

## AbstractID: 13392 Title: Pros and Cons of Flattening Filter Free IMRT: A Comparison with Conventional IMRT with Flattened Beams

**Purpose:** A new Varian machine, Trilogy MX with Flattening Filter Free (FFF) delivery mode at 6 MV and 10 MV, was installed at our institution. This study evaluates the performance of IMRT treatment planning with FFF delivery mode.

**Method and Materials:** The FFF delivery mode of our Trilogy MX is calibrated to deliver 1cGy/MU at the center of the 10x10cm<sup>2</sup> field. A number of patients who were treated previously using conventional IMRT with flattened beams were re-planned on the new machine with the new FFF beams. Both types of plans were done using Eclipse planning system. Step-and-shoot mode with 10 intensity levels was used for dose delivery. The isodose distribution, dose volume histogram (DVH), total MUs and total number of segments of the two IMRT plans for each patient were compared.

**Results:** IMRT treatment plans with FFF were found to be similar compared with conventional delivery for all the three tumor sites. For head and neck cases, slight degradations in dose coverage to tumors were observed, but they may not be clinically significant. For lung and prostate cases, plans with and without flattening filter are almost identical. However, total MUs are much larger for FFF delivery for all the cases due to the non-flatness of the dose profile. MUs for FFF mode are 10-16% higher for lung and prostate cases, and more than 25% higher for head and neck cases. As much as 10% increase in number of segments was observed in head and neck cases.

**Conclusion:** The quality of IMRT treatment plans with FFF delivery is comparable to that of the conventional delivery mode, but treatments of large-sized and complicate-shaped tumors require more MUs. Treatments of small-sized tumors benefit more from the use of FFF delivery.

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