

AbstractID: 6721 Title: Evaluation of Diagnostic Radiation Exposure Risks from CT Scans for a Radiosensitive Patient

Purpose: To estimate the effective radiation dose a radiosensitive patient received from a series of computed tomography (CT) scans and to make estimates for the excessive cancer risk due to that exposure.

Method and Materials: The Imaging Performance Assessment of Computed Tomography Scanners/NRPB (ImPACT, St. George's Hospital, Tooting, London) dose estimation spreadsheet was used to estimate effective dose from 14 CT image series obtained from an Ataxia-telangiectasia (A-T) patient. The scans were all taken within 4 months. For each exam, scanner parameters (i.e. kVp, mAs, etc) were retrieved from the dicom header. Excessive leukemia and cancer risks were calculated based upon the findings of a 15-country long-term study of nuclear power plant workers (Cardis et al. 2005).

Results: The estimated effective dose for the CT scans was a combined 124 mSv and an average dose of 8.9 mSv per exam. The excessive cancer risk was 12% and the excessive leukemia risk was 24%, using estimates for normal subjects.

Conclusions: This case indicates that diagnostic radiation exposure can pose an unintentional risk to radiosensitive patients. Given the clinical hypersensitivity to radiation and cancer predisposition for A-T patients, most have been protected from receiving standard radiation therapy to treat their cancers. On the other hand, they readily undergo diagnostic radiological procedures which incur smaller radiation exposure. The effective dose and cancer risk estimates from this study show a need for monitoring the radiation exposure from all medical sources for radiosensitive patients. Other diagnostic modalities can be suggested for radiosensitive patients in order to monitor medical responses and progress, such as magnetic resonance imaging or ultrasound.