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# ASSESSMENT OF THE DOSE OF RADIATION TO THE EYE OF A CARDIOLOGIST AND A RADIOGRAPHER FROM INTERVENTIONAL CARDIAC PROCEDURES PERFORMED IN A SELECTED HOSPITAL

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Lens opacity is considered to be a potential consequence of exposure of the eye to ionizing radiation. The International Commission on Radiological Protection, in 2011, revised the occupational dose limit of radiation to the eye from 150 to 20 mSv $y^{-1}$. Interventional cardiologists (ICs) are the primary operators during cardiac procedures and among medical professionals, most exposed to radiation.

This study presents an assessment of the cumulative dose of radiation to the eye of an IC with experience of more than 15 y and to the assisting radiographer in a selected hospital. Information on the workload in the catheterization laboratory (Cath lab), type of procedure, fluoroscopic time and radiation protection equipment were considered. Eye dose was measured for a period of 03 months using Harshaw thermoluminescent dosimeters (TLD 100).This was positioned just above the left eye in contact with the skin of the IC and the radiographer, using a headband during procedures. Element correction factor, energy correction factor and background correction were performed for the TLDs. Dose equivalent, Hp(10) at 10 mm depth measured in Sievert (Sv) was obtained from the TLD readings . The procedures were performed on a GE Innova $2100^{IQ}$ with use of ceiling suspended lead shielding. Hundred and twenty four procedures consisting of 70 coronary angiograms (CA), 16 percutaneous coronary interventions (PCI) and 38 CA with PCI were studied.

During the 03 month period an equivalent dose of 2.87 mSv was recorded in relation to the IC and 0.25 mSv in relation to the radiographer. Using hospital statistics on the number of procedures for the period 2010–2012, the calculated average annual equivalent dose to the eye was 23.53 and 3.87 mSv for the IC and radiographer, respectively.

TLD measurements in this study were for Hp (10) and not Hp (3) which would be the dose to the lens of the eye thereby underestimating the eye dose. This study revealed that the IC exceeded the occupational dose limit of 20 mSv/y from procedures performed at the studied hospital alone. However the dose to the radiographer (~ 4 mSv/y) was within the recommended value. The annual equivalent dose may be higher if the IC performs similar procedures in other hospitals.

The radiation dose to the eye could be reduced by a factor of ten if lead glass spectacles with side shields are used. However they were not worn by the Cath lab staff due to its weight and discomfort. It is encouraging that following this study the IC, who participated in the study, began to wear lead spectacles. This study needs to be extended to include more ICs with varying experience and different Cath lab conditions to determine radiation protection measures needed to reduce the radiation dose to the eye.