

DETERMINATION AND APPLICATION OF HOSPITAL SPECIFIC DOSE CONVERSION COEFFICIENTS FOR EFFECTIVE DOSE IN INTERVENTIONAL RADIOLOGY

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The effective dose (E) represents the risk of late radiation-induced effects as malignancies in interventional procedures and is based on specific organ doses. Up to now this quantity is estimated by the use of conversion coefficients, converting easily measurable quantities such as Dose-Area-Product (DAP) into E. As different conversion factors were already published, ranging from 0.18 to 0.27 mSv/Gycm² for percutaneous transluminal coronary angioplasty (PTCA), the need to calculate specific conversion coefficients per hospital, following the local procedure was emphasized in previous studies.

In present large scale multicenter study performed in 8 Belgian interventional cardiology departments, Effective Dose (E) was calculated for 318 patients based on detailed dose-area product (DAP)-registration during the complete procedure and using conversion coefficients generated by the Monte Carlo based computer program PCXMC. By taking into account the clinical protocols for the different hospitals and the specific additional filtration in the X-ray equipment, hospital-specific dose conversion coefficients were derived. Average values of 9.6 mSv and 15.3 mSv for diagnostic and therapeutic procedures respectively were measured. On the other hand, calculation of E using the factors published in NRPB yielded values on the average 12 % lower.

X-ray equipment with variable filtration resulted in lower E values (9.4 mSv versus 15.4 mSv, $p < 0.001$). Also the difficulty level of the procedure has a significant influence on the E values (4.9 mSv for level 1 versus 13.5 mSv for procedures of level 2 and 3). Flat detector technology lowered the E, but not significantly ($p = 0.068$). The contribution of fluoroscopy to E was 38.8% for diagnostic and 56.4% for therapeutic procedures. Taking into account the age dependence of the risk of radiation induced malignancies, the average risk for late effects for respectively a diagnostic or a therapeutic intervention amounts to $1.1 \cdot 10^{-4}$ and $2.1 \cdot 10^{-4}$ for both genders.

These data support the need for calculation of hospital specific conversion coefficients.

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