

Invited Editorial

Emerging role of modern proton therapy in India

Pankaj Kumar Panda¹, Rakesh Jalali²¹Division of Clinical Trials and Epidemiological Sciences, National Cancer Centre, Singapore, ²Department of Neuro-Oncology CMT, Apollo Proton Cancer Centre, Chennai, Tamil Nadu, India.

Optimal balance between patients' expectations, better outcomes, and improving the overall quality of life (QOL) of patients drives us toward achieving clinical excellence in a true sense. With the rapidly developing technologies and the advent of precision medicine, cancer care has never been as dynamic as it is now. Radiation oncology, which is one of the major cornerstones of cancer care has been developing leaps and bounds in the past few decades. In the current era of highly conformal radiotherapy, the focus has shifted from not just obtaining disease control but also maintaining an optimal QOL. Therefore, achieving immaculate clinical excellence in such a scenario is not only providing the best possible evidence-based care but also participating in adding to the pool of quality evidence and defining various standards of care models.

Radiation therapy (RT) has been known to cause several late effects of cancer treatment, such as growth defects, neurocognitive defects, endocrinopathies, cardiovascular effects, and secondary cancers.^[1] RT, however, cannot be completely avoided in many treatment plans and remains an integral component of cancer management; the best possible conformal techniques of radiation should be used in such situations. Proton beam therapy (PBT), due to its unique physical and biological properties, delivers highly conformal radiation doses as compared to conventional RT delivery modalities. It has shown potential to minimize acute and late effects of radiation including radiation-induced second cancers. However, PBT facilities are resource-intensive to set-up and maintain compared with even the most modern conventional radiotherapy machines such as linear accelerators. Data regarding the clinical superiority of PBT in treating pediatric and/or adolescent and young adult cancers, skull base tumors, tumors requiring re-irradiation, and other indications are being gradually published.^[2] Low- and middle-income countries (LMIC) are a very diverse group of regions with variability in terms of population, resources, demography, health-care infrastructure, disease presentation, and outcomes. Access to suitable RT

facilities and techniques has been a persistent key gap area in LMICs like India with significant cancer burden predicted by 2030.^[3] Modern contemporary RT techniques such as PBT have garnered significant interest among the medical fraternity and policy makers. The first proton therapy facility in India, Apollo Proton Cancer Centre (APCC) has been treating patients since 2019, APCC has treated more than 1200 patients using pencil beam scanning proton therapy for a wide range of indications such as central nervous system tumors, genitourinary (prostate) tumors, head-and-neck cancers, bone and soft tissue tumors, breast cancers, and thoracic cancers to name a few. A significant number of pediatric patients (25%) have also been successfully treated with PBT.^[4] In terms of upcoming PBT centers in the region, Tata Memorial Center's PBT facility is also currently operational and has been successfully treating patients using PBT. The facility being a Government of India undertaking will help PBT reach further out in the region. The future of PBT in the Indian subcontinent looks very promising with increasing acceptance, optimal outcomes.

REFERENCES

1. Armstrong GT, Kawashima T, Leisenring W, Stratton K, Stovall M, Hudson MM, *et al.* Aging and risk of severe, disabling, life-threatening, and fatal events in the childhood cancer survivor study. *J Clin Oncol* 2014;32:1218-27.
2. Chilukuri S, Panda PK, Jalali R. Proton therapy in LMICs: Is the need justified? *JCO Glob Oncol* 2022;8:e2100268.
3. World Health Organization. Global status report on non-communicable diseases 2010. Geneva, Switzerland: World Health Organization; 2011.
4. Chilukuri S, Burela N, Uppuluri R, Indumathi D, Nangia S, Panda PK, *et al.* Preliminary experience of treating children and young adults with image-guided proton beam therapy in India. *JCO Glob Oncol* 2020;6:1736-45.

How to cite this article: Panda PK, Jalali R. Emerging role of modern proton therapy in India. *Indian J Med Sci.* 2024;76:1. doi: 10.25259/IJMS_19_2024

*Corresponding author: Pankaj Kumar Panda, Division of Clinical Trials and Epidemiological Sciences, National Cancer Centre, Singapore. pankajpanda86@gmail.com

Received: 26 January 2024 Accepted: 26 January 2024 Published: 07 February 2024 DOI 10.25259/IJMS_19_2024

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, transform, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms. ©2024 Published by Scientific Scholar on behalf of Indian Journal of Medical Sciences