Novel association between Parkinson's disease and prostate cancer

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University of Utah School of Medicine researchers have found compelling evidence that Parkinson's disease is associated with an increased risk of prostate cancer and melanoma, and that this increased cancer risk also extends to close and distant relatives of individuals with Parkinson's disease. Although a link between Parkinson's disease and melanoma has been suspected before, this is the first time that an increased risk of prostate cancer has been reported in Parkinson's disease.

Parkinson's disease (PD) is a progressive neurologic condition that leads to tremors and difficulty with walking, movement, and coordination. Most studies demonstrate that individuals with PD have an overall decreased rate of cancer, with the notable exception of melanoma, the most serious form of skin cancer. Previous research has suggested a possible genetic link between PD and melanoma, but these studies have been limited to first-degree relatives who often share a similar environment, making it difficult to distinguish between genetic and environmental risk factors.

"Neurodegenerative disorders such as Parkinson's disease may share common disease-causing mechanisms with some cancers," says Stefan-M. Pulst, MD, professor and chair of the department of neurology, at the University of Utah, and co-author on this study. "Using the Utah Population Database, we were able to explore the association of PD with different types of cancer by studying cancer risk in individuals with PD, as well as their close and distant relatives."

The Utah Population Database (UPDB) includes birth, death, and family relationship data for over 2.2 million individuals, including genealogy data from the original Utah pioneers. Some of the records in this computerized database extend back over 15 generations, making the UPDB a useful resource for studying genetic risk. The UPDB is also linked with the Utah Cancer Registry and Utah death certificates dating back to 1904.

"In Utah, we have the unique opportunity to evaluate the relationship between PD and certain cancers using a population-based approach that eliminates many of the typical types of bias associated with epidemiological studies," says Lisa Cannon-Albright, PhD, University of Utah professor of internal medicine and division chief of genetic epidemiology, and co-author of this study. "Rather than relying on patient interviews for family medical history, we were able to use the UPDB, along with statewide registries of cancer and death, to look for links between PD and cancer."

The study team, including Seth A. Kareus, MD, University of Utah chief resident of neurology and Karla P. Figueroa, MS., screened the UPDB to identify nearly 3000 individuals with at least three generations of genealogical data who had PD listed as their cause of death. The researchers discovered that the risk of prostate cancer and melanoma within this PD population was significantly higher than expected. They also observed an increased risk for prostate cancer and melanoma among first-, second-, and third-degree relatives of these individuals with PD, although the excess risk for melanoma in third-degree relatives did not reach statistical significance.

In order to validate the observed association between PD-related death and these two cancers, the researchers also identified individuals who were diagnosed with either melanoma or prostate cancer to evaluate their risk for death with PD. They found that these individuals, as well as all

their relatives, had a significantly increased risk for death with PD.

"In our study, we not only identified an increased risk for prostate cancer and melanoma among individuals with PD and their relatives, but also established a reciprocal risk for PD among individuals with these two cancers and their relatives," says Pulst. "Collectively, these data strongly support a genetic association between PD and both prostate cancer and melanoma."

Interesting, Pulst and his colleagues noted that, while a decreased risk for lung cancer was observed among individuals with PD, this decrease in risk did not extend to any of their relatives. This finding suggests that environmental, rather than genetic, factors might be responsible for this association.

"Our findings point to the existence of underlying pathophysiologic changes that are common to PD, prostate cancer, and melanoma," says Cannon-Albright. "Exploring the precise genetic links among these diseases could improve our understanding of PD and influence strategies for prostate and skin cancer screening."

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