

Exposure to Ionizing Radiation Resulting from the Chernobyl Fallout and Childhood Cardiac Arrhythmia: A Population Based Study

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Abstract : In 2005, the Institut de Radioprotection et de Sûreté Nucléaire (IRSN, France) launched a research program named EPICE (acronym for 'Evaluation of Pathologies potentially Induced by Caesium') to collect scientific information on non-cancer effects possibly induced by chronic exposures to low doses of ionizing radiation with the view of addressing a question raised by several French NGOs related to health consequences of the Chernobyl nuclear accident in children. The implementation of the program was preceded by a pilot phase to ensure that the project would be feasible and determine the conditions for implementing an epidemiological study on a population of several thousand children. The EPICE program focused on childhood cardiac arrhythmias started in May 2009 for 4 years, in partnership with the Russian Bryansk Diagnostic Center. The purpose of this cross-sectional study was to determine the prevalence of cardiac arrhythmias in the Bryansk oblast (depending on the contamination of the territory and the caesium-137 whole-body burden) and to assess whether caesium-137 was or not a factor associated with the onset of cardiac arrhythmias. To address these questions, a study bringing together 18 152 children aged 2 to 18 years was initiated; each child received three medical examinations (ECG, echocardiography, and caesium-137 whole-body activity measurement) and some of them were given with a 24-hour Holter monitoring and blood tests. The findings of the study, currently submitted to an international journal justifying that no results can be given at this step, allow us to answer clearly to the issue of radiation-induced childhood arrhythmia, a subject that has been debated for many years. Our results will be certainly helpful for health professionals responsible for the monitoring of population exposed to the releases from the Fukushima Dai-ichi nuclear power plant and also useful for future comparative study in children exposed to ionizing radiation in other contexts, such as cancer radiation therapies.

Keywords : Caesium-137, cardiac arrhythmia, Chernobyl, children

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