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OCCUPATIONAL RADIATION-INDUCED CANCER IN MEDICAL STAFF (ORICAMs): PROTOCOL OF A FRENCH NESTED CASE-CONTROL STUDY

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CONTEXT AND OBJECTIVES

Medical workers constitute the largest group of workers occupationally exposed to ionizing radiation (IR). The radiation-associated cancer risk is still debated for low-dose IR exposures in these professionals. While some publications report an excess of central nervous system (CNS) tumor in interventional cardiologists, the association with the type of work has never been investigated in a well-controlled epidemiological study in France.

The ORICAMs nested case-control study aims to evaluate the association between external IR exposure and CNS tumor risk in radiation medical staff.

METHODS

All healthcare professionals with at least one dosimetric record in SISERI (the French national dose registry for the surveillance of radiation workers) between 2002 and 2012 were included in the ORICAMs cohort. Vital statuses and causes of death were obtained by linkage with national registries (RNIPP and CépiDc). The follow-up extended from 01/01/2002 to 31/12/2019.

All professionals who died of a **CNS tumor*** in the cohort were included as cases in the **nested case-control study**, and randomly matched with 5 controls on gender, year of birth, and date of entry into the cohort. **Occupational exposure to IR** was provided by SISERI. Additional information about potential risk factors was supplied by workers' occupational health physicians (e.g. weight, type of work...)

Conditional logistic regression models (univariate and multivariate) will be used to estimate the risk of death from CNS tumor as a function of cumulative IR dose, by comparing the occupational exposure of the cases with that of the controls.

*CIM-10 : C710, D430, D431, D432, D433, D330, D445, C714, C719, D481, G930, C859, D481, C717, C711, C718, C712

CépiDc: Centre d'épidémiologie sur les causes médicales de décès

RNIPP: Répertoire national d'identification des personnes physiques

EXPECTED RESULTS

202,709 healthcare professionals occupationally exposed to IR were selected from SISERI. Vital status and causes of death were obtained for 167,922 of them and 2,461 deaths were observed, including 45 deaths by CNS tumor. Analyses of the nested case-control study will be based on the 45 CNS tumor cases and their 225 matched controls (Fig. 1).

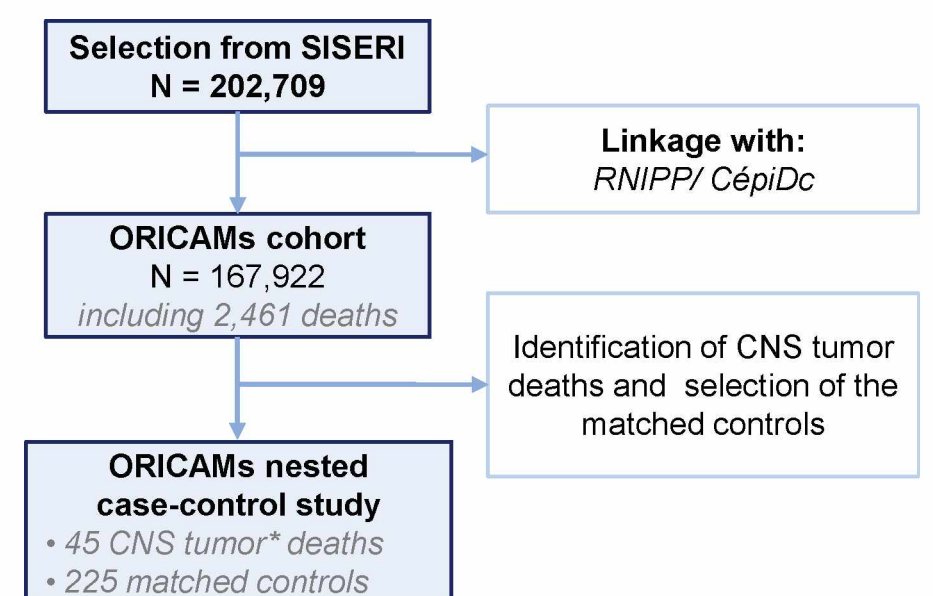


Figure 1: Steps for setting up the ORICAMs cohort and the nested case-control study

This study will enable the assessment of the **dose-response relationship** between IR exposure and CNS tumor in France. The inclusion of 45 CNS cases and their matched controls will allow detecting an odds-ratio of at least 1.5 for a statistical power of 80% and an alpha significance level of 5%.

CONCLUSION

This study will provide a better understanding of the health risks regarding CNS tumor associated with repeated low-dose IR exposures and will contribute to improve radiation protection strategies for healthcare workers. The ORICAMs cohort will be part of the international BECOME (Brain canCEr risk in a pooled Case-cOntrol study of MEDical workers) project, addressing the same objectives, however using pooled data from France, South Korea and the United States.



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