kV XVI CONE BEAM-CT DOSE MEASUREMENT USING GAFCHROMIC XRQA2 FILM

Innovation/Impact : Different imaging protocols use different energies and different filters. In this study, the effects of F_0 and F_1 (Bowtie) filters on the dose response of the Gafchromic XRQA2 film is studied. Image guided radiotherapy (IGRT) can be performed using Cone Beam Computed Tomography (CBCT) to provide a three dimensional (3D) volumetric knowledge about the patient's anatomy for each fraction. The use of CBCT on a daily basis leads to additional doses of the order of gray to normal tissues.

Effect of F0 and F1 filters on the dose response of Gafchromic XRQA2 film: Gafchromic XRQA2 film pieces were irradiated in air using the X-ray Volume Imager (XVI) mounted on the Elekta Synergy linear accelerator. The dose response of the film was studied for three irradiation setting (100 kVp S20/F0; 120 kVp S20/F0 and 120 kVp S20/F1).



Figure 1

kV XVI cone beam-CT surface dose measurements: The Gafchromic XRQA2 film was used to measure the surface dose received during seven imaging protocols. The film pieces were tapped on the surface of a male Alderson Rando at four different places (ANT., POST., RLAT and LLAT.) in the irradiated area.

Table 1. CBCT Surface dose (cGy) measured using Gafchromic XRQA 2 film.

Protocol	Anterior	Posterior	Right Lateral	Left Lateral	Average Surface dose
Head and Neck S20	0.143	0.087	0.087	0.185	0.121
Fast Head and Neck	0.066	0.019	0.025	0.101	0.053
Chest M20	3.392	3.063	3.006	2.788	3.06
Left Chest Half	0.251	0.869	0.339	0.650	0.527
Pelvis M20	3.695	3.150	2.582	2.506	2.983
Prostate Seed S10	1.006	0.442	0.1 16	0.960	0.629
Symmetry (Lung) 4D	4.999	0.639	2.127	3.198	2.741