

Paediatric interventional cardiology and radiation-induced cancer risk: the Coccinelle study.

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Introduction. Children with congenital heart disease frequently undergo interventional cardiology (IC) procedures for diagnostic or therapeutic purposes. Despite the clear clinical benefit to the patient, the complexity of these procedures may result in high cumulative radiation exposure. Given children's greater sensitivity to radiation and the longer life span during which radiation health effects can develop, an epidemiological cohort study, named Coccinelle (Cohorte sur le risque de cancer après cardiologie interventionnelle pédiatrique), is carried out in France to evaluate the risks of leukaemia and solid cancers in this population. A total number of 8000 included children is expected.

Methods. All children who have undergone at least one IC procedure since 2000 and were under 10 years old and permanent residents of France at the time of the procedure will be included.

Electronically stored patient records from the departments of paediatric cardiology of the French national network for complex congenital heart diseases (M3C) are being searched to identify the children to be included. The cohort will be followed up through linkage with French paediatric cancer registries. Radiation exposure will be estimated retrospectively for each child included in the cohort.

Results. Up to now, 4500 children have been already included in the cohort but recruitment is still ongoing. On average, each child has undergone 1.3 IC procedures, for a total of over 5,000 procedures. Nearly half of these were performed during the first year of life. Dosimetric data were analysed for 801 IC procedures performed between 2010 and 2011. Preliminary results showed that, for diagnostic procedures, effective dose varied from 0.3 mSv to 23 mSv with a mean value of 4.8 mSv. For therapeutic procedures, effective dose varied from 0.1 mSv to 48.4 mSv with a mean value of 7.3 mSv.

Conclusions. These preliminary results revealed that therapeutic IC procedures can lead to important exposure levels. This reinforces the need to conduct epidemiologic studies such as the Coccinelle study.