AbstractID: 9668 Title: Radiation Treatment Machine Mechanical Quality Assurance Check with Megavoltage Portal Imaging Device

Radiation Treatment Machine Mechanical Quality Assurance Check with Megavoltage Portal Imaging Device

Purpose: Treatment machine mechanical check is an important procedure in quality assurance (QA). Linac machines are commonly equipped with electronic portal imaging device (EPID). EPID can be used to perform mechanical QA more accurately and easily. We developed a method to use EPID to measure gantry, collimator and table isocenter runout.

Material and Methods: Measurements were performed on an Elekta's ASSEX machine that equips with an *a*-Si EPID and kilo-voltage cone beam CT. A ball-bearing phantom was position in the radiation isocenter following KV-MV isocenter calibration procedure. Portal images were taken at various gantry, collimator and table angles. Matlab algorithms were developed to analyze the gantry, collimator and table isocenter positions.

Results: Gantry, collimator and table isocenter positions were measured quantitatively with accuracy better than 0.1mm. Results clearly show the discrepancies of the three isocenters.

Conclusion: EPID is a useful tool in LINAC mechanic QA. EPID isocenter measurements are more accurate and convenient than traditional approaches.