

ultrasonography and computerized tomography, respectively. As a result, it was determined that, the height of the treatment fields and the beam entrance points of the lateral tangential beams showed 2.2 ± 1.2 and 2.6 ± 0.9 cm alterations, respectively. Thus the lung proportions in the treatment volumes were underestimated in the average of $\%61.84 \pm 25.8$ in the treatment plans performed with CT alone.

196

PUBLICATION

ENDOBONCHIAL HDR BRACHYTHERAPY: A CURATIVE APPROACH FOR VERY LIMITED NON-SMALL CELL CARCINOMAS

P. Baldeyrou, H. Marsiglia, E. Lartigau, M. Albano, M. Delapierre, T. Le Chevalier, P. Ruffie, R. Arriagada, A. Gerbaulet
Institut Gustave-Roussy, 94800 Villejuif, France

Endobronchial high dose rate brachytherapy (BT) is an alternative treatment for very small and limited bronchial carcinomas in patients with chronic respiratory deficiency after past history of lung cancer treated by surgery and/or external radiotherapy.

Study of toxicity and results of high dose rate B. T. in 18 patients with 21 limited and endoscopically visible lesions.

Patients: Medium age: 65—Sex Ratio: 16 M/2 F—OMS: 2. Localization of tumors: main bronchus = 9, lobar and segmental bronchus = 12. No adenopathy on CT-scan. No other therapy possible because of respiratory deficiency.

The treatment was: 6 sessions of 5 Gy with a 7-day interval with one or two catheter applicators. A CT-scan with catheter was perforated to have a better visualization of the tumor and to assess the relation between the tumor, the normal structures and the applicator. In 12 treatments, the dose prescription point was at < 1 cm and in 9 treatments at 1 cm.

With a mean follow-up of 9 months, toxicity on bronchus was nil; 18 tumors were locally controlled, 3 failures were observed and 1 peribronchial recurrence suspected. The 3 treatment failures were in relation with a wrong evaluation of the distance between the tumor and the applicator.

197

PUBLICATION

RADIOTHERAPY COUPLING BORON NEUTRON CAPTURE THERAPY (BNCT) AND ^{252}Cf BRACHYTHERAPY

I.F. Chaves, T.P.R. Campos

Department of Nuclear Engineering, Federal University of Minas Gerais, 30160-060 Belo Horizonte, Brazil

Neutron radiation techniques applied onto human body cavities are investigated as oncological radiation therapy. The proposal treatment consists of the coupling of two distinct techniques: Boron Neutron Capture Therapy (BNCT) and Brachytherapy through discrete sources of neutrons. Biological and radiodosemetrical aspects of the coupled technique are considered. Nuclear aspects, such as the nuclear reactions occurred in tumoral region and the forms of evaluation of the isodose curves are discussed. The coupled technique BNCT and Brachytherapy is studied as a possible oncological treatment. The computational evaluation of the doses for simulating clinical situations are presented, based on a ^{252}Cf neutron source. The theoretical results shows that the dose is close to six times greater in the tumor than in the health tissues neighboring to the cancer region, with low concentration of the boron incorporated radiosensitisers.

198

PUBLICATION

MEDULLARY COMPRESSION AND RADIOTHERAPY

S. Cariello, E. Catalano¹, D. Napoli, D. Di Gemaro¹, A. Frusciante¹

Department of Oncology

¹Department of Radiotherapy, Azienda Ospedaliera S. Giovanni Di Dio E Ruggi D'aragona, Salerno, Italy

We treated 54 patients affected by medullary compression, by radiotherapy with ^{60}Co , in the period 1985–1993; there were 42 bone metastasis, 5 intramedullary metastasis, 7 were paravertebral neoplasms. The primitive cancers were: 19 breast, 10 prostate, 12 non-small cell lung, 4 small cell lung, 2 kidney, 1 melanoma, 1 soft tissue sarcoma, 1 colon and in 4 patients there was no history of cancer. We detected no difference, using 2 fractionation schedules (30 Gy/10 F vs. 40 Gy/20 F). Pain improved dramatically in 45 of 54 patients (83%), with reduction of analgesics (73 vs. 20%), and a mean duration time of 5 months. The 9 patients that had no improvement were: 2 lung adenocarcinoma, 1 melanoma, 1 soft tissue sarcoma, 1 kidney, 2 prostate, 2 breast cancer; 4 of these were affected by intramedullary metastasis.

199

PUBLICATION

STATIC BEAM-SEGMENTATION CONFORMAL RADIOTHERAPY FOR CONCAVE TARGETS

S. Derycke, L. Fortan, B. Van Duyse, C. Colle, C. De Wagter, W. De Neve
University Hospital Gent, Department of Radiotherapy and Nuclear Medicine, B-9000 Gent, Belgium

In many clinical situations, local control rates are restricted because of radiation-dose limitations imposed by radiation sensitive tissues invaginating with the target. In order to avoid these dose limitations, we developed a method based on the understanding of concave dose distributions in its most elementary form, being the cylindrical shell sector.

By combining and stacking distributions, individually shaped as cylindrical shell sectors, targets of any shape can be uniformly irradiated with predictable dose distributions inside and to a lesser extent also outside the target volume. Brahme *et al.* (*Phys. Med. Biol.* 1989, 27, 1221–1229,) described the beam intensity profile required for homogeneous irradiation of a cylindrical shell using rotational techniques. We investigated by virtual simulation using Sherouse's GRATIS system, the beam profiles required for execution with static gantry positions. These profiles were obtained by field-segmentation and were executable with a Philips MLC multileaf collimator. For targets with a single concavity in its surface 5–8 beam incidences and 25–50 segments were sufficient to obtain a sharp dose-gradient between invaginating structure and target.

200

PUBLICATION

SIDE EFFECTS OF CONDITIONING REGIMENS PRIOR TO BONE MARROW TRANSPLANTATION

P. Feyer, V. Budach, O. Titlbach, F. Kamprad, M. Kubel, A. Walter

Department of Radiotherapy, Medical School Charité, Berlin

Department of Radiotherapy

Department of Hematology, University of Leipzig, Germany

Conditioning regimens prior to bone marrow transplantation (BMT) represent an aggressive radio-chemotherapy in order to achieve a complete tumor cell kill. Gastrointestinal reactions (GIR) are the most common side effects during conditioning concerning up to 80% of patients. We investigated 300 BMT-patients and compared single (STBI $n = 105$), fractionated (FTBI $n = 60$) as well as busulfan (BU $n = 135$) conditioning regarding to the acute side effects especially frequency and possibilities to influence GIR. The conditioning regimens were different in the frequency and severity of GIR. The STBI has been replaced by FTBI in order to reduce toxicity. Reversible early reactions could not be reduced by FTBI. But as a result of replacing STBI by FTBI there was a decrease of severe complications.

201

PUBLICATION

PALLIATIVE HIGH DOSE RATE BRACHYTHERAPY FOR ADVANCED LUNG CANCER

H. Marsiglia, P. Baldeyrou, R. Arriagada, E. Briot, E. Lartigau, E. Chirat, C. Haie-Meder, M. Delapierre, M. Albano, C. Petit, A. Gerbaulet
Institut Gustave-Roussy, 94800 Villejuif, France

High dose rate brachytherapy (HDRB) is an effective palliative treatment for bronchial carcinoma with an obstructive component.

We have studied the toxicity and efficacy of palliative HDRB for endobronchial tumors in areas previously irradiated or not.

HDRB (^{192}Ir source) delivered a same total dose of 24 Gy, giving 6×4 Gy in 36 days for patients with previous irradiation (Group A), or 3×8 Gy in 15 days for patients without previous irradiation (Group B). The given dose was prescribed according to the target volume, and the physical dose was specified at 1 cm. The treatment catheter was positioned by the pneumologist (P.B.) and the treatment volume defined according to the endoscopy and to pre-treatment CT scanner, with a 2 cm safety margin on each extremity of the macroscopic tumor. The catheter was checked by radiographic films before any HDR treatment.

Five patients were included in group A, and 15 in group B. With a mean follow up time of 12 months, three patients out of 5 in group A developed a lethal hemoptysis. No toxicity was found in group B (one limited necrosis).

HDRB is a safe and effective palliative treatment in patients without previous irradiation. For patients with previous irradiation, we noticed severe complications even if a protracted treatment with low dose per fraction is used.