As the use of intensity modulated radiation therapy increases, national cancer study groups are beginning to initiate clinical trials that involve its use. It is important that the institutions in these trials administer IMRT consistently and accurately.

A Quality Assurance Office (QAO) has been funded by the NCI to assure the study groups that participants in clinical trials have adequate QA procedures and are not making dosimetry errors. For some trials, the QAO participates in credentialing of institutions.

The QAO developed a mailable anthropomorphic head and neck phantom used to evaluate the planning and delivery of IMRT. The water-filled phantom contained a polystyrene insert that incorporated solid-water imageable structures representing a primary PTV, a secondary PTV and a critical structure. The insert held four TLD and a set of orthogonal radiochromic films. The phantom was used to demonstrate that doses were delivered accurately to the intended locations.

The phantom was mailed to eleven institutions to date. Instructions stated the prescribed doses to the PTVs and the limiting critical structure dose. Film profiles were scaled to TLD measurements and compared to the institutions’ treatment plans. TLD results showed that in most cases institutions delivered doses to the primary PTV to within 5% of the intended dose. Doses in high gradient regions such as the critical structure varied from the intended dose by as much as 34% often with a displacement of over 5 mm.

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