To verify the accuracy of monitor unit calculations of the three-dimensional radiation treatment planning system (3DRTP) used at our facility[1], comparisons were made with doses measured in an anthropomorphic head phantom[2]. Doses were measured using a micro-ionization chamber[3]. Dosimetry planning was carried out using computed tomography images of the head phantom. Doses were calculated and measured for three fields, four beam energies, and 4 wedges on one of the fields to give a total of 28 permutations.

A hand calculational procedure using tissue phantom ratios was also developed for photon beams incident on a flat water phantom. Comparisons were made between the hand and 3DRTP calculated monitor unit values.

The average 3DRTP calculated dose-per-monitor-unit value was less than 1% greater than the measured value, and the maximum difference was 4.5%. The average hand calculated dose-per-monitor unit value was less than 1% greater than the 3DRTP value, and the maximum difference was 2.4%. It was concluded that the 3DRTP accurately calculated monitor unit values for the head phantom and a hand calculation could be used as a quality assurance check of 3DRTP monitor unit values.

[1]PINNACLE[3], ADAC Laboratories, Milpitas, CA

[2]RSVP Head Phantom, The Phantom Laboratory, Salem, New York

[3]A 14 Microchamber, Exradin Instrument Co., Springfield, IL.