UCCM/RCC1.958018.002D

March 13, 1969

Dr. Edward W. Webster
Department of Radiology
Massachusetts General Hospital
Boston, Massachusetts

Dear Dr. Webster:

Enclosed is the abstract for the in-vivo dosimetry topic of the radiation dosimetry session or for the radiobiology session as is considered suitable by the Program Committee. The abstract is forwarded as per John Laughlin's recent correspondence with me.

Sincerely,

James G. Kereiakes, Ph.D.
Professor of Radiology
(Radiologic Physics)

JGK/sjk

Enclosure

AUTHOR'S ABSTRACT FORM

SECOND INTERNATIONAL CONFERENCE

ON MEDICAL PHYSICS

August 11-15, 1969

Sheraton Boston Hotel, Boston, Massachusetts

Preparing your abstract:

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BONE MARROW DOSIMETRY IN A CO-60 IRRADIATED TISSUE-EQUIVALENT HUMAN PHANTOM

James G. Kereiakes, Edward B. Silberstein, J. Winston Rogers, and Eugene L. Saenger (University of Cincinnati, Cincinnati, Ohio, U.S.A.)

Whole body and partial body irradiation (either upper half or lower half) is being used in the therapy of certain cancers. This therapy is given as a single dose bilaterally with the xiphoid serving as the radiation field boundary for upper and lower half irradiation exposures. Hematological side effects are observed as a result of these exposures. Correlation of these effects with patient midline dose, integral dose, or average dose is difficult; however, possible correlation with "active" bone marrow dose warrants further study, particularly for the partial body procedures where some "active" bone marrow remains protected during the procedure. The purpose in this study was to determine experimentally "active" bone marrow dose under simulated whole body and partial body cobalt-60 exposure conditions for humans. A tissue-equivalent phantom (Rando) containing a human skeleton was used. Capsules filled with lithium fluoride were judiciously placed in bone cavities as demonstrated by radiographs of each phantom section. The cavities selected were based on locations of "active" bone marrow spaces as indicated by Ellis[1]. From the average rad dose and "active" bone marrow weight, the integral dose to "active" bone marrow was calculated. "Active" bone marrow integral doses for lower half-body and upper half-body are 68.9% and exposures 37.0%, respectively, of that determined for whole body exposure under the irradiation exposure conditions given above. The implications of these "active" bone marrow dose determinations in the clinical hematological pattern observed for humans irradiated under similar exposure conditions will be discussed.

1 Ellis, R.E., Phys. Med. Biol. 5:255, 1961. Supported by DASA Contract No. DA-49-146-XZ-315 and by Public Health Service Training Grant No. 57992-02-68, from the National Center for Radiological Health

BONE MARROW DOSE IN A ^{60}Co IRRADIATED TISSUE-EQUIVALENT HUMAN PHANTOM USING LITHIUM FLUORIDE DOSIMETRY

James G. Kereiakes and Eugene L. Saenger

Whole body and partial body irradiation (either upper half or lower half) is being used in the therapy of certain cancers. This therapy is given as a single dose bilaterally with the xiphoid serving as the radiation field boundary for upper and lower half irradiation exposures. Hematological sideg effects are observed as a result of these exposures. Correlation of these effects to patient integral dose is difficult, however, possible correlation with "active" bone marrow dose warrants further study, particularly for the partial body procedures, where some "active" bone marrow remains protected during the procedure. The purpose in this study was to experimentally determine "active" bone marrow dose under simulated whole body and partial body cobalt-60 exposure conditions for humans. A tissue-equivalent phantom (RÂndo) containing a human skeleton was used. Capsules filled with lithium fluoride were judiciously placed in bone cavities as demonstrated by radiographs of each phantom section. The cavities selected were based on locations of "active" bone marrow spaces as indicated in the review article by Ellis ( ). From the average rad dose and "active" bone marrow weight, the integral dose to "active" bone marrow was calculated for each anatomical phantom section. Total gram rads to the whole body "active" bone marrow were found to be 56477, 38903 and 20916 gram.rads for whole body, lower half-body, and upper half-body, respectively, per R trunk midline air exposure. "Active" bone marrow integral dose for lower half-body exposure is 68.9% of that determined for whole body exposure under the irradiation exposure conditions given above. The importance of these "active" bone marrow dose determinations in the clinical hematological pattern observed for humans irradiated under similar exposure conditions will be discussed.