Gastrointestinal Cancer Survival and Radiation Exposure among Atomic Bomb Survivors: The Life Span Study

Radiation exposure is known to be a risk factor for the development of several types of cancers, including many gastrointestinal cancers (relating to the stomach and intestines). However, few studies have investigated the association between radiation exposure before cancer diagnosis and survival rate after diagnosis.

Study participants were selected for our analysis from among RERF's Life Span Study (LSS)[1] of atomic bomb survivors who were diagnosed with a gastrointestinal cancer (stomach, colon, or rectum) during the period 1958–2009. Common survival time analysis was used to assess the association between radiation dose from A-bomb exposure and survival rate after later cancer diagnosis, with adjustments made for age at diagnosis, year of diagnosis, sex, and city of exposure (Hiroshima or Nagasaki).

A total of 7,728 individuals diagnosed with a gastrointestinal cancer were determined to be eligible for analysis. There was no statistically clear association between radiation dose and survival rates in those who died of a gastrointestinal cancer after diagnosis. However, among patients diagnosed with colon cancer, those exposed to high-dose radiation of at least 1 gray[2] tended to have a slightly poorer survival rate compared with the unexposed when colon cancer as the cause of death was considered. In addition, in people diagnosed with any of stomach, colon, or rectum cancer, those exposed to high-dose radiation tended to have a poorer survival rate for all causes of death not just cancer. Nevertheless, the two trends were not found to be statistically significant.

Although radiation exposure is known to be associated with increased risk of developing and dying of many gastrointestinal cancers, this study's results were inconclusive about an association between radiation exposure and survival rates after cancer diagnosis.

Notes

[1] Life Span Study (LSS):
The main purpose of this study is to investigate the long-term effects of atomic bomb radiation on the cause of death and cancer incidence. At the time of the 1950 national population census in Japan, about 94,000 atomic bomb survivors were selected from among those who were confirmed to be in Hiroshima and/or Nagasaki at the time of the atomic bombings and about 27,000 who were not in city at the time. This study has tracked over many years about 120,000 subjects.

[2] Gray (Gy):
Gray (1 gray = 1,000 milligray) is a unit of radiation that represents the amount of radiation dose absorbed by a substance when it is exposed to radiation. The average dose for RERF's LSS participants is around 140–200 milligray (0.14–0.2 Gy). As reference, the average annual amount of radiation we are all exposed to in our daily lives, include medically, is estimated to be around 2–6 milligray (0.002–0.006 Gy).

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RERF's objective with this brief outline is to succinctly explain our research for the lay public. Much of the technical content of the original paper has been omitted. For further details about the study, please refer to the full paper published by the journal.