AbstractID: 7577 Title: Two beam segment-based intensity modulated radiation therapy for solid tumours of the brain

ABSTRACT: We present a novel segment-based intensity-modulated radiation therapy (s-IMRT) technique that utilizes a single lateral and single vertex beam for the treatment of solid brain tumours that eliminates the necessity of employing physical wedges traditionally employed for such treatments. The two beam s-IMRT method potentially allows for streamlined treatment planning and improved dose calculation accuracy while minimizing quality assurance workload compared to conventional multi-beam IMRT treatments. The beam segments for lateral beams were generated based on the isodose distributions of a 100% weighted vertex beam while the vertex beam were created from the isodose distribution of a 100% weighted lateral beam. Segment weight optimization was performed using the inverse planning tool of the Pinnacle 7.6 treatment planning software. Segment-IMRT plans were compared to "best-case" wedge-based plans to evaluate differences in dose uniformity, target coverage, and normal tissue sparing. Five patients with solid tumours of the brain were planned for radiation therapy. Overall, the s-IMRT approach resulted in similar dose distributions as the wedge-based plans. However, the overall treatment planning time was significantly reduced using s-IMRT (~ 60 min. compared to ~ 150 min.). With the addition of script-based automated segment generation and optimized inverse planning parameters it is believed that treatment planning time may be further reduced to ~ 30 min. Furthermore, it is anticipated that the elimination of physical wedges will expedite patient set-up time for treatments while improving dosimetric accuracy.