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RESULTS OF RADIATION TREATMENT IN CARCINOMA OF THE ORAL CAVITY

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Malignant tumors of the oral cavity are important as they are easily accessible for direct or instrumental examination. The patients themselves, as well as physicians and dental surgeons have therefore good opportunities to observe the lesions at a stage when curative treatment is still possible. Nevertheless, many cases have advanced disease when first seen in specialized centers (JACKSON 1979). A considerable diagnostic delay has been reported in as many as 90 per cent of the cases (SANTANA 1975).

The average annual crude incidence rate of malignant tumors of the oral cavity in Cuba during 1968 to 1972 (Registro Nacional del Cáncer 1977) is given in Table 1.

The selection of the treatment method for oral carcinoma is influenced by several factors as size, localization and stage of the disease. In early stages both surgery and radiation therapy offer good possibilities for cure (CHU & FLETCHER 1973, ALERT 1975, ALERT & MENÉNDEZ 1975, HIRATA et coll. 1975, FU et coll. 1976, SHAH et coll. 1976, NAKISSA et coll. 1978, ALERT et coll. 1979. CHUNG et coll. 1979). On the contrary, advanced tumors consitute difficult treatment problems, due to the high risk of tumor remnants, recurrences or metastases. The purpose of this communication is to evaluate the efficacy of radiation therapy in a large series of patients with oral carcinoma.

Material and Methods

The material included 391 cases of oral carcinoma treated at this institute in 1965 through 1971 and given irradiation alone or in combination with surgery. The localization of the primary tumors appears in Table 2. The cases were clinically classified according to the TNM system. The average age was 57.3 years (range 32–87), and the material included 239 males (75.7%) and 95 females (24.3%).

Of the 391 patients, 219 (56.1%) received external irradiation alone (usually ^{60}Co), either from a single homolateral field or from 2 opposing fields covering the primary tumor and the neck nodes. The tumor dose was usually 50 to 70 Gy, 1.7 to 2.0 Gy per day 5 days a week. A few patients, usually old and in bad general condition and with advanced tumors, received a dose of less than 50 Gy.

In 43 patients (10.9%) an interstitial radium implant was used. Most of these patients had a localized lesion on the lateral part of the tongue and a small group of patients had carcinoma of the floor of the mouth. The tumor dose ranged from 45 to 100 Gy, with a dose rate of 0.4 to 1.0 Gy/h.

Pre- or postoperative external radiation therapy was given to 109 patients (27.6%). In 20 patients (5.4%) both external and interstitial radiation therapy was given and some type of surgery performed.

Only 36 patients (9.2%) had T1 and T2 tumors and 251 (64.2%) had no clinical evidence of lymph node metastases.

Results

Actuarial survival in the total series at 5 and 10 years after treatment was 30.5 per cent and 25.2 per cent. The actuarial survival in relation to type of treatment appears in Table 3, to localization in Ta-

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Table 1

Crude incidence rate (per year and 100000 inhabitants)

	Males	Females
Tongue	3.6	0.8
Floor of mouth	0.7	0.2
Palate	0.6	0.3
Other parts	1.8	0.6

Table 2

Localization of the primary tumor (per cent in parentheses)

Gingiva	114 (29.2)
Oral part of tongue	113 (28.9)
Floor of mouth	96 (24.5)
Hard palate	24 (6.1)
Other parts of oral cavity (cheek etc.)	44 (11.3)

Table 3

Actuarial survival (in per cent) in relation to type of treatment

Method	5 years	10 years
Radiation therapy	21.5	18.5
Radiation therapy and surgery	33.2	28.7
Radium implant	56.1	43.8
Radium implant, external irradiation and surgery	50.0	50.0

Table 4

Actuarial survival (in per cent) in relation to localization of primary tumor

Localization	5 years	10 years
Gingiva	19.2	16.3
Tongue	38.4	33.2
Floor of mouth	36.2	30.0
Other parts (cheek etc.)	36.2	30.0
Hard palate	38.6	31.4

Table 5

Actuarial survival (in per cent) in relation to tumor dose

Dose	5 years	10 years
Less than 50 Gy	21.6	18.4
50 to 60 Gy	23.1	22.1
Over 60 Gy	41.6	34.5

Table 6

Five-year crude survival and TN classification (alive/treated)

	N0	N1	N2	N3	Total
T1	2/3	0	0	0	2/3
T2	13/28	1/4	0/1	0	14/33
T3	49/103	4/21	0/5	0/10	53/139
T4	23/117	5/44	2/13	3/42	33/216
Total	87/251	10/69	2/19	3/52	102/391

ble 4, and to radiation dose in Table 5. The 5-year crude survival in different TN-groups is given in Table 6.

Of the 14 surviving patients with T2 tumors 8 had received interstitial radium treatment and the others external irradiation. Of the 49 survivors in the T3NO group 24 had been treated with interstitial radium or interstitial radium plus surgery. Of 23 survivors in the T4NO group 14 had been treated by external irradiation and surgery and the others by external and interstitial irradiation plus surgery.

As regards different localizations carcinoma of the gums (gingival carcinoma) had in the present series the poorest prognosis (Table 4). Of the 17 5-year survivors in this group 12 had N2 disease. Among the cases with carcinoma of the tongue 77 survived for 5 years; of these, 27 had T2NO or T3NO disease and only one T1NO disease.

In 272 patients irradiation was the only treatment. In 225 of these cases the primary result (presence or absence of clinical tumor remnants) was recorded soon after the treatment. The correlation between the primary result and 5- and 10-year survival appears in Table 7.

Discussion

Radiation treatment can be used both in early and advanced oral carcinomas (BENAK et coll. 1970, ANSFIELD et coll. 1970, SAHATCHIEV et coll. 1972, CHU & FLETCHER, RAFLAS & BOCHETTO 1974, HIRATA et coll., HAMBERGUER et coll. 1976, SHAH

Table 7

Acturial survival (in per cent) in relation to result at end of irradiation

Primary result	5 years	10 years
Gross tumor remnant	0	0
Considerable tumor reduction	18.4	15.1
No signs of tumor	56.4	48.2

et coll., NAKISSA et coll., CHUNG et coll., ALERT et coll. 1979). However, it must often be combined with surgery in order to obtain optimum results, and in the present series almost 1/3 of the patients received combined radiologic and surgical treatment.

This series comprised all types of cases from quite early, well localized tumors to very advanced cases often in bad general condition. The results can therefore not be compared with the result in a purely surgical series, which always represents a selection of less advanced tumors. In this department for instance (ALERT et coll. 1979) 87 patients were during the same period treated by surgery alone, with 5- and 10-year survivals of 58.1 and 46.7 per cent, respectively. These cases were, however, on an average much less advanced than the cases in the present series that received pure radiologic or combined radiologic and surgical treatment.

The good survival rate (Table 3) after interstitial radiation treatment was also mainly an expression of patient selection, as these cases generally had early, well localized lesions. The efficacy of interstitial radiation therapy in such tumors has been reported by several authors (PIERQUIN et coll. 1971, SAHATCHIEV et coll., CHU & FLETCHER, FU et coll., NAKISSA et coll.).

The results obtained with tumor doses above 60 Gy were significantly ($p<0.005$) better than those after lower doses (Table 5). It has been reported (SCHNEIDER et coll. 1975) that a tumor dose of 65 Gy may sterilize carcinoma stage N1 in up to 90 per cent of cases. In more extensive tumors it may be difficult to reach this dose due to mucositis and the general condition of the patients (DONALDSON 1977). A more extensive carcinoma also implies a higher probability for tumor remnants within the treated volume, regardless of the tumor dose.

As could be expected the primary result obtained after radiation therapy had an important influence on the prognosis (Table 7). Of 67 patients with residual tumor at the end of treatment none was alive after 5 years. Of 79 without signs of tumor at the end of treatment 37 were alive without evidence of disease after 5 years. Early, complete disappearance may be an expression of good oxygenation of the tumor cells (BARKLEY & FLETCHER 1977).

As in all other reported series absence or presence of lymph node metastases had a very marked influence on the prognosis (Table 6). Early diagnosis is very essential for the treatment results in this type of malignant tumor.

SUMMARY

Treatment results in 391 patients with oral carcinoma after radiation therapy are reported. In the total series 5- and 10-year actuarial survival were 30.8 and 25.2 per cent, respectively. After irradiation alone the corresponding figures were 21.5 and 18.5 per cent, after combined radiologic and surgical treatment 33.3 and 28.7 per cent, and after interstitial radium therapy 56.1 and 43.8 per cent, respectively. These differences were mainly an expression of selection factors. Tumor doses above 60 Gy gave a higher survival than lower doses. The presence of neck node metastases was prognostically unfavourable.

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