Weighing up prostate cancer treatment outcomes

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The main treatment options for prostate cancer, one of the most common cancers in men over the age of 50, are surgical removal of the prostate or radiotherapy – either on its own or alongside hormone therapy (androgen deprivation therapy, ADT). Because both options can have serious side effects, including erectile dysfunction, urinary and rectal toxicities, treatment decisions in localized and non-life-threatening cases should aim to maintain patients' quality of life as well as eliminate the cancer. With this in mind, researchers working with the Translational Research Center for Medical Innovation (TRI) are taking a closer look at available treatment options.

Permanent seed brachytherapy is a form of radiotherapy in which tiny radioactive sources are placed into the prostate to provide a steady dose of radiation over a few months. The use of permanent iodine-125 seed implantation has become a popular treatment option in Japan. It is estimated that since 2003, more than 40,000 patients have received this treatment in more than 110 institutions nationwide.

The Japanese Prostate Cancer Outcome Study of Permanent Iodine-125 Seed Implantation (J-POPS) study, which included researchers from TRI, enrolled approximately 40% of all permanent iodine-125 seed implantation cases in Japan between 2005-2010[1].

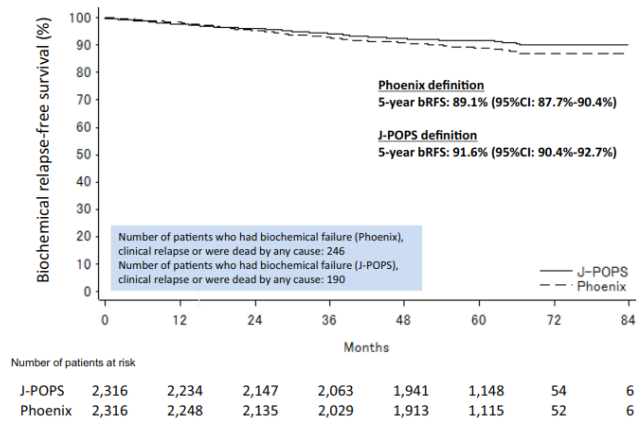

Figure 1: Biochemical relapse-free survival rate based on the Phoenix (prostate-specific antigen (PSA) nadir + 2.0 ng/ml) and J-POPS (PSA of more than 1.0 ng/ml that is increasing over three measurements) definitions for PSA failure. *Reprinted with permission from Ref. 2 © Japan Society of Clinical Oncology 2018*

A recent publication examined the outcomes of 2,316 patients with localized prostate cancer that underwent permanent seed implantation between July 2005 and June 2007, and showed that the rates of biochemical relapse-free survival and overall survival after five years were 91.6% (see Figure 1) and 97.3%, respectively[2]. Furthermore, when focusing on the rate of mortality limited to prostate cancer recurrence, cause-specific death (prostate cancer death) occurred only in 7 subjects (0.3%). The mortality due to cancer was less than one-tenth of total deaths during 5 years. Together with previous findings on the low likelihood of moderate or severe urinary (7.36% in acute, 5.75% in late phase) and rectal (1.03% in acute, 1.86% in late phase) toxicities of patients enrolled during this period and treated with permanent seed implantation with or without external beam radiation therapy (EBRT)[3], the J-POPS data suggest that permanent seed implantation is an efficient and safe treatment option for localized prostate cancer. It should also be noted that the treatment period or hospital stay is shorter than surgery and EBRT because brachytherapy only takes a few hours.

Comparing outcomes from studies involving surgery and radiotherapy is problematic due to differences in reporting methods. The speed of technological advances in these treatments, such as robotic prostatectomy or carbon ion radiotherapy, also make long-term comparisons difficult. Nevertheless, and in agreement with the J-POPS study, a publication by the Prostate Cancer Results Study Group in the United States also highlighted the efficacy of brachytherapy[4]. They found that it led to a higher average biochemical relapse-free survival rate in patients with low-risk prostate cancer than radical prostatectomy or EBRT. Furthermore, combination therapies involving EBRT and brachytherapy with or without ADT appeared to have superior outcomes than surgery alone or EBRT in high-risk patients.

TRI researchers are involved in two other ongoing multicentre, randomized, prospective clinical trials to assess the efficacy and safety of permanent iodine-125 seed implantation in patients with intermediate-risk prostate cancer (with or without ADT)[5], and as part of a combination therapy with EBRT and hormone therapy for high-risk localized prostate cancer[6]. The results of these studies will enable comprehensive, evidence-based prostate cancer treatment comparisons that will assist physicians in choosing the best possible treatment option.

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