

**AbstractID: 7051 Title: Treatment planning comparison on normal tissue complication probability and tumor control probability in the preoperative pelvic irradiation for rectal cancer**

**Purpose:** The surgical operation to remove the tumor is the premier treatment method for rectal cancer, and the radiation therapy is an auxiliary but important way. The radiation treatments for rectal cancer include preoperative irradiation and postoperative irradiation. The purpose of this study is to compare different treatment planning techniques for preoperative pelvic irradiation of rectal cancer. The comparisons include three-field vs four-field (box) techniques and the treatment planning with full bladder vs post voiding bladder.

**Method and Materials:** The different planning techniques for the same patient were compared via score function of TCP (Tumor Control Probability) and NTCP (Normal Tissue Complication Probability). The organs contoured include femoral head, intestine, and urinary bladder walls with full bladder and with post voiding bladder for the same PTV. All patients were treated with preoperative irradiation at VGH-Taippei. These patients include 6 male and 3 female with a mean age of 51.67 (28-76). The clinical stages for all patients are stage II and III rectal cancer (AJCC T<sub>2-4</sub>N<sub>0-2</sub>M<sub>0</sub>). The total dose was 4500 cGy with a fraction size of 225 cGy. ANOVA (F-test) was performed for the results analysis

**Results:** The results from score function show the treatment with 3-field is better than that with 4-field. It also shows the treatment with full bladder is better than that with post voiding bladder.

**Conclusion:** In the F test, the P value of field factor (3-field vs 4-field) is 0.00024. It means the field factor is a significant factor. The P value of the bladder-status factor (full or empty bladder) is 0.59 (<0.95). It means the bladder-status factor isn't significant. Therefore, we conclude the treatment field is a treatment planning factor, but not bladder-status. However, we need more patients to make a much solid conclusion for the bladder-status factor.