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The Scattered-Radiation Doses at Different Positions and Eye Levels in the Interventional Angiography Room

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ABSTRACT

It is important to know the distribution of harmful scattered-radiation doses that reach the eyes of interventional angiography staff. This is because those radiations are capable of causing radiation-induced cataract. Thus, a preliminary study was conducted to compare the scattered-doses in the angiography room at different positions and eye levels. An upper body phantom (Kyoto Kagaku PBU-31) that simulates a patient was exposed to radiation exposures from an angiographic system (Artis Q; Siemens Medical Solutions Inc., Erlangen, Germany). The technical factors for percutaneous transhepatic biliary drainage procedure in a posteroanterior (PA) projection were used for the exposure. Four durations of Digital Subtraction Angiography (DSA) acquisition were studied; 4s, 8s, 10s and 16s. The scattered doses at different positions and eye levels were measured using the nanodot optically stimulated luminescence (OSL) dosimeters (Landauer, Inc., Glenwood, USA). For each duration, a total of 27 nanodots were placed on nine paper tubes to simulate nine different positions of staff in the angiography room. On each paper tube, three nanodots were used to study the scattered doses at the eye levels of 135cm, 150cm and 165cm. The preliminary findings are similar for all four acquisition durations. Positions which are nearer to the phantom received higher dose except for the 165cm eye level. At this level, the flat panel detector acts as scattered-radiation absorber. Meanwhile, comparing the doses at different eye levels, 135cm eye level received higher dose as compared to others especially when nearer to the phantom. However, at farther positions, doses of three eye levels are quite similar. In conclusion, there is a pattern of increase or decrease in scattered-radiation doses with different positions and eye levels. The findings are useful for the angiography staff of different eye levels to know which position is safer for them during the procedure.

Keywords: Scattered-radiation; eye level dose; interventional angiography

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