Radiobiology and Physics of Heavy Particles

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In this issue of *Applied Radiation Oncology*, we turn our focus to the radiobiology and physics of heavy particles, which provide another option to treat various malignancies.

Dr Daniel Koffler and his co-authors cover the subject in a comprehensive two-part review. *Eradicating Cancer Stem Cells Using High Linear Energy Transfer Radiation Therapy Part 1: Physics and Radiobiology* offers a primer on the fundamental physics and radiobiology that distinguish high linear energy transfer (LET) particles from conventional photon and proton therapies. Part 2, *LET Painting and Other Advanced Techniques*, delves into LET painting, spatial fractionation, and multi-ion strategies as promising tools to selectively target cancer stem cells. Together, these articles present the possibility that high LET may offer more than local control—it may enable systemic disease modification.

This month's research article, *The Effect of Pentoxifylline and Vitamin E in Preventing Grade 3 Radiation Pneumonitis: A Single Arm, Phase II Prospective Study*, presents a phase II study evaluating the combination of pentoxifylline and vitamin E in preventing grade three pneumonitis in patients undergoing thoracic reirradiation with stereotactic ablative body radiation therapy. The results showed that the pneumonitis incidence was significantly reduced at all time points, and the intervention was well tolerated, making it a promising adjunct in this clinical scenario.

Malignant Melanotic Nerve Sheath Tumor of the Neck: A Case Report details the rare presentation of a malignant melanotic nerve sheath tumor in the carotid space, underscoring the critical importance of genomic profiling and multidisciplinary management for these aggressive, anatomically challenging tumors. It also highlights the evolving role of proton therapy in head and neck reirradiation.

June's Resident Voice editorial, *Entrustable Professional Activities in Radiation Oncology: A Framework for Competency-Based Training*, discusses the implementation of entrustable professional activities (EPAs) as a model for evaluating competency in radiation oncology education, which is rapidly evolving. The editorial underscores the current gaps in training, particularly in brachytherapy, and offers EPAs as a structured solution for assessing readiness for real-world clinical practice.

The June issue captures a central theme: bridging the gap between the current and future state of heavy particles and residency training. By redefining how we train the next generation of radiation oncologists and by refining our approach to radioresistant tumors, each article invites us to reconsider established paradigms and embrace innovation to provide better care of patients.

As always, I thank you for your continued support of *Applied Radiation Oncology*!

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