

## Case report

# Successful interstitial treatment for bilateral tongue cancer

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**Abstract.** We report three cases of bilateral tongue cancer who received interstitial brachytherapy successively for each tumour. Tumour control following treatment are as good as that for unilateral tongue cancer and there have been no severe complications in, or around, the tumour area after using a mandibular protective spacer and dose reduction for the second treatment.

Bilateral tongue cancers, which are synchronous multicentric cancers found on both sides of the oral tongue, are rare. In the last 5 years we have experienced three such cases and report the results of treatment by low dose rate brachytherapy for each cancer.

## Case reports

### Case 1

A 36-year-old male complained of pain on the right side of his tongue in 1985. He was diagnosed as having leukoplakia pathologically and followed up. In 1991, he noticed another painful lesion on the left side of his tongue. In 1993, biopsies were taken from both sides of the tongue which confirmed the diagnosis of bilateral squamous cell carcinomas. As the patient was an actor, he was referred to our institution to receive tongue conserving treatment.

On examination the right-sided tumour was superficial type measuring  $3.6 \times 1.4$  cm, whereas the left-sided cancer was nodular type measuring  $1.6 \times 1.4 \times 0.3$  cm. Cervical lymph node metastases were not detected.

Because it was associated with pain, the right-sided tumour was treated first by interstitial brachytherapy with radium-226 needles implanted in a single plane (treated area  $4.5 \times 3.5$  cm); the patient was given 70 Gy in 154 h (Figure 1a and 2). After 7 days, the left-sided lesion was treated with iridium-192 hairpins implanted in a single plane (treated area  $3 \times 4$  cm); 60 Gy was given in 116 h (Figure 1b and 2). Using the spacer during interstitial brachytherapy for both lesions,

there were no severe complications during, or after, treatment.

In 1996 the patient was suspected of having recurrent tumour on the right side of his tongue. A biopsy confirmed the diagnosis of squamous cell carcinoma. He proceeded to hemiglossectomy and prophylactic neck dissection.

Since then, he has had neither recurrence of the primaries nor lymph node metastasis.

### Case 2

A 60-year-old male was first diagnosed as having leukoplakia on the left side of his tongue in 1973 and followed up. In 1977, biopsy established the diagnosis of squamous cell carcinoma of the tongue, and partial glossectomy and prophylactic left neck dissection were performed.

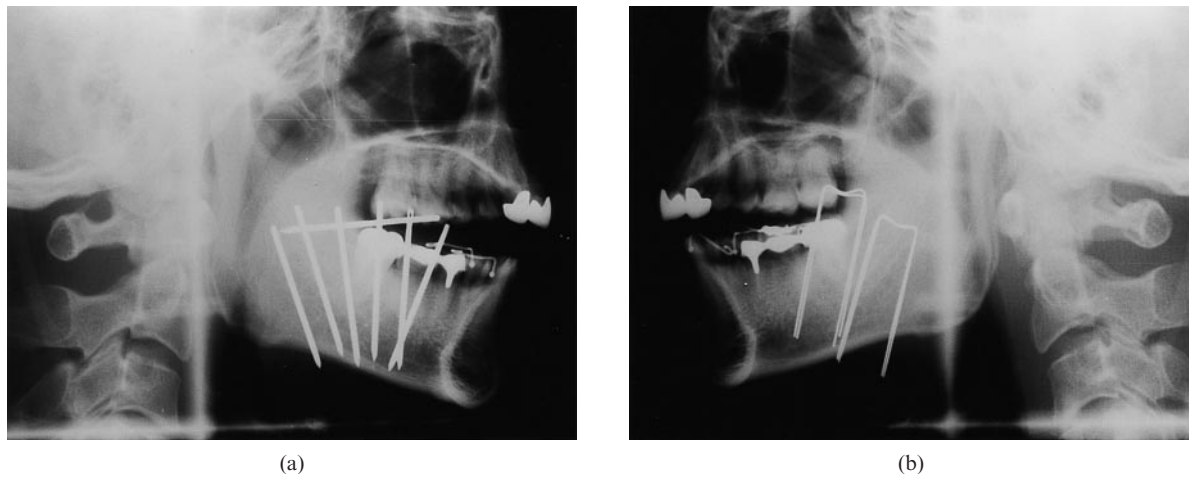
In 1994, a tumour measuring  $1.9 \times 1.7 \times 0.5$  cm was found on the left side of the tongue, anterior to the previous operation site and was diagnosed as squamous cell carcinoma. He was referred to our institution for interstitial brachytherapy. On admission, further leukoplakia on the right side of his tongue was found.

The left-sided tumour was treated by interstitial brachytherapy using radium-226 needles implanted in a single plane (treated area  $3 \times 3.5$  cm); 70 Gy was delivered in 168 h.

2 months after treatment for the left-sided tumour, biopsy of the right side of his tongue was performed giving a diagnosis of a  $2.2 \times 0.5$  cm sized squamous cell carcinoma. This tumour was also treated by interstitial brachytherapy but with iridium-192 hairpins in a single plane (treated area  $3.1 \times 4$  cm); 60 Gy was delivered in 185 h.

4 months after the iridium-192 treatment, a cervical lymph node metastasis was detected on the right side and radical neck dissection was

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**Figure 1.** Case 1. (a) Radium-226 needle single plane implantation for the right-sided tumour. (b) Iridium-192 hairpins single plane implantation for the left-sided tumour.

performed. A mandibular protective spacer was used during each of the implants.

This patient has been making good progress with neither recurrence of either primary nor another neck metastasis having been detected to date.

### Case 3

A 68-year-old female was referred for treatment of a painful, red lesion on the left and a small erosive lesion on the right side of the tongue. She was diagnosed pathologically as having separate squamous cell carcinomas on both sides of the tongue. At our first examination, the left tumour measured  $3.2 \times 2.3 \times 1.5$  cm and the right  $2.0 \times 1.5 \times 0.3$  cm. Initially, external beam radiotherapy, encompassing both cancers, delivered 30 Gy in 3 weeks. Following this, the left-sided tumour was given interstitial brachytherapy with caesium-137 needles (treated area  $4 \times 3.5$  cm) to a dose of 70 Gy in 148 h.

23 days after the caesium-137 needle treatment, the right tumour was treated with permanent implantation of gold-198 seeds (treated area  $3.2$  cm<sup>2</sup>) and the patient was given 81 Gy in total decay. During each treatment, a spacer was inserted to protect the mandible.

Neither locoregional recurrence nor severe complications have been detected to date.

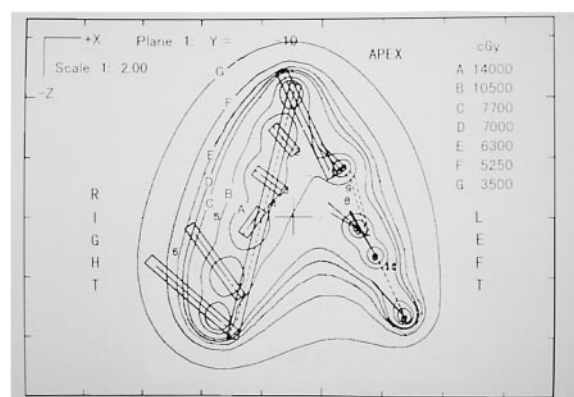
### Discussion

It is well known that second cancers in the same tissue or organ occur far more frequently than the incidence of cancer in the general population [1]. The incidence of the second cancer has been reported as 5.5% by Slaughter et al [2] and 8.7% by Moertel [1]. In our institution, 4.2% of patients with tongue cancers have had synchronous or

secondary cancers in the oral cavity and/or pharynx [3]. These phenomena can be explained by the hypothesis of “field cancerization”; an area of epithelium has been pre-conditioned by an as yet unknown carcinogenic agent, with the oral carcinoma arising from multifocal areas of pre-cancerous change and not from one cell that suddenly becomes malignant [2–4].

Of 1239 patients with tongue cancer who have presented to our institution, 21 have been diagnosed as having a contralateral or ipsilateral second cancer separate from their initial tongue cancer (four were synchronous and 17 were metachronous) up until April 1998. In the last 5 years, three patients have had multicentric cancers on both sides of their tongue synchronously (called “bilateral tongue cancer” in this report). We could not find any report of bilateral tongue cancers which have been treated successfully by interstitial brachytherapy.

It is well known that smoking and mechanical stimulation are associated with the occurrence of tongue cancer. In particular, smoking has been reported to be an important associating factor in the occurrence of a second cancer [5]. However, in



**Figure 2.** Case 1. Computer dosimetry distribution for bilateral interstitial brachytherapies.

these three cases, one had no smoking history and the other two patients had stopped smoking prior to the diagnosis of tongue cancers. On the other hand, in Cases 1 and 2, long-term leukoplakias had been observed on both sides of the tongue. For oral cavity, several reports have indicated rates of variant malignant transformation of leukoplakia from 4% to 17.5%. The incidence of secondary oral and/or pharynx carcinomas in the leukoplakia group has been reported to be five times greater than that of the group without leukoplakia [3]. The association of leukoplakia must also be an important factor in bilateral tongue cancer.

In the treatment of stages I and II oral tongue cancer, interstitial brachytherapy is considered to give a better functional result than surgery, with an equal chance of local control [6]. We have previously reported that brachytherapy can give an 85% 2-year local control rate for all T1–2 cases and 75% control rate at 5 years [7]. In the three bilateral cases presented here, the stage of each tumour was T1–2 (UICC, 1997). To avoid glossectomy, all three patients chose interstitial brachytherapy. The state of the tongue after treatment was the same as that in unilateral tongue cancer with neither atrophy of the tongue nor functional disorder detected. We consider that interstitial brachytherapy can give the same results for bilateral tongue as for unilateral tongue cancer.

The brachytherapy dose prescribed for linear sources (radium-226, iridium-192) in our institution is 70 Gy. In each of the first treatments, we gave a dose of 70 Gy. According to computer dosimetry after imaging the actual implant, the first brachytherapy treatment gave 10–20 Gy to the contralateral side of the tongue. The dose in the second brachytherapy treatment was therefore reduced by about 10 Gy. In addition, we used

iridium-192 hairpins or gold-198 seeds for the second brachytherapy treatments, because the dose attrition around the source is sharp and the implanted sources would not give more than 10 Gy to the side treated first. We have not detected poorer control as a result of this dose reduction, without which severe complications might have occurred. Furthermore, we have not detected any mandibular complications as a result of using a spacer [8].

## References

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