Purpose: To measure sample planes of two 3D dose distributions that can be used to evaluate the accuracy of planning and delivery of bolus electron conformal therapy (ECT).

Method: The planning target volumes (PTV) from a parotid and a chest wall patient were modified to a CT image set of a cylindrical polystyrene phantom. A bolus ECT plan for each PTV was developed using .decimal p.d software to design a custom bolus and dose was calculated using Pinnacle. Once acceptable, .decimal fabricated the bolus from machinable wax. Approximately 45 cGy given dose was delivered for each bolus ECT plan, and planar dose measurements were taken in the mid-sagittal and five transverse phantom planes (±5cm, ±2.5cm, 0cm) using Kodak XV radiographic film sealed within the in-phantom cassettes. Films were developed and digitized to (0.5mm pixels) using a Vidar DosimetryPRO Advantage, and converted to dose using a film calibration curve created at the time of measurement. Four film measurements were taken in each plane, with the mean dose and standard error being determined at each pixel. The precision of the data was quantified in the low gradient regions (Dose > 90% and Dose <10%) by the mean percent standard error of all pixels and in the high gradient region (90% > Dose > 10%) by the mean distance to dose agreement.

Results: The percent average standard errors in the low gradient, high dose region were less than 1.5% for parotid and chest wall measurements and less than 3% in the low gradient, low dose regions. Average distances to agreement in the high gradient region were less than 0.6 mm.

Conclusions: For two PTVs bolus, ECT dose distributions in 6 planes were measured and their precision quantified for three dose regions. These data are well-suited for comparison with calculated electron dose distributions.

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