PATIENT SKIN DOSES IN INTERVENTIONAL RADIOLOGY AND CARDIOLOGY PRACTICE IN 6 COUNTRIES PARTICIPATING IN AN IAEA COORDINATED RESEARCH PROJECT

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The purpose of this study was to evaluate maximum entrance air kerma in a sample of fluoroscopically guided interventional procedures in 6 centres in 6 countries (Japan, India, Italy, Malaysia, Thailand andTurkey) participating in an IAEA coordinated research programme.

Patient entrance skin air kerma were measured for 663 interventional, 409 cardiac (CA, PTCA, CA+PTCA, RF ablation), 55 neuroradiological (embolisation) and 199 hepatic procedures (embolisation, biliary drainage, ECRP). Fluoroscopy time, KAP and maximum entrance air kerma (MSK) were measured for each procedure according to a common agreed methodology. For complex procedures MSK was evaluated using radiochromic film and in one centre skin dose monitors were additionally used.

In 61 procedures (9.4% of all procedures) the MSK was greater than 2 Gy, 15 with more than 4 Gy. The maximum MSK was 6.6 Gy; Of the 61 cases, 38 were PTCA, 6 RF ablation, 1 neuro-embolisation and 6 hepatic. Thirty-nine occurred at two hospitals, with a mean high-dose incidence of 19% and 12%, respectively, substantially higher that the overall incidence of 7.4%.

The skin dose monitor was shown to underestimate MSK.

This multinational study has identified a number of interventional procedures resulting in patient skin doses exceeding 2 Gy. Most high dose procedures were concentrated in 2 hospitals and were associated with: (i) the use of old equipment not designed for modern dose-efficient applications, (ii) long fluoroscopy durations and a large number of cine frames for cardiac procedures,(iv) lack of use of transparent filters, and, (v) over imposition of several beams on the same skin area.

The study has demonstrated a number of interventional procedures resulting in skin doses exceeding 2 Gy. It has demonstrated the benefits of large area dosimeters over skin dose monitors.

The study highlights the importance of periodic dosimetric evaluation.

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