*Acta Radiologica Oncology 25 (1986) Fasc. 3*

FROM THE VALAVADI NARAYANASWAMY CANCER CENTRE, UNIT OF G. K. N. M. HOSPITAL, COIMBATORE 641 037 INDIA.

# DAILY MULTIPLE SESSION RADIATION THERAPY IN ADVANCED ORAL CARCINOMA

## A preliminary investigation

V. NAGARAJAN, V. PARIMALARANGAN and M. LEELA MEENAKSHI

**Abstract**

Radiation therapy using conventional fractionation schedules has not achieved adequate disease control in patients with advanced oral carcinoma. Hence a trial was conducted to investigate the efficacy of daily multiple session irradiation in this disease. Of the 32 patients entered in the study, 25 were eligible for evaluation. Sixteen of the 25 patients had no evidence of disease during a follow-up period of 24 months. Acute mucosal reactions were observed in all the patients, but they subsided in 2 to 4 weeks after completion of treatment. The results obtained in this pilot study justify evaluation of this method in a larger number of patients with advanced oral carcinoma.

*Key words:* Therapeutic radiology; oral carcinoma, superfractionation.

Oral cancers are among the most frequently encountered malignant diseases in India. At the V.N. Cancer Centre, Coimbatore, they account for about 50 per cent of all cancers seen. Most of these patients have advanced local disease which is often inoperable. Radiation ther apy using conventional fractionation schedules has not achieved adequate disease control. The reports on superfractionated radiation therapy, by JACOBSSON & LITTBRAND (3), BÄCKSTRÖM et coll. (1), SVOBODA (5, 6) and GONZALEZ GONZALEZ et coll. (2), have been followed with great interest at this hospital. The work of these authors prompted us to initiate a trial on daily multiple session irradiation in patients with advanced oral carcinoma.

### Material and Methods

Since May 1982, 32 patients with advanced oral cancer have been entered in this pilot study. The criteria for inclusion were as follows: Carcinoma in the oral cavity which could be easily seen and palpated at a simple clinical examination; Stage IV disease according to the TNM classification (7); Primary surgical treatment not feasible; Patients who would normally have been advised purely symptomatic therapy or only palliative radiation therapy; No concomitant diseases like tuberculosis, diabetes and hypertension; Performance status of at least 50 per cent or higher on the Karnofsky scale; Histologic confirmation of squamous cell carcinoma; Consent from the patient for inclusion in the study.

Of the 32 patients who satisfied the above criteria, 19 were males and 13 were females. The youngest patient was 30 years and the oldest 74 years, mean age being 54 years. The mean performance status was 74 per cent on the Karnofsky scale (range 70–90). All the patients had squamous cell carcinoma of varying degrees of differentiation. The tumour localization was as follows: cheek 17 cases, alveolar process 11, tonsil 1, and floor of the mouth 3 cases. Twenty of the patients were addicted to chewing betel and tobacco. Four of the male patients and one female patient were smokers. Adequate care was taken to improve dental and oral hygiene in all the patients. Pretreatment dental extraction was done when necessary.

All the patients were treated with external irradiation from a telecobalt therapy unit. Parallel opposing fields were used, the average field size being 12 cm × 17 cm. The fields encompassed the primary lesion and the entire chain of cervical lymph nodes.

Even when the neck nodes were not clinically palpable,

Accepted for publication 24 February 1986.

they were irradiated on the basis of subclinical disease. The spinal medulla was not shielded during this part of the treatment. At 30 Gy, the lower neck nodes were excluded from the radiation fields. Treatment was then continued against the primary lesion and the upper cervical nodes with reduced parallel opposing fields, measuring on an average 8 cm × 10 cm. By reducing the fields the medulla was excluded from the irradiated volume in most patients during the second half of the treatment. The tumour dose delivered in each patient was 1 Gy three times a day at 4-hour intervals (8 a.m., 12 noon, 4 p.m.) to a total tumour dose of 60 Gy. Owing to the acute mucosal reaction the treatment was given as a split-course with a gap of 3 weeks after 30 Gy. Routine assessment of patients was not done during the gap period. However, patients who sustained very severe mucosal reactions were retained as in-patients and the reactions were treated.

All patients were examined three times a week while on treatment. They were all given vitamins and other supportive care as indicated. After completion of treatment the patients were examined monthly.

## Results

Of the 32 patients who entered the study, 4 discontinued treatment at 30 Gy and in one patient treatment had to be stopped due to deterioration of his general condition. Two patients who completed the treatment were not available for follow-up. Thus, of the 32 patients, only 25 (12 males, 13 females) were eligible for clinical evaluation.

*Skin and mucosal reactions.* All patients developed mucosal reactions at a dose of about 20 to 30 Gy. The Table shows the arbitrary score used for assessing skin and mucosal reactions (2). Of the 12 male patients, 7 developed a grade I skin reaction. Mucosal reactions were more severe: 2 patients had grade I, 5 patients grade II, and 5 patients grade III mucosal reaction. Among the female patients, 10 had a grade I skin reaction. Four patients hade grade I mucosal reaction, 5 grade II, and 4 grade III mucosal reaction.

The skin and mucosal reactions subsided within 2 to 4 weeks after completion of treatment.

*Disease control and follow-up data.* Seven of the 12 male patients who were available for a minimum follow-up period of 24 months had no evidence of disease. One patient underwent resection and reconstructive sugery for minimal residual disease. However, 2 weeks after surgery, he developed pulmonary metastases and died. The local wound healing was satisfactory, with no evidence of disease.

Nine of the 13 female patients were available for a minimum follow-up period of 24 months. All of them were free of disease. No cancer-related death occurred in this group.

**Table**

*Arbitrary score of skin and mucosal reactions*

| Score | Skin | Mucosa |
|---|---|---|
| 0 | No reaction | No reaction |
| 1 | Mild erythema | Mild enanthema |
| 2 | Intensive erythema | Intensive enanthema |
| 3 | Moist areas | Mucositis in areas |
| 4 | Confluent moist reaction | Confluent mucositis |

## Discussion

Experimental work on animals led HILL & BUSH (4) to conclude that frequent fractionation in clinical radiation therapy could be advantageous. JAKOBSSON & LITTBRAND (3) and BÄCKSTRÖM et coll. (1) tried the split-course treatment with 3 fractions a day with good clinical results.

According to our experience the method gives a good primary result in patients with stage IV oral carcinoma, and acceptable treatment morbidity. Mucosal reactions in both male and female patients were severe, but subsided within 2 to 4 weeks after completion of treatment. No increase in complications or delayed healing was noted if surgery later on had to be performed. On the basis of the results obtained in this pilot study, it would seem justifiable to extend this fractionation schedule to a larger number of patients with advanced oral cancers, and also to advanced cancers in other sites.

*Request for reprints*: Dr M. Leela Meenakshi, V. N. Cancer Centre, Unit of G. K. N. M. Hospital, Coimbatore 641 037, India.

## REFERENCES

1. BÄCKSTRÖM A., JAKOBSSON P. Å., LITTBRAND B. and WERSÄLL J.: Fractionation scheme with low individual doses in irradiation of carcinoma of the mouth. Acta radiol. Ther. Phys. Biol. 12 (1973), 401.
2. GONZALEZ GONZALEZ D., BREUR K. and SCHUEREN E. V. D.: Preliminary results in advanced head and neck cancers with radiotherapy by multiple fractions a day. Clin. Radiol. 31 (1980), 417.
3. JAKOBSSON P. Å. and LITTBRAND B.: Fractionation scheme with low individual tumour dose and high total dose. Acta radiol. Ther. Phys. Biol. 12 (1973), 337.
4. HILL R. P. and BUSH R. S.: The effect of continuous or fractionated irradiation on a murine sarcoma. Brit. J. Radiol. 46 (1973), 167.
5. SVOBODA V. H. J.: Radiotherapy by several sessions a day. Brit. J. Radiol. 48 (1975), 131.
6. — Further experience with radiotherapy by multiple daily sessions. Brit. J. Radiol. 51 (1978), 363.
7. TNM Classification of malignant tumours. Third edition, UICC Publication, 1978.