

Assessing Occupational Radiation Exposure in Interventional Cardiology: A Study on Effective Dose Estimation

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Abstract

Safeguarding of safety and well-being of interventional cardiology healthcare workers, monitoring their occupational radiation exposure is crucial. This study evaluates the radiation dose of interventional cardiologists using the Swiss Ordinance for personal dosimetry approach. Its primary aim is to estimate the radiation dose for each operator engaged in interventional cardiology procedures to protect from dangerous levels of radiation. Notably, no previous studies in Sri Lanka have specifically assessed radiation dose in this context, making this research vital in shedding light on radiation exposure in an interventional cardiology environment. Two cardiologists conducted a total of 108 interventional cardiology procedures, including coronary angiograms and percutaneous coronary interventions for three months at the Cardiac Catheterization Laboratory of Sri Jayawardenepura General Hospital, Sri Lanka. Active dosimeters were utilized to measure dose values using a two-dosimeter approach where one dosimeter was positioned above the thyroid collar and the other beneath the lead apron on the left side of the waist. The Swiss Ordinance algorithm calculated the effective dose for each cardiologist, resulting in 3.0397 $\mu\text{Sv}/\text{year}$ and 0.9697 $\mu\text{Sv}/\text{year}$, respectively showing that the estimated annual occupational doses remained well below the annual dose limit (20 mSv/year). The accuracy of the algorithm in interventional ionizing radiation scenarios was also highlighted. In conclusion, implementing the Swiss Ordinance for personal dosimetry in interventional cardiology enhances our understanding of radiation dosimetry and underscores the importance of accurate dose estimation to protect cardiologists. This study contributes to advancing radiation safety practices in the interventional cardiology field.

Keywords: *Effective dose, Double dosimetric algorithm, Interventional cardiology, Occupational exposure, Radiation protection, Swiss ordinance for personal dosimetry*