

Dr. Takeshi Arimura: The present and future of proton therapy in Japan

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Expert introduction

Dr. Arimura is a Director of Diagnosis and Treatment Dept of Medipolis Proton Therapy and Research Center, Medipolis Medical Research Institute, Ibusuki, Japan; certified physician of Japanese Society for Radiation Oncology; Radiation Therapy Specialist of Japan Radiological Society; Executive board member of Japanese Radiation Oncology Study Group. Dr. Arimura specializes in proton therapies to treat cancers such as prostate, pancreatic and breast cancers.

Editor's note

From 9–10 December 2017, the 2017 Annual Meeting of China Anti-Cancer Association-Genitourinary Cancer Committee and the 7th Shanghai Genitourinary Oncology International Symposium took place on piercingly cold days with shivery wintry breeze. Yet, a thaw had set in due to the intense academic passion and warmth of a team of experts coming from all corners of the world. Co-organized by China Anti-Cancer Association-Genitourinary Cancer Committee and Shanghai Anti-Cancer Association, and supported by Fudan University Shanghai Cancer Center, the symposium had prepared all guests of honor the most fruitful academic feast of the year. At the symposium, we had the pleasure to invite the General Corporate Judicial Person Department Head of Medipolis Proton Therapy and Research Center, Medipolis Medical Research Institute, Dr. Takeshi Arimura, to share his insights into the current status of proton therapy in Japan as well as his personal experience in using the therapy to manage cancer (*Figure 1*).

Interview

Surgery, chemotherapy and radiation therapy are the three most commonly adopted approaches to manage cancer. Based on the principles of radiation therapy, the pursuit of concentrated dose has been intensified. Since



Figure 1 Dr. Takeshi Arimura (middle), Dr. Shan Ding (left) and AME editor (right).

the 20th century, high-precision radiation therapies such as stereotactic radiation therapy (SRT), stereotactic body radiation therapy (SBRT), intensity-modulated radiation therapy (IMRT) and image-guided radiation therapy (IGRT) have been widely employed due to the advances in medical technology. Heavy-particle therapy using beams of energetic protons, neutrons, or positive ions for cancer treatment that is believed to be of next level of photon therapies such as X-ray and gamma-ray has been developing tremendously. Proton therapy as a kind of external-beam radiation therapy uses protons, a positively charged particle, to destroy cancer cells at high energy by painlessly delivering radiation through the skin from a machine outside the body.

Proton therapy in Japan

After graduation, Dr. Arimura has put most of his effort into the study of radiation therapy. It was about a decade ago that he realized photon radiation therapy was not always effective to treat certain kind of cancers and could cause a number of side effects. On the contrary, the use of proton therapy had achieved unexpectedly satisfactory results, so



Figure 2 Dr. Takeshi Arimura: The present and future of proton therapy in Japan (1).

Available online: <http://www.asvide.com/article/view/23350>

he started shifting his focus to the study of proton therapy in cancer treatment. In 2011, Medipolis Proton Therapy and Research Center opened and provide proton therapy to treat cancer, where Dr. Arimura has engaged in medical practicing. So far, it has treated about 2400 local and overseas patients, many of whom are Chinese.

“Proton therapy as an advanced medical treatment has been slowly developing in Japan. Despite the government support in policies, the cost of proton therapy or heavy-particle therapy is rather high in general. In comparison with proton therapy, heavy-particle therapy takes up much more space in light of the size of the equipment, making it even pricier to install such facilities. The expense of proton (heavy-particle) therapy is not currently covered in Japanese insurance plans, and thus it is not yet popularized in Japan. Yet, it is a very promising treatment approach that is already showing favorable treatment results.” explained Dr. Arimura.

Dr. Arimura continued, “Currently, the use of proton therapy is most commonly seen in Japan and the United States. Whilst it is mainly proton therapy that the United States uses, Japan uses both proton and heavy-particle therapies. There is now a center in Shanghai, China that performs heavy-particle therapy. If proton or heavy-particle therapies can be made more popular among China and other countries, a new series of studies can be unfolded to have each other’s knowledge and techniques shared and further improve the treatment outcomes.”

The features and indications of proton therapy

Based on personal clinical experience, Dr. Arimura shared

with us his thought about the features and indications of proton therapy, “General radiation therapy like X-ray delivers wide-range radiation based on the size of the lesion in order to achieve certain therapeutic effects. Yet, due to the unique physical characteristics of proton, after crossing the lesion, the energy of the proton would rapidly decrease without affecting too much the tissues at the rear or surrounding areas of the lesion. This feature is to be considered when drawing up any treatment plan. Despite the good treatment effects of proton therapy, not all tumors can be effectively treated with it. Therefore, the judgement in whether this therapy should be adopted has to be based on high diagnostic techniques and suitable treatment plan if one wants to achieve best treatment results.”

The prospect of proton therapy

With technological advances, X-ray therapy as a type of photon radiation therapy can achieve very good treatment effects. This is the view by many scholars, including Dr. Arimura. Yet, after an in-depth look into proton therapy with considerable clinical experience, Dr. Arimura believes that the use of proton therapy may be able to achieve even better results than that of the X-ray therapy.

With regard to the future of proton therapy, Dr. Arimura said, “About a decade ago, proton therapy was primarily used medically. Its development is rather slow with limited number of large-scale clinical trials conducted. In view of the growing number of patients, we expect to see more relevant research to be carried out. From the perspective of technological advances, we expect to see miniaturization of related equipment associated with the growing convenience and reduction in cost. When it comes to the day that the therapy begins to be widely used by hospitals at all levels, with the complementary use of X-ray therapy, there is without a doubt that better treatment results would be achieved.”

For more details, please check out the interview video (Figure 2).

Interview questions

- (I) What is the current situation of prostate cancer treatment in Japan? How is it different from the treatment in Europe and America?
- (II) Would you share with us your experience in proton therapy?
- (III) What do we have to bear in mind at the beginning of

a proton therapy?

- (IV) What are the indications of proton therapy?
- (V) What do you think is the future research direction in the field of proton therapy?
- (VI) What is the most promising clinical study of proton therapy?

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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