Increased Rate of Infections May Indicate a Future Cancer Diagnosis

People who have more flu, gastroenteritis, hepatitis and pneumonia infections are more likely to be diagnosed with cancer.

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Patients experienced a greater occurrence of infections in the years preceding a cancer diagnosis, according to results from a study published in Cancer Immunology Research, a journal of the American Association for Cancer Research.

“Cancer can develop in an inflammatory environment caused by infections, immunity disruption, exposure to chemical carcinogens, or chronic or genetic conditions,” said Shinako Inaida, PhD, a visiting researcher at the Graduate School of Medicine at Kyoto University in Japan. “An individual’s immunity is thought to be a factor in the development of cancer, but additional research is needed to understand the relationship among precancerous immunity, infections, and cancer development,” added Inaida. “This information may contribute to efforts to prevent or detect cancer.”

Studies have suggested an increase in infections prior to the development of non-solid tumors, such as lymphoma, chronic lymphocytic leukemia, and myeloma, explained Inaida. However, fewer studies have examined infection prior to the development of solid tumors.

In this retrospective case-control study, Inaida, along with Shigeo Matsuno, PhD, examined a medical claims database in Japan to determine the annual rate of infections in adults from 2005 to 2012. Individuals 30 years of age and older without any recorded immunodeficiencies were included in the study. The case group was composed of 2,354 individuals who were diagnosed with any malignant cancer between July 2010 and June 2011, and the control group was composed of 48,395 individuals who were not diagnosed with cancer between January 2005 and December 2012. The annual prevalence rates for influenza, gastroenteritis, hepatitis, and pneumonia infections were calculated for each group.

The case group included 1,843 men and 511 women; the control group had 37,779 men and 10,616 women. The average age of individuals in the case group was 45.1 years, while the average age of those in the control group was 43.9 years. The most common cancers diagnosed in the case group were digestive and gastrointestinal, head and neck, and stomach cancers. Other cancer types diagnosed in the case group fell into the following categories: respiratory and

thoracic; germ cell; genitourinary; liver; female breast; hematologic, blood, bone, and bone marrow; endocrine; and unknown or other cancers.

The authors found that individuals in the case group had experienced higher rates of infection over the six years prior to their cancer diagnoses than those in the control group over the same time period. The largest differences in annual infection prevalence rates occurred in the sixth year, which was one year prior to cancer diagnosis. During this year, the infection prevalence rates for the case group were higher than the control group by 18 percent for influenza, 46.1 percent for gastroenteritis, 232.1 percent for hepatitis, and 135.9 percent for pneumonia.

For individuals in the case group, the age-adjusted odds of infection increased each year. During the first year, those in the case group had a 16 percent higher likelihood of infection than the control group, compared with a 55 percent greater risk in the sixth year. During the sixth year, the highest age-adjusted odds ratio was observed for hepatitis infection, with those in the case group having had a 238 percent higher likelihood of hepatitis infection than those in the control group.

The authors also found that certain infections appeared to have a greater association with certain cancer types. The odds of influenza infection just before cancer detection, for example, were highest for those who developed male germ cell cancers. Additionally, the odds of pneumonia were highest in those who went on to develop stomach cancer, and the odds of hepatitis infection were highest in those who developed hematologic, blood, bone, or bone marrow cancers. “Interestingly, we found that infection afflicting a specific organ did not necessarily correlate with increased risk of cancer in the same organ,” noted Inaida.

A limitation of the study was the lack of information about environmental exposures, lifestyles, or underlying genetic or medical conditions, which could have contributed to increased infection in addition to causing cancer. Another limitation was that information regarding infection was based solely on diagnoses recorded in the database; thus, there may be variability in diagnoses across different clinicians, and some infections may not have been diagnosed or recorded. The small sample size for rare cancers was an additional limitation. Inaida declares no conflicts of interest.

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