

Radiotherapy results in higher diabetes risk for some childhood cancer survivors

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The study – which analysed more than 2500 patient questionnaires and medical records from French and British people who had cancer in childhood but survived for at least 20 years after undergoing treatment – is the first to link diabetes and radiation.

The researchers used sophisticated mathematical modelling techniques, along with information about how the patient would have been likely to be treated when they received radiotherapy, to reconstruct exactly how and where the respondents were exposed to radiation when treated.

Overall, at age 45, 2.3% patients who had not received radiotherapy had been diagnosed with [diabetes](#), compared with 6.6% of those people who had been treated for childhood cancer with radiotherapy. By reconstructing how the radiotherapy would have been applied, the researchers were able to discover that when the tail of the pancreas was exposed to radiation, patients were significantly more likely to be diagnosed with diabetes later in life, although radiation exposure to other parts of the pancreas did not affect diabetes rates. The authors speculate that this is because the tail of the pancreas contains a type of cell involved in insulin production.

They also found that higher doses of radiation resulted in a greater likelihood of acquiring diabetes in later life, with patients who received an average radiation dose of 24.2 Grays to the tail of the pancreas being 12.6 times more likely to be diagnosed with diabetes within 20 years of completing [radiation therapy](#), compared to patients who did not receive

radiation therapy.

The type of cancer treated affected later diabetes risk—14.7% of patients who had been treated for nephroblastoma (kidney cancer) had been diagnosed with diabetes by age 45, compared to an average of 3.1% for other types of cancer included in the study. Radiation therapy for nephroblastoma often focuses in the abdominal area, which increases the likelihood that the tail of the pancreas will be exposed to radiation.

Dr Florent de Vathaire of the Centre for Epidemiology and Public Health (CESP) of INSERM at the Gustave Roussy Institute in France, one of the authors of the paper, said: "The pancreas needs to be regarded as a critical organ when planning radiation therapy, particularly in children. Until now, the pancreas was one of the few organs not considered at risk of normal tissue complication in the French and the UK national guidelines for cancer radiation therapy. Our findings indicate that the [pancreas](#) is an organ at risk during radiation therapy and has to be contoured when planning treatment, to ensure a radiation dose of as low as possible."

In a linked Comment, Kevin Oeffinger of the Memorial Sloan-Kettering Cancer Center, New York, said, "The clinical implications of this study are important, since radiation remains an integral part of therapy for many children with Wilms' tumour [a type of kidney [cancer](#)] or neuroblastoma. Diabetes is a major risk factor for all-cause and cardiovascular mortality. Further study is therefore needed to clarify the mechanisms underlying diabetes after abdominal radiation. Understanding these mechanisms will, hopefully, result in the development of targeted interventions that will lead to a reduction in risk in this population."

More information: [www.thelancet.com/journals/lan ... \(12\)70323-6/abstract](http://www.thelancet.com/journals/lan... (12)70323-6/abstract)

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