

強度調控放射治療、強度調控弧形治療及螺旋刀技術於全頭皮放射治療計畫的劑量比較

### Dosimetric Comparison of Treatment Plans between Intensity-modulated Radiotherapy, Intensity-modulated Arc therapy and Helical Tomotherapy for Total Scalp Irradiation

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**Purpose:** To compare the dosimetric advantage of helical tomotherapy (HT) over intensity-modulated arc therapy (IMAT) and sliding window intensity-modulated radiation therapy (SW-IMRT) for total scalp irradiation.

**Methods:** A patient with scalp angiosarcoma undergoing IMRT to the whole scalp was included. Three treatment plans (SW-IMRT, IMAT and HT) were generated for this patient. The doses to planning target volume (PTV) were both  $\geq 50$  Gy. Conformity indexes, doses to the brain and lens, monitor units (MU), and treatment time were compared between techniques. Plan verification using a phantom study was also performed to compare the radiation planning results.

**Results:** The coverage factors of the PTV and homogeneous index was 0.99 / 1.10 for the SW-IMRT, 0.95 / 1.14 for the IMAT, and 0.98 / 1.07 for the HT. The conformation number for the three plans was 0.74, 0.74, and 0.67, respectively. The proportion of normal brain receiving above 30 Gy / 40 Gy were 43.8% / 10.4% for the IMRT, 40.7% / 18.5% for the IMAT and 12.5% / 3.0% for the HT. Although the IMAT showed no superior dosimetric advantage over SW-IMRT, lower MUs and treatment time were needed for the IMAT. The phantom study met the similar dosimetric results.

**Conclusions:** For patients receiving total scalp irradiation, three techniques can provide comparable target coverage. The HT spares the brain better than the IMAT and SW-IMRT.

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