

Film Dosimetry - An Asset for Collaboration Between Cancer Radiotherapy Centers at Established Institutions and Those Located in Low- and Middle-Income Countries

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Abstract : Purpose: Film's unique qualities, such as tissue equivalence, high spatial resolution, near energy independence and comparatively less expensive dosimeter, ought to make it the preferred and widely used in radiotherapy centers in low and middle income countries (LMICs). This, however, is not always the case, as other factors that are often maybe taken for granted in advanced radiotherapy centers remain a challenge in LMICs. We explored the unique qualities of film dosimetry that can make it possible for one Institution to benefit from another's protocols via collaboration. Methods: For simplicity, two Institutions were considered in this work. We used a single batch of films (EBT-XD) and established a calibration protocol, including scan protocols and calibration curves, using the radiotherapy delivery system at Institution A. We then proceeded and performed patient-specific QA for patients treated on system A (PSQA-A-A). Films from the same batch were then sent to a remote center for PSQA on radiotherapy delivery system B. Irradiations were done at Institution B and then returned to Institution A for processing and analysis (PSQA-B-A). The following points were taken into consideration throughout the process (a) A reference film was irradiated to a known dose on the same system irradiating the PSQA film. (b) For calibration, we utilized the one-scan protocol and maintained the same scan orientation of the calibration, PSQA and reference films. Results: Gamma index analysis using a dose threshold of 10% and 3%/2mm criteria showed a gamma passing rate of 99.8% and 100% for the PSQA-A-A and PSQA-B-A, respectively. Conclusion: This work demonstrates that one could use established film dosimetry protocols in one Institution, e.g., an advanced radiotherapy center and apply similar accuracies to irradiations performed at another institution, e.g., a center located in LMIC, which thus encourages collaboration between the two for worldwide patient benefits.

Keywords : collaboration, film dosimetry, LMIC, radiotherapy, calibration

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