AbstractID: 6730 Title: MRI of Nasopharygneal Carcinoma (NPC) Patients in Radiation Treatment Position to improve the Delineation of the Tumour and Cervical Lymph Nodes

Purpose: The existing MR imaging technique for NPC patients precludes the use of any immobilization device and inclusion of adequate neck coverage due to the design of the head coil used. We established an MR imaging protocol for NPC patients performed in the radiation treatment position to facilitate the MR/CT image registration and to include adequate coverage to the lower neck. The goal is to reduce the uncertainties associated with the localization of the tumour and cervical lymph nodes.

Method and Materials: An MR compatible base-plate which accommodates the immobilization mask was fabricated. We employed two large surface coils (one anterior and one posterior) to acquire the MRI with the patient immobilized in a thermoplastic mask in the radiation treatment position. Seven NPC patients were selected and, for each patient, two series of MR images, namely T1-weighted with contrast and T2-weighted, were taken respectively. Both series included images from the vertex to the lower neck. The MR images were then registered with the planning CT images by an automatic image registration software for contouring purposes.

Results: The same orientation for the MR and CT images eliminates the necessity of reformatting the MR images to a plane as that of the CT images during the registration. This reduces the degradation of image quality no matter what algorithm of image registration is used. The inclusion of the lower neck in the MR images greatly improves the delineation of the cervical lymph nodes.

Conclusion: The present method provides MR images in a radiation treatment position with adequate lower neck coverage. The MR image quality is good enough for contouring purposes. The accurate registered MR images are particularly valuable in reducing the uncertainties associated with the localization of the tumour especially near the skull base and of the cervical lymph nodes.