

AbstractID: 4438 Title: IMRT of the Central Nervous System

Intensity modulated radiation therapy (IMRT) for the central nervous system (CNS) is being used more frequently in radiation oncology clinics. There are two general situations that the treatment of CNS disease may benefit from the use of IMRT compared to conventional, three-dimensional conformal radiation therapy: 1) when multiple critical structures confined within the intracranial vault are to be avoided, one may desire an optimal dose distribution that allows for the dose to these structures to be minimized, and 2) since high-grade gliomas tend to recur locally, IMRT should allow for dose escalation proportional to the corresponding heterogeneous cell populations. Based on the anatomic location of the treatment volumes, one can visualize examples where IMRT could be of benefit. Patients with a concave or irregularly-shaped target in a frontal lobe may require IMRT in order to spare the adjacent globe and any uninvolved optic apparatus. In patients with well-lateralized tumors involving the brain parenchyma, complete sparing of the contralateral hemisphere is desirable. Patients with infiltrative gliomas traditionally have large margins placed around the treatment volumes, and these may often encompass uninvolved critical normal structures. For such cases, IMRT may allow for non-uniform reduction of the treatment volume around these normal structures. The primary goal of this presentation is to provide a practical overview of IMRT for the CNS.

Though much attention has been given to the inverse planning and quality assurance aspects of IMRT, one should have an adequate understanding of the entire process; from proper patient selection to positioning/immobilization and continuing through treatment. A discussion of the steps of the CNS IMRT process will include: patient selection, immobilization, recommended imaging acquisitions, structure delineation, planning strategies/parameters, dose objectives, plan evaluation, QA, and potential delivery issues. Guidelines and practical examples for each component of this process will be presented.

To gain further familiarization of CNS IMRT, one should review the corresponding technological and clinical outcome literature. Comparisons to conventional radiotherapy methods will be examined in terms of technique, dosimetry and clinical outcome. Finally, current research and future directions of CNS IMRT will be introduced such as the novel use of sophisticated imaging techniques for improved structure definition, patient positioning and dose modulation.

Educational Objectives:

1. To understand the general practice of CNS IMRT from patient selection through actual treatment.
2. To become familiar with specific details pertaining to the CNS IMRT process through several illustrative examples.
3. To be introduced to some of the research and future directions of CNS IMRT.

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