INVESTIGATION OF DOSE ACCURACY OF RADIATION IN THE TREATMENT OF BREAST CARCINOMA USING GLANCING FIELDS

A PROJECT REPORT PRESENTED

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ABSTRACT

When treating to breast and chest wall with gamma radiation in external beam therapy, the treatment volume gets an irregular shape. The points just inside the contour receive lesser doses than the calculated, due to absence of scattering material on one side. This treatment volume illustrates that the calculation of accurate dose, when the scatter conditions are very different from those in the water phantom, is difficult. Irradiation of the whole breast and chest wall is carried out using opposed beams with a shallow angle to each other.

For complicated situations such as chest wall, some experimental checks are very desirable. This can be done most conveniently using number of TLD chips placed at points of interest in an anatomical phantom. The phantom was made using paraffin wax, which is tissue equivalent. The TLD chips were irradiated inside the phantom in different planes at different points.

Two situations were considered for irradiation.

1. Phantom was placed on the treatment couch similarly as the patient lies on supine position for treatments.
2. Phantom was tilted until the sternum angle become lateral (Then collimator rotation is not required).

The TLD irradiated points of the phantom were calculated according to the treatment planning technique. By comparing measured and calculated dose for all points, up to 12% dose variation can be seen. The major reason to reduce the absorbed doses is the scatter

contribution due to lack of tissue. When phantom was tilted absorbed doses were increased by up to 5% mainly in plane 1and plane 4 for both cases but few points can be seen where doses are decreased. Some factors depend on the absorbed dose variation such as TLD accuracy and phantom flexibility.