

**Interventional cardiology irradiation: clinical and dosimetric aspects of treated population**

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**Context:** Minimally invasive interventional cardiology procedures (ICP) have been widely used over the last 10 years, but can involve potentially high radiation doses to the patients. Although deterministic effects of ionising radiation are likely to occur in that field, stochastic effects, in particular radiation-induced cancers, have never been investigated in a population of adult patients. As a first step toward such investigation, a study was conducted with the view of characterizing clinical features and analysing variation factors of dosimetric data, based on a population undergoing ICP.

**Material and methods:** A total of 1,591 patients who underwent 1 to 5 ICP, either coronarography and/or angioplasty, during the year 2005, at the Saint-Gatien Clinic in Tours (France), were included. Individual clinical characteristics were registered, dose-area product (DAP) values were recorded and patients' organ doses to lung, oesophagus, bone marrow and breast were assessed by a mathematical modelling. A logistic regression to test associations between high doses and clinical and technical factors was used.

**Results:** Mean age of patients was 68 years. More than 60% of them had hypertension, 60% hypercholesterolemia and 25% diabetes. One patient out of three was smoker or ex-smoker, with higher percentage of patients aged less than 60 years. As for dosimetry, patient mean cumulative DAP value was 78.9 Gy.cm<sup>2</sup> and the mean effective dose was 15.8 mSv. The corresponding estimated mean organ doses were: 62.3 mGy for lung, 54.9 mGy for oesophagus, 17.0 mGy for bone marrow and 5.6 mGy for breast. Based on univariate analysis, high DAP values (> 200 Gy.cm<sup>2</sup>) were significantly associated with gender, high body mass index, diabetes, hypertension, previous heart bypass, previous myocardial infarction, number of ICP, type of ICP (coronarography and/or angioplasty) and operator. In multivariate analysis, some of these factors remained significant: body mass index (OR=1.16, 95%CI=[1.10-1.21]), previous heart bypass (OR=3.13 [2.14-6.32]) and increased number of ICP (OR=3.82 [1.82-4.20]). Odds ratios were even higher when comparing coronary angioplasties to coronarographies (OR=20.72 [7.77-55.27]). Operator effect was also observed with an increased risk for one operator among the three others (OR=1.91 [1.15-3.18]).

**Conclusion:** Radiation doses received by patients undergoing ICP can widely vary according to clinical characteristics but also technical characteristics of procedures.

In order to plan epidemiological studies on the harmful stochastic effect of ionising radiation induced by ICP, such factors, which may be associated with higher DAP values, should be taken into account when designing epidemiological studies on highly irradiated patients.