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ABSTRACTS – POSTERS

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Role of intensity modulated radiotherapy in the treatment of soft tissue sarcoma arising close to dose limiting normal structures

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Background

Radical radiotherapy in conjunction with surgical excision is an integral part of the local treatment of many patients with soft tissue sarcoma (STS). In some cases the tumour develops in close proximity to normal critical organs such as the spinal cord, optic chiasm and lung. Using conventional conformal radiotherapy it can be difficult to deliver radical doses of radiotherapy without risking damage to these adjacent organs at risk (OARs). In these situations it may be necessary to compromise radiotherapy treatment either by reducing dose or compromising the margin around the tumour or tumour bed. Intensity-modulated radiotherapy (IMRT) is a sophisticated radiotherapy technique, which permits unrivalled flexibility in beam shaping and permits high doses of radiotherapy to be delivered to complex treatment volumes whilst sparing dose to adjacent critical structures. There is limited access in the U.K. to IMRT as planning is both complex and time consuming. We describe 12 cases where it was clinically judged that IMRT would confer dosimetric advantages over standard radiotherapy techniques.

Methods

Patients treated at Christie with IMRT between 2005 to 2008 were identified from the sarcoma database. A planning CT scan was performed in all cases in order to delineate target volumes and OARs. Tolerance doses to the adjacent OARs were given to the planning physicist. Patients were planned using inverse IMRT with five to seven co-planar beams using a Pinnacle planning system. Dose-volume histograms (DVH) for target volumes and OARs were analysed.

Results

Eleven patients with STS were treated post-operatively and one patient with inoperable fibromatosis of the mediastinum was treated. Nine patients were female and 3 were male. The median age was 62yrs (range: 37 to 75yrs). Tumour locations were as follows: 6 chest wall, 2 para-spinal, 2 orbits, 1 heart, and 1 mediastinum. Ten patients were treated with 60-66 Gy in 2 Gy per fraction daily. One patient who had a sarcoma of left atrium was treated with 60Gy in 1.8 Gy per fraction and one patient with fibromatosis received 45Gy in 1.8 Gy per fraction. Analysis of the DVHs confirmed the dose delivered to the planning target volume (PTV) conformed to ICRU recommendations and that the dose delivered to the OARs were within acceptable dose constraints for the relevant organs. There were no serious grade 3 or 4 toxicities encountered. Of the eleven patients, eight patients are alive and disease-free, two died of metastatic disease and two had in-field recurrences. Both had high-grade disease with positive margins after surgery.

Conclusion

IMRT delivery in these patients allowed radical doses of radiotherapy to be delivered whilst delivering safe doses to adjacent critical structures. We believe that IMRT treatments in STS should be considered when planning complex volumes adjacent to critical structures.