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Characterization of a portal imager Amorphous Silicon Portal Vision aS 1000 for in vivo dosimetry for IMRT

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Background of the study: The complex and individualized photon fluence patterns constructed during intensity modulated radiation therapy (IMRT) treatment planning must be verified before they are delivered to the patient. The aim of this work is to implement the Amorphous silicon (aSi) Electronic Portal Imaging Devices (EPIDs) in the process of IMRT treatment plans verification. The aim of this work is to evaluate the influence of irradiation parameters on the response of portal imager amorphous silicon, the PortalVision aS 1000, on a Varian iX21 linac used for IMRT treatment at Radiotherapy Department of Chahids Mahmoudi hospital (Tizi Ouzou, Algeria).

Methodology: The image on the EPID results from the combination of the primary and scattered radiation. This later varies with various parameters inherent to the treatment. The materials downstream of the imaging plate are not of a homogeneous composition and geometry. The result is local variations in the backscattered signal as a function of various parameters. The study consists to compare the gray level of portal imaging G to the portal dose D_p (measured using ionization chamber) by calculating the ratio G / D_p for each physical parameters (in the range of UM used in clinical on central axis) and to study its behaviour.

Results: Parameters taken into account in this study are: variation of field size, source detector distance, the energy and the backscatter photons on the walls and floor. The results show that the relationship between the gray level G of the image acquired by the portal imager (PortalVision aS 1000) and the measured dose portal is stable for all parameters.

Conclusion: The extensive tests performed in this investigation show that the electronic portal imaging device is a reliable detector and could be a useful tool for the quality assurance and the verification of radiotherapy plans (in vivo dose and patient position) for IMRT treatments.

Country

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