

Evaluation of Wedge Angles in Half-blocked Fields

Half-blocked fields produced by linear accelerators are characterized with isodose curves that are tilted toward the blocked edge of the field. The degree of tilt is noticeable although not large (according to our measurements, about 7° to 9° , depending on the beam energy). It was reported in the literature that the effect of asymmetric beam configuration on the wedge angle was minimal. Our measurements, however, only partially supported the aforementioned statement. When a wedge was inserted with the heel toward the blocked area, the isodose tilt was about 5° greater than the nominal wedge angle (for a 30° wedge, 18 MV beam, at 10 cm depth the tilt was 35°). When the wedge orientation was reversed, a significant reduction of the isodose tilt was observed (for example, for the 30° wedge, 18 MV beam, the degree of isodose tilt became 17°). A similar behavior was observed for enhanced dynamic wedges. On the other hand, no significant change of the wedge angle was found for a Cobalt-60 beam. Therefore, the observed phenomenon may be attributed to variation of the linear accelerator beam energy with the distance from the central axis. Detailed analysis of the experimental data and evaluation of the clinical significance of the observed phenomenon will be given during presentation of this study.