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The past, present and future directions of radiotherapy in Asia: linking technology and the fight against cancer

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Introduction

Asia is a heterogeneous and diverse continent having a population of 4.2 billion at present. The total incidence of cancer cases in Asia is 6.7 million which is almost 48% of the global incidence. In the 2015 statistics from a survey done by the Federation of Asian Organizations in Radiation Oncology (FARO), approximately 1.6 million cancer patients per year are being treated with radiotherapy from the 11 participating Asian countries. There are 7,984 radiation facilities in the FARO region with an estimated 200 cancer patients treated annually per radiotherapy facility. Currently, among the radiotherapy equipment being used, there are 564 cobalt-60 teletherapy, 3405 linear accelerators (LINAC), 1,671 2-D simulators, 1301 CT simulators, 4,001 treatment planning systems, 29 LDR and 978 HDR brachytherapy units. As the cancer burden is estimated to increase to 10.7 million in 2030, radiotherapy should meet this growing demand by improving accessibility, availability and support for these advances in technology.

Methodology

Radiotherapy developed over 4 major eras: Discovery Era (1895-1925's), Orthovoltage Era (late1920's-1950), Megavoltage Era (1950-1985) and Computer-Assisted Era (1996-2012). The future is the Ion Beams Era with the development of proton and carbon ions. These advancements in technology have the primary goal of delivering high doses of radiation in order to target the tumor while minimizing doses to the surrounding normal organs at risks. This results in better tumor control, decrease in local failure rates, improvement in survival and improvement in the quality of life.

Current trends and technological advancements in Asia include: Stereotactic Radiosurgery (SRS), Stereotactic Body Radiotherapy (SBRT/SABR), Image-Guided Radiotherapy (IGRT), Image-Guided Brachytherapy (IGBT), Intraoperative Radiotherapy (IORT), Proton Beam Therapy and Carbon-Ion Radiotherapy. Many countries in Asia have started to use these or are already utilizing highly-advanced technologies in radiotherapy.

Different local and regional radiation oncology societies such as JASTRO, SEAROG, Tri-lateral, FARO, etc, together with other international organizations like IAEA, ASTRO, ESTRO, are establishing linkages in order to improve the current state of radiotherapy in Asia through education and training, development of practice guidelines, research, and quality assurance programs. International cooperation and networking is important in conducting these activities primarily for the best interest of our patients.

Conclusion

Therefore, radiotherapy in Asia continues to evolve in order to address the demands of the growing cancer burden. Treatment-related toxicities are important issues that need our attention. Socioeconomic factors in an ever-increasing population are adding to the complexities of the cancer problem in the region. Other important components in the fight against cancer include prevention, screening, and collaboration with a multi-disciplinary team of surgeons, medical oncologists and other related specialists. Strategic and concrete planning is necessary in order to assure the availability of these advancements in every place in Asia.

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