

## Solid Tumors



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## Radiation–Second Malignancy Link in Testicular Cancer Probed

From *Journal of Clinical Oncology*

Men with low-grade testicular cancer have a low risk for second malignancy of the abdomen–pelvis, irrespective of radiation exposure from diagnostic imaging, according to long-term data on more than 2,500 men (*J Clin Oncol*; 2011;29:2883-2888, PMID: 21690479).

During the first five years of follow-up, 14 patients had diagnoses of second abdominal–pelvic malignancy, which translated into a rate of five per 10,000 patient-years of observation. Diagnostic radiation exposure did not increase the risk for a second abdominal–pelvic malignancy, as reflected in a hazard ratio of 0.99 per 10 mSv increase in radiation (95% confidence interval [CI], 0.95-1.04).

Radiation exposure from diagnostic imaging has increased substantially over the past three decades. Per-capita exposure averaged 0.5 mSv in 1980, compared with 3.0 mSv in 2006. Computed tomography (CT) scans have accounted for much of the increase and currently constitute half of the cumulative effective dose, the authors noted.

Prior studies have calculated radiation exposure from diagnostic tests and used statistical models to estimate risk for malignancy. Few studies have measured radiation exposure and followed patients to determine actual tumor incidence.

Using population-based administrative data sets, the new study identified all diagnoses of testicular cancer in Ontario, Canada from 1991 to 2004. Exclusion for previous cancer, radiation therapy, retroperitoneal lymph node dissection and follow-up for less than five years resulted in a study population of 2,569 patients, who had a median age of 34.7 years at diagnosis and a median follow-up of 11.2 years.

Patients had a median of 10 CT scans during the first five years of follow-up (interquartile range [IQR], 4-18). Median cumulative radiation exposure from the studies was 110 mSv (IQR, 44-190 mSv). Of the 14 abdominal–pelvic malignancies diagnosed during that time, colorectal and kidney cancers accounted for a majority of the malignancies (nine of 14).

The lack of association between radiation exposure and subsequent abdominal–pelvic malignancy in the primary analysis persisted in an analysis that included patients followed for less than five years (hazard ratio, 1.00; 95% CI, 0.96-1.04).

Noting that the median dose of radiation in their study exceeded that of most atomic bomb survivors, the authors cited evidence suggesting that the relationship between radiation and cancer risk might not be linear or cumulative.

According to the hypothesis, “a particular threshold rate, or flux, of radiation delivery is required to overwhelm cellular repair mechanisms and start carcinogenesis. Low rates of radiation, such as those from radiographic examinations, may not exceed this threshold rate and therefore may not induce cancers.”

## EXPERT INSIGHT



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**“Currently, men with stage 1 seminomatous and nonseminomatous testicular cancer undergo serial CT scanning surveillance of the retroperitoneum to identify recurrent disease. The current study is a population-based analysis of testicular cancer patients from the Ontario Cancer Registry and represents the largest cohort studied to assess second cancer risk associated with diagnostic radiation. The data demonstrate that second malignancies in the abdomen-pelvis were uncommon events in patients with low-risk testis cancer, and importantly,**

**they did not demonstrate an association between second cancers and the amount of radiation exposure.”**