

SUMMARY FACTSHEET HUMAN EXPERIMENTATION - SFS4.001

Project Category: Teletherapy with Particle Beams

Funding Source(s): AEC

Institution(s): (1), (2) Univ. of California, Berkeley
(3) Univ. of California, San Francisco

Principal Investigator(s): (1) J. H. Lawrence, C. A. Tobias
(2) John A. Linfoot
(3) J. R. Castro

Objective(s) of Project: To determine possible beneficial effects in various neoplastic and metabolic diseases

Short Description: (1) In the period 1953-1959 the pituitary glands of patients with advanced metastatic mammary carcinoma or other endocrine related diseases were irradiated with beams from the 184 inch cyclotron at first with the 340 meV proton beam, later with the 900 meV alpha particle beam. Doses of 24,000 to 30,000 rad to the pituitary were given.

(2) Heavy particle irradiation was used (1968) for the irradiation of the pituitary in acromegaly, Cushing's disease, and chromophobe adenomas of the pituitary and in metabolic disease such as diabetic retinopathy, metastatic breast and prostatic carcinoma where these are sensitive to hormonal control through the pituitary or the endocrine end organs of the pituitary. Heavy particle irradiation was used for direct tumor irradiation at other sites in the body where the tumor boundaries can be adequately delineated.

(3) Since 1975, 94 patients with localized unresectable carcinoma of the pancreas have been irradiated using helium and heavier particles.

Follow-up Data: (1) By April 1959, 103 patients had been treated. Clinical and laboratory studies were conducted every 4-8 weeks on survivors. Twenty-nine of the 82 with metastatic carcinoma were living in 1959, the longest being 4 years post irradiation.

(2) Four hundred and twenty six patients have had heavy particle therapy. In the series of 66 patients with acromegaly, 90% have had a complete amelioration of their disease process establishing heavy particle irradiation to the pituitary as being the optimal form of treatment at the present time. Highly successful results have also been achieved in patients with Cushing's disease and in 10 patients with chromophobe adenomas. The results in diabetic retinopathy are promising, but require longer follow-up for definitive evaluation.

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(3) Many patients proved to have occult liver metastases manifested within 9 months post treatment. In addition, local and regional control of the primary neoplasm (approx. 20%) has been difficult to obtain even with doses of 6000 rad in 7 1/2 weeks. Gastric and biliary obstruction have required surgical bypass procedures since irradiation has not been successful in relieving obstructive symptoms. Evidence of gastrointestinal injury has been present in postradiation therapy in approximately 10% of patients.

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SUMMARY FACTSHEET HUMAN EXPERIMENTATION - SFS4.002

Project Category: Teletherapy with Particle Beams

Funding Source(s): DOE

Institution(s): Lawrence Berkeley Laboratory

Principal Investigator(s): Jacob I. Fabrikant

Objective(s) of Project: To establish stereotactic heavy-ion Bragg peak radiosurgery for brain disorders, including intracranial arteriovenous malformations.

Short Description: Initial observations in 55 patients treated to date (1980-1984) indicate that the clinical objectives of a decrease in (1) frequency of hemorrhages, (2) in neurological deficiencies, (3) subjective complaints including headaches, or (4) in frequency of seizures are being achieved.

Follow-up Data: There have been no neurological complications of radiation damage to the normal brain tissue; thus far, no evidence of brain injury or progressive or fixed neurological deficiencies have occurred as a result of the stereotactic radiosurgical procedure.

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SUMMARY FACTSHEET HUMAN EXPERIMENTATION - SFS4.003

Project Category: Teletherapy with Particle Beams

Funding Source(s): AEC/ERDA/DOE, NCI

Institution(s): Los Alamos National Laboratory

Principal Investigator(s): M. Kligerman
S. Bush
R. D. Moseley
J. Bradbury

Objective(s) of Project: To conduct the necessary physical, biological, and clinical studies to evaluate the efficacy, potential benefit, and role of pions in the management of some types and stages of solid tumors.

Short Description: This program was a joint effort between the University of New Mexico and the Los Alamos National Laboratory utilizing negative pions produced by the 800 MeV LAMPF accelerator. The program involved beam development, radiobiology studies, new dosimetry and patient positioning techniques, and the evaluation of different total dose/fractionation schemes. During the program 234 patients were treated with tumor sites including prostate, head and neck, rectum and colon, cervix; brain, pancreas, and bladder. The studies began October 1974 and were terminated in late 1981.

Follow-up Data: One hundred and ninety-six patients have been followed for a minimum of 18 months. Crude survival data range from 11% for unresectable pancreatic carcinoma to 82% for stages C and D1 adenocarcinoma of the prostate indicate that this modality did not demonstrate advantages over more traditional radiotherapy and was therefore discontinued.

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