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UCM1.951212.009

EFFECTS OF WHOLE AND PARTIAL BODY THERAPEUTIC IRRADIATION IN MAN

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Whole body irradiation has been given to 48 patients and partial body irradiation to ten patients with various solid malignant neoplasms (excluding lymphomas). Doses of 50-200 rad (absorbed midline tissue) whole body and 100-300 rad partial body were given with Cobalt-60 at rates of 3-6 r/min. Each individual serves as his own control. All patients received sham irradiation. Body volumes for partial body irradiation are about 40% for upper body and 60% for lower body. The xiphoid process serves as the lower level for upper body irradiation and conversely for lower body irradiation.

Prodromal symptoms were recorded only when volunteered by the patient. In no case were the patients queried as to presence or absence of symptoms nor were they instructed before exposure as to possible after effects. The incidence of prodromal nausea, vomiting and anorexia was found to increase both with increasing midline absorbed dose and integral dose. No prodromal symptoms were found below 100 rad or with integral doses of less than 6 megagram rad. In 14 patients receiving 100 rad (6.6-10.6 megagram rad) only 4 patients showed prodromal symptoms. Eight of 12 patients receiving 150 rad (7.1-14.4 megagram rad) and 4 of 6 patients receiving 200 rad (11.1-21.2 megagram rad) of whole body radiation, hence 2/3 of the patients, showed prodromal symptoms.

There were only 3 patients receiving upper body radiation with doses of 100-200 rad (3.0-9.1 megagram rad). None showed symptoms. Of 10 patients receiving lower body radiation 4 showed prodromal symptoms at 200 rad and 300 rad with integral doses of 7.9-11.7 megagram rad.

Eleven patients died within 40 days after irradiation. At the time of death eight patients had hematological findings indicating some radiation effect. The doses were 150-200 rad and integral doses were more than 8.2 megagram rad.

Psychic depression seemed to parallel changes in physical state. Anxiety was high prior to sham or actual treatment and decreased subsequently.

Hematological changes in whole body radiation have been similar to those reported elsewhere. Total white counts fall to a low point at 25 to 40 days post irradiation. Lymphopenia persisted for 40 to 60 days. In contrast to the observations in whole body irradiation the patients receiving partial body radiation showed minimal changes in total white count, platelets and hematocrit even at midline doses of 300 rad. Lymphopenia was observed within 1 to 2 days in most cases; in 3 patients lymphocyte levels did not fall until 3 days after exposure. The mild degree of change in hematological values is particularly striking when compared to the high frequency of prodromal symptoms in 4 of 5 patients receiving lower body doses of 200-300 rad.

These observations emphasize the importance of shielding in protecting human beings from acute radiation effects. If about half of the body is shielded, the hematological changes at 300 rad are about the same as those found at 50 rad of whole body radiation except for lymphopenia which is greater in the partial body irradiation.