

AbstractID: 10426 Title: Variation of beam characteristics for Physical and Enhanced dynamic wedge from a dual energy accelerator

Purpose:

The aim of this study was to compare few of the dosimetric characteristics of a physical and enhanced dynamic wedge from a dual energy (6 and 18 MV) linear accelerator.

Materials and Methods:

This study used the Varian Clinac-DHX (S.No.3172) linear accelerator which is equipped with three different type of wedges. To compare the change in beam quality with physical and enhanced dynamic wedge half value layer (HVL) was measured using a 0.14 cc ion chamber covered with brass build up cap positioned at 2 meter distance from the source and the distance from the target to absorber distance was maintained as 1 meter. Transmission measurements were made for varying thickness of white polystyrene phantom placed on the couch. The surface dose with physical and enhanced dynamic wedges were measured using a parallel plate chamber at 85 and 100 cm source to surface distance (SSD), for 6 and 18 MV photons.

Results:

The HVL was estimated for 6 and 18 MV photons along the central axis and at off-axis points for the field size of 20 x 20 cm² with 45° upper physical wedge and compared with that of the enhanced dynamic wedge (EDW). For physical wedged field, at heel edge side HVL value was high compared with the measured that of EDW. It was noticed that, the HVL variation across the beam was significantly high for 6 MV X-rays than for 18 MV X-rays. The measured surface dose was found to be more at 85 cm FSD for all the fields. The lower energy photons (6 MV) were found to result in higher surface dose than the higher energy photons (18 MV).

Conclusion:

The three wedge systems produce significantly different surface doses that should be considered in properly choosing a wedge system for clinical use.