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Emerging role of neurocognitive sparing radiotherapy: Can it be the new standard of care?

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Brain metastases constitute approximately 15%-30% of all intracranial tumors. As much as 30% of patients will develop brain metastases as a part of their primary cancer. Whole brain radiotherapy (WBRT), with or without SRS boost is the mainstay in the treatment of brain metastases. While, there has been an improvement in the median survival, with a significant decline in the risk of recurrence and in the risk of neurological death, a paradoxical reduction in neurocognitive functions (NCF) appears as a sequel and which cannot be neglected. This impairment starts within 1-4 months of the WBRT. The sub-granular zone of the hippocampus that contains proliferating neuronal progenitor cells is an integral component of memory formation and learning. Following WBRT, the decline in the neurocognitive functions may be due to radiation induced impairment in hippocampal neurogenesis. Mean doses of 45 Gy or higher to the left temporal lobes are associated with significant decline in the IQ. Biologically equivalent dose greater than 7.3 Gy applied to 40% of hippocampal volume may cause long-term impairment in neurocognitive functions. With improvements in imaging and its incorporation in conformal radiotherapy planning, it is now possible to selectively spare the hippocampus from radiation and improve the quality of life and NCF of patients. Neurocognitive sparing radiotherapy promises to prove as a novel mode for ensuring the efficacy of WBRT while minimizing its associated neurocognitive dysfunctions.

Biography

Swarupa Mitra has served as a Consultant, Faculty, and as Research Guide to post graduate students since 2000. She has many publications in international journals and has several research projects to her credit, including the prestigious one with the National Cancer Registry Program where she is the Principal Investigator. She has authored books and has been a Reviewer in some international journals. She is the Nominated Member of the Project Advisory Board by Department of Science and technology, Government of India.

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