AbstractID: 4492 Title: Radiation Induced Cancers in Treated Patients

The increasing numbers of radiation treated patient surviving for long periods forces an assessment of their risk of radiation associated cancer.
Dose response relationships for cancer induction in the laboratory mice varies with strain, gender, tissue/organ of concern, observation period, dose fractionation and LET. For most experiments, risk increased with dose in an orderly manner. However, in some large experiments on mice and one on Macaca mullata, there was no evident increase risk of cancer at 1-2.Gy single dose WBI. These studies were life span and autopsy examinations.

Risk of death due radiation induced solid cancer among 86,611 survivors of the atom bomb explosions in 1945 [entered the study in 1950] increased throughout the observation period of 52 years. There have been 10,127 deaths due to solid cancer and of these, 479 [4.7%] have been attributed to the radiation exposure. The time distribution of these cancer deaths have been: 18%, 19.1%, 27.1% and 35.4 % for the periods 1950-67, 1968-77, 1978-87 and 1988-97. Namely, 35% of these radiation cancer deaths occurred at 42-52 years post irradiation.

Data from 14 large and long follow-up series of irradiated human patients demonstrate increased risk with dose for cancers of the stomach and pancreas; over the dose range 1-45 Gy. In contrast there was no evident increased risk of bladder or rectal cancer after doses of 1-60 Gy. For the studies on murine, canine, sub-human and human subjects there is not a constant relative risk for the different organs, *viz* probability of a radiation cancer for a specified dose varies with the organ.

Consideration will be given to the differential risk between photon [conformal and IMXT], proton [broad beam energy modulated and pencil beam scattered] and ^{12}C ion beams.

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