

عنوان مقاله:

Evaluation of the Portal Imaging System Performance for an Elekta Precise Linac in Radiotherapy

محل انتشار:

مجله فیزیک پزشکی ایران, دوره 15, شماره 4 (سال: 1397)

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خلاصه مقاله:

Introduction: Electronic portal imaging devices (EPIDs) provide two- and three-dimensional planar and volumetric cone beam images to improve the accuracy of radiation treatment delivery. Periodic quality assurance (QA) of EPIDs is essential for dosimetric verification in radiotherapy. In this study, a QA program was implemented to evaluate the function of the EPID to be confident in applying corrections for the uncertainty of patient set-up. Material and Methods: Firstly, the safety features were verified, and the uniformity of EPID response was evaluated using flat panel detector. Additionally, the contrast and spatial resolutions of the EPID were assessed using detail counting of the Los Vegas phantom images by visualization method and measuring the modulation transfer function using edge technique, respectively. Moreover, a combination of smoothing methods was used for optimal use of edge detection algorithm for the noisy portal images. Finally, the location of the central ray on the EPID surface at different gantry angles was determined to evaluate the mechanical stability of the supporting arm. Results: The safety interlocks were found to be functional. The EPID response variation was less than 3% according to the results obtained from the detector. The contrast resolution met the recommended tolerance; however, the visualization method was widely observer-dependent. The value of $f50$ for spatial resolution was 0.401 ± 0.005 lp/mm for the photon energy of 6 MV. The supporting arm deviation was within ± 1 mm. Conclusion: The periodic QA of image guidance system gave confidence to apply the corrections for set-up in clinic.

کلمات کلیدی:

Quality Assurance, Radiotherapy, Imaging

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