AbstractID: 9425 Title: Technical feasibility of performing extracranial radiosurgery

The technical challenge for extracranial radiosurgery is how to precisely deliver high dose radiation to the target while keeping normal tissue radiations within tolerances. In this study, we systematically evaluated various techniques developed for extracranial radiosurgery including immobilization, positioning, treatment planning, target localization, delivery, and verification. Patient was immobilized using a vacuum system (BodyFix). Majority of treatment plans were done using either non-coplanar or co-planar inverse treatment plans. The Novalis Body image-guided system was used to position the patient and localize the target. The treatment was delivered using a Novalis shaped beam unit with micro MLC. We analyzed treatment accuracy for 150 radiosurgery cases with spinal, head and neck, lung, pelvic, breast, and abdominal cancers. Phantom study indicated that the localization accuracy using the automated image-guided positioning device was 1 mm. The measured average deviation between the treatment and planned isocenters for all patients was less than 2 mm based on bony structures. The intra-treatment deviation was documented by taking a few verification images during the treatment and was less than 2 mm. For lung, head&neck, and abdominal radiosurgery treatment, non-coplanar IMRT beam arrangement generally required one less beam number than coplanar arrangement, and generated superior DVHs for normal tissues and critical organs. The absolute phantom dose measurements indicated that the average deviation between the measured and the planned isocenter doses for all patients was 2%, with a maximum deviation of less than 4%. Extracranail radiosurgery is technically feasible with proper management of organ motions.

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