

Purpose:The Wellhofer® MatriXX is a two-dimensional ion chamber array designed for IMRT dose verifications. Its dosimetric properties have been characterized for megavoltage beams in a number of studies; however, dose verifications for the MatriXX are discrete estimations for the number of ion chambers of the MatriXX. Therefore, there is still a lack of an investigation into its performance in dose verifications for IMRT. In this work, to compare traditional IMRT dose verifications using film dosimetry, we have carried out a systematic study using Mutual Information (MI) on this issue.

Methods:Dose distributions from several 6X and 10X IMRT treatment plans for pelvis and head and neck radiotherapy patients were measured using radiographic film, the MatriXX array. In each case the dose distributions predicted by the treatment planning system was compared to the measured dose distribution using Mutual Information(MI). The standard information of MI is dose distributions from treatment plans. MI of dose distributions from treatment plans is normalized itself.

Results:The MI comparison with dose distributions from film for plans of pelvis and head and neck were , on the average, within 2%, 3%, respectively. The one of reasons can be given for this lack of high dose information. but, their dose information are almost same. At the same time, the MI comparison with dose distributions from the MatriXX for plans of pelvis and head and neck were, on the average, within 5%, 6%, respectively. The MI was large than MI of film. The reason is that the MatriXX is low the number of dose verification points. There difference is small, therefore, the MatriXX has ability for enough dose verification.

Conclusions:Nevertheless, the MatriXX are discrete estimations, this work indicates the MatriXX has ability for IMRT dose verification.