AbstractID: 5155 Title: Dosimetric Evaluation of Parallel Opposed GRID Radiation Therapy for Deep-Seated Bulky Tumors

Purpose: Grid radiation therapy, using single field of megavoltage x-ray beam has been proven to be an effective method for management of bulky (>8 cm in diameter) malignant tumors. However, the effectiveness of this treatment modality for deep seated tumor is limited by the dose to the overlying normal tissue. In this investigation the use of parallel opposed beam is being evaluated for treatment of deep seated bulky tumors, using two different grid patterns.

Method and Materials: Dosimetric characteristics of single field and parallel opposed radiation field were experimentally determined with film in Solid Water phantom material and using ion chamber in water. These measurements were performed with 6 and 18 MV x-ray beams from a Varian Clinac 2100EX linear accelerator. Two different Grid block patterns, fabricated by Radiation Products Design, Inc. were utilized in these investigations. The GRID blocks molded into a cerrobend block of 7.5 cm thickness were manufactured with hole diameters of 5.9 mm and 8.5 mm.

Results: Dose profiles and percentage depth doses of two GRID blocks for the parallel opposed beam were compared with a single radiation field. The results of these investigations indicated that with a 5.9 mm GRID block, dose to the overlaying normal tissue at d_{max} reduced from 200% for a single field to 100%, for the same tumor dose, with equally weighted parallel opposed fields. Similarly, for the 8.5 mm GRID block, dose to normal tissue at dmax were reduced from 185% to 100%.

Conclusion: Parallel opposed GRID therapy resulted in a substantial decrease in dose delivered to the normal tissues for the same prescribed tumor dose. Thus, parallel opposed GRID radiotherapy is a viable option for treatment of deep-seated bulky tumor. With this technique, the tumor dose can be increased for a higher therapeutic result.