For Immediate Release

HKSH Releases MR Linac Clinical Research for Localised Prostate Cancer

(16 June 2022, Hong Kong) A clinical study by HKSH Medical Group (HKSH) found that the combination of stereotactic body radiotherapy (SBRT) and magnetic resonance-guided radiation therapy (MRgRT) offers the potential for achieving better treatment outcome for prostate cancer patients. The research was published as Asia's first MR Linac clinical study for localised prostate cancer in *Cancers*, a journal of oncology.

The study is aimed to understand the clinical results of using MR Linac treatment for prostate cancer patients in terms of post-treatment side effects and quality of life. The results show that the side effects during and after the treatment are generally mild, patients can maintain good quality of life and resume normal functions in urinary, bowel, hormonal and sexual domains shortly after the treatment.

According to clinician-reported outcome measurement (CROM), over 90% of patients had no major side effects. Only one out of the 51 patients in the cohort had acute gastrointestinal problems and six of them with some genitourinary symptoms. All such conditions were improved within one month. Based on the patient-reported outcome measurement (PROM), urinary and bowel functions returned to baseline levels at four months. The hormonal domain remained relatively stable, while the sexual domain gradually resumed one year after the treatment.

According to Hong Kong Cancer Registry, prostate cancer is the third most common cancer amongst males, with over 2,500 new cases every year and is on an upward trend. Factors affecting the treatment options for prostate cancer include the patient's age, health condition, cancer staging and the impact on quality of life (QoL). Most patients of low- to intermediate- risk could be cured through surgery or radiotherapy. As the median age at diagnosis of prostate cancer patients is 70, radiotherapy is a better option for some patients who are not fit for surgery due to age and other chronic diseases.

For conventional radiotherapy of prostate cancer, the targeted beam-on area is usually larger than the actual tumour size and contour for achieving the desired treatment outcome. However, those nearby normal tissues and organs such as bladder, rectum and small intestine may inevitably be affected and thus short-term effects such as diarrhea, inflammatory bowel syndrome and urinary retention may be resulted.

The lead author, **Dr. Darren POON, Honorary Consultant in Clinical Oncology of Hong Kong Sanatorium & Hospital, Specialist in Clinical Oncology**, explained, "The clinical application of magnetic resonance-guided (MR-guided) radiotherapy is one of the major breakthroughs in prostate cancer treatment. The location, size and shape of the tumour are constantly changing during the process of radiotherapy. With the MR imaging, those difficult-to-visualise soft-tissue anatomies can be seen and tracked, therefore any changes in tumour size and position are clearly shown. We can adopt stereotactic body radiotherapy (SBRT) together with this imaging technique to increase the precision in localising tumour and reduce treatment margins. Damage to surrounding healthy tissues and organs can be minimised, resulting in fewer bowel and urinary-related symptoms."

"In addition, we can conduct online adaptive planning and real-time monitoring with the help of beam-on imaging and adjust radiation doses during treatment. Compared to conventional radiotherapy, the number of treatment session can be substantially reduced from 40 to five, thus alleviating the hassle of travelling for treatments," said Dr. POON.

The research was conducted by a team of oncologist, radiotherapists, dosimetrists and medical physicists from HKSH between March 2020 and June 2021. A cohort of 51 prostate cancer patients at an average age of 71.5 were recruited for evaluation. The outcomes of the treatment using MR Linac were assessed based on both CROM and PROM.

HKSH was the first in Asia to introduce 1.5T Unity MR Linac in 2019 for clinical use in treating malignancies such as prostate, bladder, gynaecological, pancreas and liver cancers. Since then, HKSH has conducted a wide range of clinical research about MR Linac in order to enhance the applications and treatment outcomes.

Cancer as the top killer in Hong Kong could now be cured and managed with the advancement in medicine and medical technology. A variety of treatment modalities has become available, some local patients deliberately travel abroad for obtaining the latest cancer treatment.

Mr. Wyman LI, Chief Operating Officer of HKSH Medical Group, said, "We understand that no single equipment can handle all cancer types and treatment needs. At HKSH, we strive to broaden our range of available therapies through introducing the most advanced and the strongest fleet of diagnostic and therapeutic equipment, with a view to enabling our doctors to offer appropriate treatment plans for patients."

"Putting all the top-notch equipment and technology in place is not enough. We believe that clinical research is integral to optimising the potential of clinical applications of these technologies, so as to achieve better clinical outcomes and greater benefits for patients. HKSH has been incessant in conducting a wide range of clinical research, over 100 research papers are published in medical journals every year," Mr LI continued.

"MR Linac application is one of our focus areas. In 2018, HKSH was invited to be the first member in Asia to join MR Linac Consortium, a collaborative effort of leading international universities and medical centres to explore the clinical applications of this technology on the aspects ranging from technical advancement, treatment planning adjustment to clinical application. HKSH has issued 16 research publications on MR Linac so far, covering the clinical research on treatments of prostate cancer, head and neck cancer and liver cancer. We also helped tackle some technical issues in using this technology, such as enabling patients with cardiovascular implantable electronic devices to receive MR-guided radiotherapy. We also offer consultancy on MR Linac application to various medical institutions in Australia and Thailand," added Mr. LI.

Dr. Ben YU, Head of Medical Physics Department of HKSH Medical Group highlighted that all research projects on MR Linac conducted by HKSH are for clinical purposes as well as maximising patients' benefits. For instance, the treatment bed is meticulously designed to ensure that the positions of patients are aligned during the imaging and radiotherapy, which is important in terms of achieving a high degree of precision and reducing the possible side effects.

"Respiratory gating has been one of the biggest challenges for MR-guided radiotherapy. We have been working on clinical research to address this issue with some favorable results. It is expected that the empirical findings could be applied to clinical management next year. By then, we can monitor the tumour location as it moves when the patients breathe during the treatment, and we can precisely target the tumour with spot-on radiation beams and dosage. This new technique can be extended to treatment for various other cancer types such as pancreatic and lung tumours, more patients will be benefitted in the long run," said Dr YU.

The study is published on *Cancers (Basel)*, Poon et al, 2021 Sep 28;13(19):4866
https://pubmed.ncbi.nlm.nih.gov/34638348/

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About HKSH Medical Group

Officially launched in September 2017, HKSH Medical Group promotes public health and advanced medicine through a multi-faceted, coordinated approach in clinical services, medical education, scientific research and public health education. Members of the Group, including Hong Kong Sanatorium & Hospital, HKSH Healthcare and HKSH Eastern Medical Centre, are dedicated to offering top-quality holistic care to patients, upholding the motto "Quality in Service, Excellence in Care".

About Hong Kong Sanatorium & Hospital

Established in 1922, Hong Kong Sanatorium & Hospital is one of the leading private hospitals in Hong Kong. With the motto "Quality in Service Excellence in Care", the Hospital is committed to serving the public as well as promoting medical education and research.

About HKSH Eastern Medical Centre

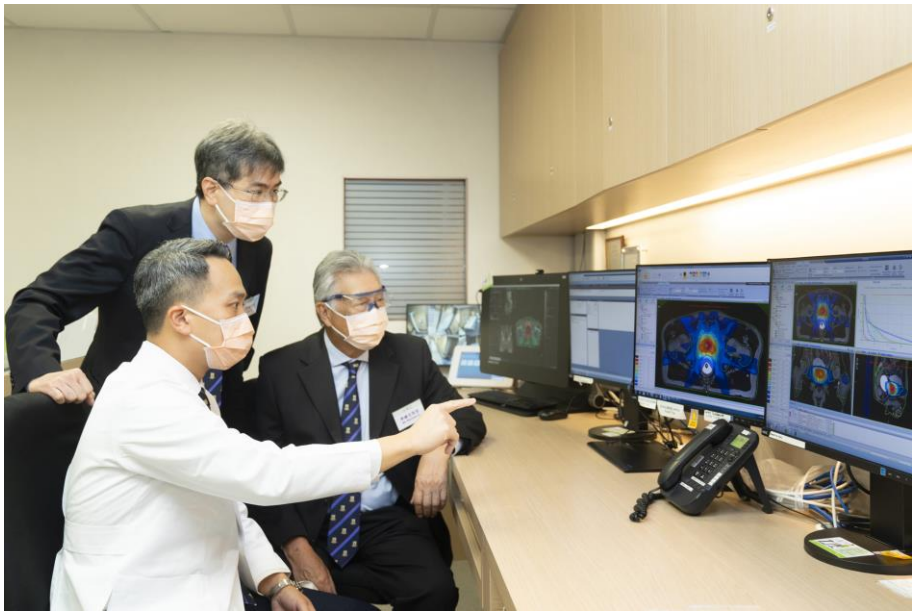
HKSH Eastern Medical Centre is the new medical landmark in Hong Kong East. It houses HKSH Cancer Centre which provides advanced and full range of cancer treatment options, Family Medicine and Primary Care and Health Assessment services.

Photo Captions:

1. Mr. Wyman LI, Chief Operating Officer of HKSH Medical Group (Middle), Dr. Darren POON, Honorary Consultant in Clinical Oncology of Hong Kong Sanatorium & Hospital, Specialist in Clinical Oncology (Right) and Dr. Ben YU, Head of Medical Physics Department of HKSH Medical Group (Left) introduce the research findings and future development of MR-guided radiation therapy at HKSH.

2. The combination of stereotactic body radiotherapy and magnetic resonance-guided radiation therapy enhances the precision in localising tumour and minimises the effects on the normal tissues near the tumour during the radiation therapy. With the beam-on imaging, HKSH medical team can conduct online adaptive planning and real-time monitoring to adjust the doses during the treatment. The technique can be extended to treatment of oligometastatic cancers such as in lymph nodes or bone, which facilitates the treatment of primary tumours and the metastatic tumours simultaneously.

   Mr. Wyman LI, Chief Operating Officer of HKSH Medical Group, Dr. Darren POON, Honorary Consultant in Clinical Oncology of Hong Kong Sanatorium & Hospital, Specialist in Clinical Oncology and Dr. Ben YU, Head of Medical Physics Department of HKSH Medical Group.



3. HKSH Medical Group (the Group) is committed to promoting and making contributions to medical advances through interdisciplinary clinical research. Thanks to the collaborative effort of the medical professionals and researchers at HKSH, the Group conducts over 100 clinical research projects every year. A group photo of HKSH Management and the clinical research team: Mr. Wyman LI, Chief Operating Officer of the Group (middle), Dr. Joseph CHAN, Chief Medical Officer of the Group and Deputy Medical Superintendent of Hong Kong Sanatorium & Hospital (second from right), Dr. Raymond YUNG, Department In-charge of Research Department of the Group and Deputy Medical Superintendent of Hong Kong Sanatorium & Hospital (second from left), Dr. LAU Chor Chiu, Chief Operating Officer of HKSH Eastern Medical Centre (first from right), Dr. Darren POON, Honorary Consultant in Clinical Oncology of Hong Kong Sanatorium & Hospital, Specialist in Clinical Oncology (third from right), Dr. Ben YU, Head of Medical Physics Department of the Group (third to left) and Dr. George CHIU, Head of Department of Radiotherapy of the Group (first to left).

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