

## Link between NYC cancer cluster and Chernobyl disaster

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A new study led by a University at Albany professor has found a potential link between a cluster of cancer diagnoses in New York City and the 1986 Chernobyl Nuclear Disaster.

When four ophthalmology and oncology practices in New York City diagnosed 10 patients with ultra-rare vitreoretinal lymphoma (VRL) during a four-year period, the doctors' curiosity piqued: VRL is an unusual presentation of the already-rare primary central nervous system lymphoma where the cancer occurs in the eyes. Only about one quarter of patients suffering from primary center nervous system lymphoma, a non-Hodgkin's lymphoma in the brain or spine, develop vitreoretinal lymphoma.

Considering the uniqueness of the situation, the doctors reached out to Roxana Moslehi, associate professor in the University at Albany's School of Public Health and a renowned genetic epidemiologist/cancer researcher, to clarify the epidemiology of VRL and consider potential causes or risk factors among their 10 cases.

Upon determining the overall incidence rates of VRL in the US and in New York State (NYS), the team confirmed that the 10 NYC cases constituted a "cluster," or an unusually high incidence of a disease occurring in close proximity both in time and location.

For this cluster of 10 New York patients, the team looked at characteristics including but not limited to:



- Age at diagnosis
- Racial/ethnic background
- Past and prior residences
- Clinical characteristics of their diseases
- Other medical conditions
- Family history

After surveying patients for potential risk factors, the team realized that six of them had one major thing in common: they had all lived in regions close to the Chernobyl nuclear power facility at the time of the notorious radioactive disaster. Though the number of immediate deaths related to the accident is believed by many experts to be under 50, experts also acknowledge that potential long-term effects of radiation exposure is not concretely known. Therefore, even if someone survives initial exposure to radiation, it does not necessarily mean the person will not experience complications later in life.

Of the six New York VRL patients who lived near the power facility at the time of the accident, four reported living in the Ukraine, one in Poland, and one in Moldova. The median time from the accident to diagnosis was 26 years, and there were no other medical conditions unique to this group of six patients when compared to the other four. The only common demographic variable among the cases was Ashkenazi Jewish ancestry in 7 of the 10 subjects.

"As soon as I was contacted by Dr. Sanford Kempin at Mount Sinai Beth Israel Comprehensive Cancer Center, I was immediately interested in helping because the cause of VRL to date is unknown," said Moslehi.

"Any clues pointing to risk factors or causes we could learn from studying these 10 cases could be valuable in understanding the biologic mechanisms that lead to this type of <u>cancer</u>, and possibly to other forms of lymphoma as well. Determining the risk and causative factors is



instrumental in disease prevention," Moslehi continued.

In addition to looking at characteristics of the 10 patients, the group calculated rates of VRL in 13 areas from 1992 to 2014 using data from the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) Program. SEER rates are representative of overall rates for the US. Because NYS data is not reported to SEER, they also utilized the New York State Cancer Registry Database.

The team's findings through descriptive epidemiologic analyses demonstrate the true rarity of VRL and the oddity of so many cases concentrated during a four-year period in New York City: During the 22-year period between 1992 and 2014, just 20 people were diagnosed in the 13 SEER areas; a significantly lower incidence than the occurrence of 10 cases in four years in New York City. The team estimated the number of expected cases as approximately three in four years for the entire state of New York.

"Though our results do not definitively confirm that exposure to nuclear radiation is a cause of VRL, our findings warrant further research on the role of radiation alone and/or in combination with genetic factors and gene-environment interactions," said Moslehi.

According to Moslehi, the findings also underscore the importance of establishing and maintaining registries in a multi-center collaborative manner for rare cancers such as VRL, so that these types of etiologic investigations can occur.

**More information:** Sanford Kempin et al. A cluster of vitreoretinal lymphoma in New York with possible link to the Chernobyl nuclear disaster, *Leukemia & Lymphoma* (2017). DOI: 10.1080/10428194.2017.1403025



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