOL) concerns, urinary function, and potency rate after treatment are important to patients when selecting treatment options for clinically localized prostate cancer, and they also play a critical role in evaluating outcome following intervention.

Many studies have been carried out with the aim of improving QOL, urinary function, and potency rate after treatment for localized prostate cancer with many modalities. Clinicians have an obligation to assess the impacts these treatments have on QOL, and use this knowledge in an overall evaluation of efficacy.

2. QOL changes after treatment for localized prostate cancer

There are few changes in general HRQOL after a retropubic radical prostatectomy (RRP) or interstitial brachytherapy.¹⁻³ However, disease-specific QOL, especially bowel function and urinary irritative symptoms, is worse in the interstitial brachytherapy group, and urinary incontinence and sexual function are worse in the RRP group.¹ Hamada *et al.* evaluated QOL immediately before surgery and at several points during the 6-month period after retropubic radical prostatectomy (RRP). They reported that a radical prostatectomy aggravates the Social/Family well-being score and the FACT-P score.⁴ Other studies have also showed that prostatectomy and interstitial brachytherapy continuously decreased health-related QOL.⁵⁻⁸ Hanlon *et al.* showed that external beam radiotherapy for localized prostate cancer aggravates bowel function.⁹ Hubosky *et al.* reported that HRQOL showed patients undergoing cryoablation on average achieved urinary and bowel domain scores

comparable to baseline, but sexual domains remained well below baseline at 12 months follow-up and compared to brachytherapy, cryotherapy results in less irritative and obstructive voiding systems in the early post-treatment period, and may improve the urinary function for up to 24 months after treatment.¹⁰

We reported QOL after HIFU for localized prostate cancer.¹¹ In our report the total FACT score significantly improved at 24 months, and Physical well-being factor (at 6 and 12 months after HIFU therapy) and Functional well-being factor (at 24 months after HIFU therapy) in FACT-G showed significant improvements. Further analysis of the elements of FACT-G showed such responses as “I am bothered by the side-effects of treatment” (at 12 months after HIFU therapy), “I am able to enjoy life” (at 24 months after HIFU therapy) and “I have accepted my illness” (at 24 months after HIFU therapy) to have all statistically improved.

3. Urinary function after treatment for localized prostate cancer

3.1 Urinary incontinence after radical prostatectomy

Urinary incontinence is the most prominent side effect of radical prostatectomy. Urinary incontinence after treatment for localized prostate cancer is caused by sphincter malfunction. So, several technical modifications of open, laparoscopic and robot-assisted laparoscopic radical prostatectomy have been advocated to improve early and late urinary incontinence.

Pardo *et al.* reported that urinary incontinence rates of patients treated with non-nerve sparing RRP and nerve sparing RRP were 69% and 54%.¹² It has recently been demonstrated that reconstruction of the posterior aspects of the rhabdoshincter allows a rapid recovery of continence after retropubic radical prostatectomy and laparoscopic radical prostatectomy.¹³ But, Joshi *et al.* reported that there was no significant difference in early urinary incontinence between the group for which the posterior aspects of the rhabdoshincter were reconstructed and the group for which they were not reconstructed in cases of RALP.¹⁴ They suggested the reason why there was no significant difference was a magnified stereoscopic view and/or the finer, more maneuverable instruments in robot system may allow better preservation of sphincter supporting musculature, hence improving continence, and may obviate the advantages of posterior reinforcing sutures.

Di Pierro *et al.* compared continence rate between groups of patients treated with RRP and RALP, and reported that the continence rate of the RALP group was significantly higher than the RRP group at 3 and 12 months after RALP.¹⁵ Wang *et al.* reported that continence was achieved in 82%, 87%, and 91% of men at 3, 6, and 12 months after RALP.¹⁶ They also reported that the mean IPSS scores of these patients preoperatively and 3, 6, and 12 months after surgery were 14.1, 5.2, 3.0, and 2.9 and corresponding mean QOL scores were 3.4, 2.1, 1.6, and 1.6.¹³

3.2 Urinary function after radiation therapy, cryotherapy, and HIFU

Sanda *et al.* reported that 18% of patients in the brachytherapy group, 11% of those in the radiotherapy group, and 7% of those in the prostatectomy group had moderate or worse distress from overall urinary symptoms at 1 year.¹⁷ Pardo *et al.* reported that compared to the brachytherapy group, the prostatectomy group showed a greater deterioration of urinary incontinence but better urinary irrigative-obstructive results.¹²

Hubosky *et al.* reported that the urinary function was similar for the groups of patients treated with cryoablation and brachytherapy until 18 months, at which time cryoablation patients fared better and this was sustained up to 24 months.¹⁰

We reported that the QOL index improved significantly at 6 months after HIFU therapy. Our data on uroflowmetry showed that maximum flow rate and residual urine volume were significantly impaired at 6 months after HIFU. However, the data on maximum flow rate and residual urine volume recovered to baseline at 12, 24 months after HIFU.¹¹

4. Erectile function

It is important to preserve erectile function during treatment of prostate cancer. Postoperative potency depends on the preservation of neurovascular bundles (NVB), which are some times affected by tumor invasion.

Hanlon *et al.* reported a normal potency rate at 1 year after treatment of 50% for patients in the RRP group, 65% for patients in the brachytherapy group, and 69% for patients in the radiotherapy group.¹⁷

4.1 Erectile function after radical prostatectomy

Generally, the potency rate is aggravated by injury to NVB after radical prostatectomy. Poel *et al.* reported a potency rate 53.3 % at 6 months after RALP, and 42% of patients had potency without using a PDE5 inhibitor. They concluded that prostatic fascia preservation resulted to good potency rates after RALP.¹⁸ Consequently, preservation of NVB and prostatic fascia is important to preserve erectile function. Di Pierro *et al.* compared potency rates between groups of patients treated with RRP and RALP. They performed RALP with a procedure using a transperitoneal approach and preserved the NVB through a tension- and energy-free technique¹⁹ as far as cancer localization allowed, and reported that the potency rate without PDE-5 inhibitors of the RALP group (68% and 55%) was significantly higher than that of the RRP group (25% and 26%) at 3 and 12 months after RALP.¹⁵

4.2 Erectile function after radiation therapy, cryotherapy, and HIFU

Pardo *et al.* reported that among patients with no relevant sexual problems at baseline, approximately 40% in the external and interstitial brachytherapy groups had preserved their pretreatment sexual status.¹²

Merrick *et al.* reported that 39% of patients maintained potency after prostate brachytherapy with a plateau on the potency preservation curve at 6-year follow-up, and preservation of potency after brachytherapy correlated with preimplant erectile function, patients age, use of supplemental external beam radiation therapy, and diabetes, and was statistically significant.²⁰

Asterling *et al.* reported that 3.7% and 14.3% of patients had partial erections at 6 weeks and 9 months after cryosurgical ablation. Besides, 21% and 24% of the patients had regained full potency at 18 and 24 months after cryosurgical ablation.²¹

Hubosky *et al.* reported that cryotherapy patients experienced more negative impacts on sexual function steadily up to 12 months compared to brachytherapy patients.¹⁰

We reported that potency rates were 52%, 63% and 78% for patients who did not undergo NADT at 6, 12 and 24 months after HIFU therapy. Furthermore, potency rates were 39%, 62% and 67% at 6, 12, and 24 months, respectively, after HIFU therapy without the use of

PDE5 inhibitors.¹¹ HIFU therapy can, therefore, preserve erectile function better than RRP and cryotherapy, and is similar to RALP.

5. Conclusion

5.1 QOL

RRP and interstitial brachytherapy continuously decreased health-related QOL. External beam radiotherapy for localized prostate cancer aggravates the bowel function. Health-related QOL was significantly improved in patients treated with HIFU therapy at 24 months after HIFU.

5.2 Urinary function

Urinary incontinence is the most prominent side effect of radical prostatectomy. But, RALP might improve incontinence rates of patients. The urinary function of patients after brachytherapy and cryotherapy were similar. In HIFU, however maximum flow rate and residual urine volume were significantly impaired at 6 months after treatment, and data on maximum flow rate and residual urine volume recovered to baseline at 12, 24 months after HIFU.

5.3 Erectile function

Generally, potency rate was aggravated by injury to NVB after radical prostatectomy. Consequently, using RALP to preserve the NVB and prostatic fascia is important for preserving erectile function. Approximately 40% of patients in the external and interstitial brachytherapy groups preserved their pretreatment sexual status. In cryoablation, 3.7% and 14.3% of patients had partial erections at 6 weeks and 9 months after treatment. And, 21% and 24% of the patients had regained full potency at 18 and 24 months after cryosurgical ablation. After HIFU, 52%, 63% and 78% of patients who did not undergo NADT had regained full potency at 6, 12, and 24 months after treatment therapy. Furthermore, the potency rates were 39%, 62%, and 67% at 6, 12, and 24 months, respectively, without the use of PDE5 inhibitors. HIFU therapy can, therefore, preserve erectile function better than RRP, radiotherapy, or cryotherapy.

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In this book entitled "Prostate Cancer - Diagnostic and Therapeutic Advances", we highlight many of the significant advances made in our treatment armamentarium of prostate cancer. The book is subdivided into four sections termed: 1) novel diagnostic approaches, 2) surgical treatments options, 3) radiation therapy and its potential sequelae, and 4) medical management and its treatment complications. After reading the present book, readers will be very familiar with the major clinical advances made in our multifaceted treatment approach to prostate cancer over the past decade. This book is a tribute to our pioneering urologists and allied healthcare professionals who have continually pushed forward our traditional therapeutic envelope.

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