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One-Stop Daily Beam Verification with Electronic Portal Imaging Device

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Dosimetric properties of an amorphous silicon electronic portal imaging device (EPID) for the computer-based routine quality assurance (QA) of the linear accelerator (linac) were developed in this study. The template phantom consists of a 25×25 cm² size and 2 mm thick acrylic slab with right angled lead wires. The lead wires were inset in acrylic template phantom with exact 2 cm-off from the cross hair of the phantom. The difference between the center of radiation field and light field would be the light/radiation field congruence. It enables the software to determine the edge of the radiation field and the center of the field light field easily at various SSDs and field sizes. The light-radiation field congruence was determined by measuring the distance between the edges of the radiation field and that of the light field determined by above method. It was designed that each light fields could be aligned with the scale on top of the phantom. The software to verify the images from the EPID was developed in this study using the IDL (version 6.0, Research Systems, USA). After the irradiation, the images from the EPID were transferred to the local computer as a DICOM format. The software designed to analyze the field size, the field symmetry, and the constancy of beam energy at one time. To assure the QA system, the ion-chamber and the films (X-Omat V2, Kodak, USA) were used. The symmetry, the energy and the field size of the beam from the linac could be verified at once. The verification performed everyday. The discrepancy between the measurements of the EPID agrees well with the measurements of the film. It was found that this QA tool using the EPID could be substituted the film test which is time-consuming for the daily routine QA.