

## **DOSE AREA PRODUCT TO ESTIMATE RADIATION DOSE TO THE EYE OF A RADIOLOGIST**

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Occupational radiation doses in interventional procedures guided by fluoroscopy are highest among medical staff, especially interventional cardiologists (IC). If protection tools and good operation measures are not used and if several complex procedures are undertaken per day radiation lesions of the eyes may result after several years of work. Radiation dose to the eye need to be monitored to ensure that the dose does not approach the level where lens opacities might occur.

This study presents an estimate of the dose of radiation to the eye of an IC in a selected hospital using dose area product (DAP) values. Information on workload, type of procedure, fluoroscopic time and radiation protection equipment were considered. Procedures were performed on a GE Innova2100<sup>iQ</sup>.124 procedures consisting of 70 coronary angiograms (CA), 16 percutaneous coronary interventions (PCI) and 38 CA with PCI was studied during 03 months. Ceiling suspended Pb screens were used but protective eye goggles were not worn.

Using the International Atomic Energy Agency Radiation and cataract staff protection statement, 1 Gy·cm<sup>2</sup>DAP reading to the patient results in an average of 1 μSv to the unprotected eyes of the primary operator. When protective ceiling suspended screens are used average eye dose per procedure was estimated as 0.018, 0.048 and 0.056 mSv for CA, PCI and CA+PCI, respectively. Average time for the said procedures was 2.04, 8.59 and 10.31 min., respectively. Based on hospital statistics around 1000 procedures were performed annually by the studied cardiologist and the annual dose to the eye was estimated to be 34.43 mSv, which was much higher than the recommended 20 mSv by the International Commission on Radiological Protection.

Our results were comparable with a study carried out by the European Radiation Dosimetry Group where 0.025 and 0.04mSv per procedure was recorded for CA and PCI, respectively. This indicates the studied operator's skill and the use of an effective ceiling suspended shield. If lead lined glasses are worn the dose could be greatly reduced. DAP measurements also gives an indication on the number of procedures the operator should undertake in a given year. Ideally eye dose should be measured by wearing a Thermo Luminescent Dosimeter (TLD) above the eye. The operational quantity H<sub>p</sub> (3) is the most appropriate to monitor the eye lens dose. However, this is not commonly in use and such dosimeters are rarely available. As such the DAP readings can be used to obtain a reasonable estimate of the radiation dose to the eye.