

IRIDIUM-192 WAX MOULD THERAPY FOR THE TREATMENT OF SUPERFICIAL TUMOR OF THE FLOOR OF MOUTH.

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ABSTRACT

Two cases of superficial tumor of the floor of mouth with $T_{1,2} N_0 M_x$ lesions were treated with radiation therapy by surface mould technique. The brachytherapy source was HDR-Ir.¹⁹² One case was treated with brachytherapy alone with a dose of 32.5 Gy in 5 weeks. One fraction of 6.5 Gy per week was given for 5 fractions in order to avoid a repeated course of external irradiation. This patient had received a previous treatment for laryngeal cancer 7 years ago by external radiation with a late radiation reaction of the skin in the neck region. The other patient was treated with 6.5 Gy per fraction, 2 fractions with 1 week interval, prior to 50 Gy of external irradiation in 5 weeks. The result were complete response without any complication. The technique was simple, reproducible and safe for the treatment of carcinoma of the floor of mouth and might be used for other tumors in the oral cavity.

INTRODUCTION

Brachytherapy is one of the two main methods of irradiation technique, performed by placing the radionuclide sources closed to or within the tumor. Its main advantage is the ability to deliver a high dose at the tumor area without excessive irradiation to the surrounding structures. The tumor of skin, esophagus, nasopharynx and cervix are the major sites that can be treated by this procedure with various radionuclides such as Ra-226, Cs 137 and Co-60 by various methods of brachytherapy: Intracavitary insertion, Interstitial implantation and surface mould.¹⁻⁸ Among these techniques, mould therapy is the most proper for any superficial tumor that can be easily approached, such as skin, vulva, vaginal canal and oral cavity, and easy to make the negative mould that can be fitted to the anatomy of the treatment sites.

In this report, two patients with the superficial tumor of the floor of mouth were treated by mould therapy with two different ways for curative intent. The wax moulds were individually made. The procedure was evaluated. The result and complication were observed.

CASE REPORT

Case no. I

A 67 years old male patient developed a second primary cancer at the floor of mouth after 66 Gy of postoperative irradiation for laryngeal cancer 7 years ago. (figure 1) The pathological section was proved to be squamous cell carcinoma. Because of medical contra-indication for surgery, the patient was planned to be treated radically by irradiation. Because of the late sequelae of the skin and subcutaneous tissue from the previous radiation therapy in the neck region, brachytherapy was the main treatment for this patient.

The individual wax mould of lower jaw and floor of mouth was made for the stable fixation of the applicators. (Figure 2) The procedure for making mould is

1. The 0.5 cm thick wax was made by melting wax at 55°C and left it to be cool.
2. The wax was imprinted on the floor of mouth while it is cool but still soft.
3. Three grooves were done on the upper surface of the mould along the position of the lesion that was imprinted on the mould.

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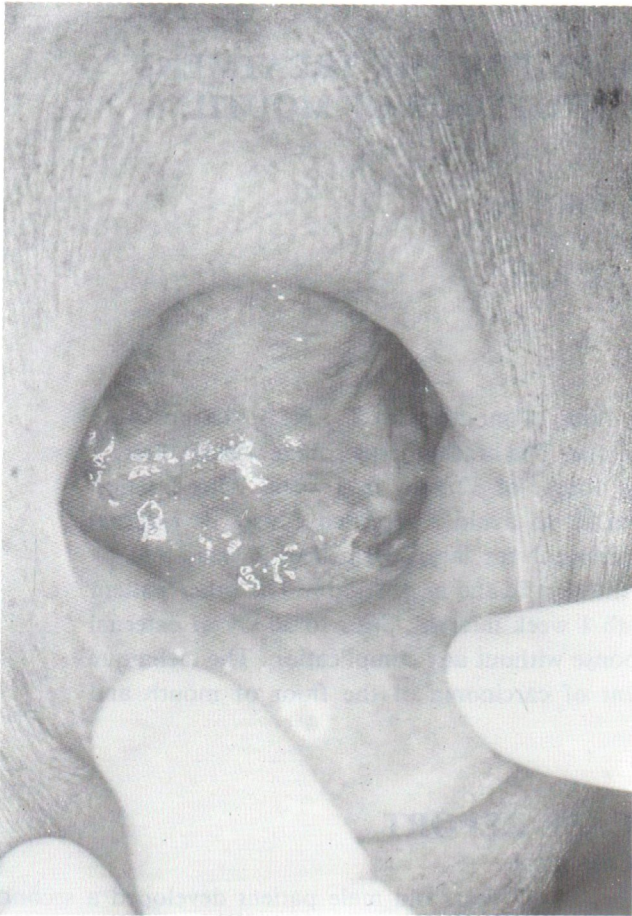


Fig. 1 The superficial ulcer at the floor of mouth.

4. Three plastic catheters were placed in the grooves and fixed by pouring the melted wax about 1 cm thick for separation of the tongue and palate, and imprint the upper surface of mould by placing the mould in position.

5. Local anesthesia was given by xylocaine spray and the surgical clip was placed at the edge of the tumor. The wax mould was held in the mouth (Figure 3) and the simulation film was taken with the dummy in the catheters for treatment planing in order to locate the dwelling positions of the Ir-192 source (Figure 4).

The radiation dose of 6.5 Gy was prescribed at 1 cm beneath the mucosal surface and 1 cm around the tumor margin shown by surgical clip. Five fractions of mould therapy was given once a week for 5 weeks. With the TDF formula, the total tumor dose is equivalent to 5000 cGy of external radiation.¹⁴

Case no. II

A 52 years old male patient was diagnosed to be T₁ N₀ M₀ carcinoma of the floor of mouth. Because the lesion was bordered line T₁ or T₂, he was then treated as a T₂ lesion. The treatment was started with 2 times of mould therapy with the same technique and dosage as in the first patient to the primary lesion, and then after, the external irradiation of 50 Gy was given to the primary and the regional lymph nodes. The patient received 13 Gy by mould therapy and 50 Gy by external radiation to the primary tumour.

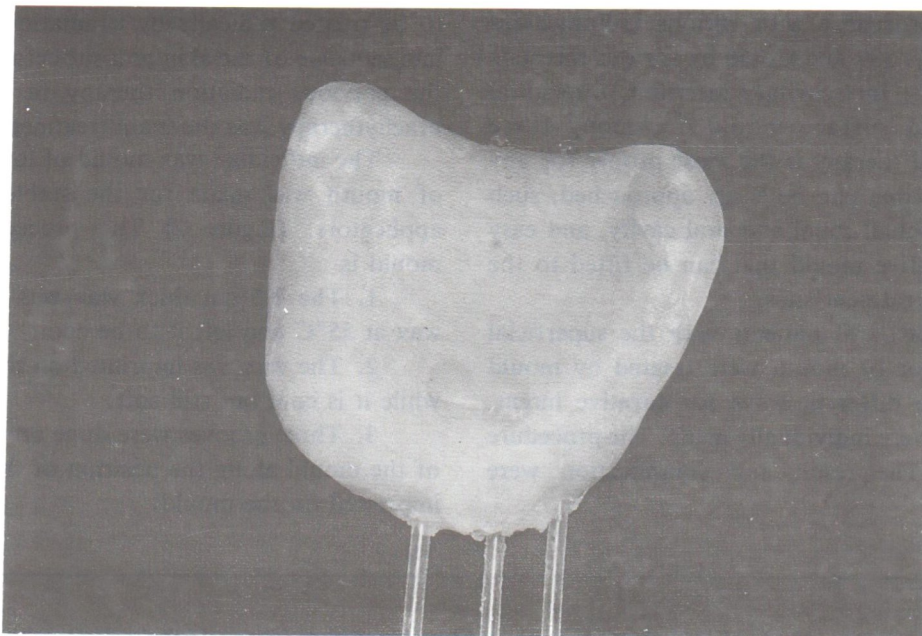


Fig. 2 The wax mould with three catheters.

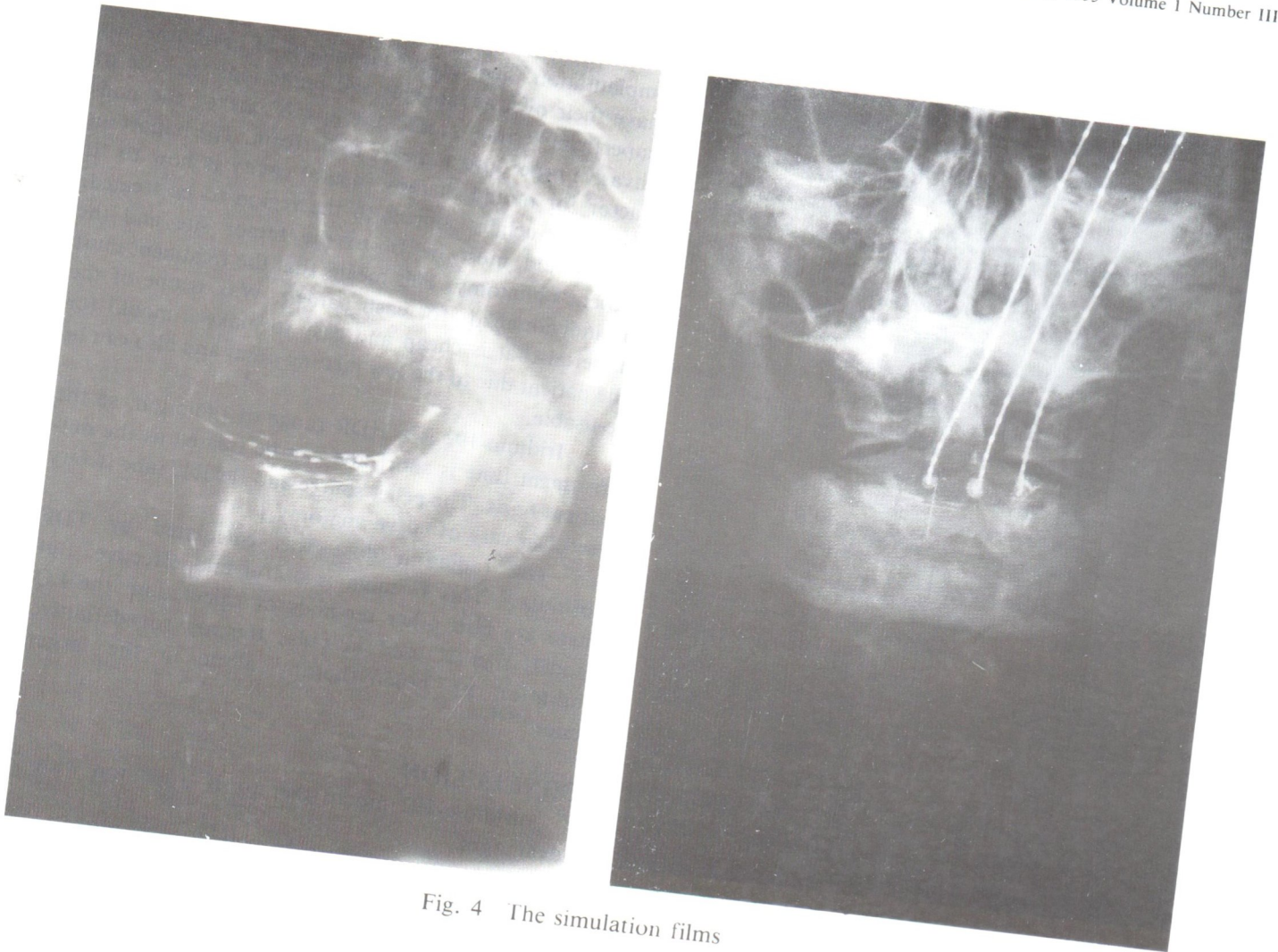


Fig. 4 The simulation films

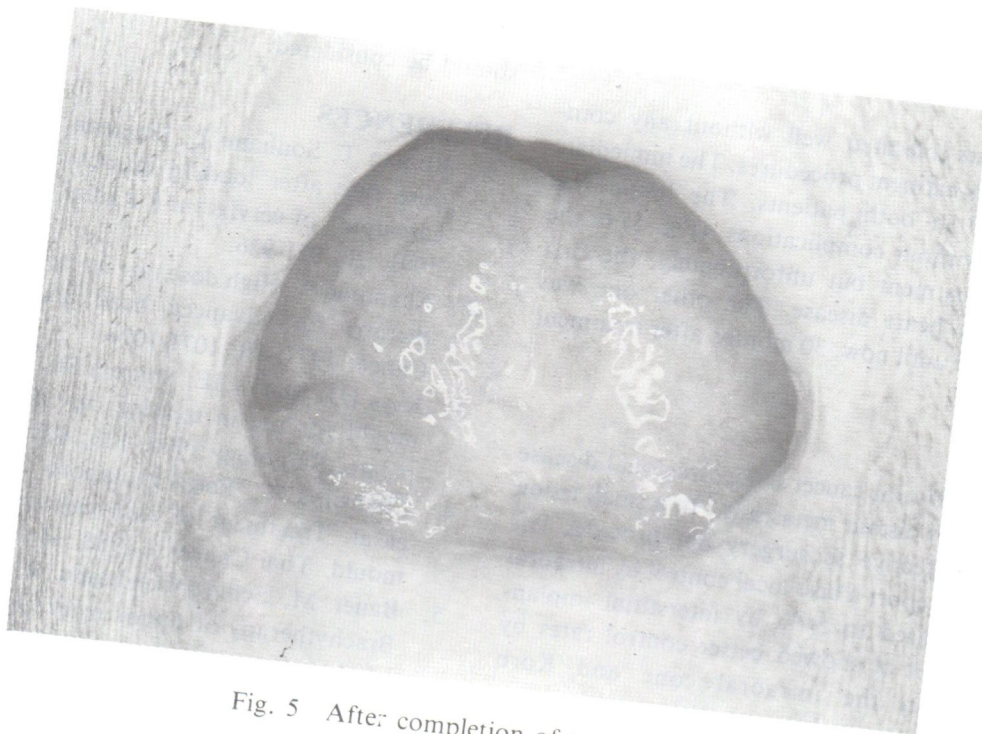


Fig. 5 After completion of treatment



Fig. 3 The wax mould in position.

RESULT

The 2 patients tolerated well without any complication from the treatment procedures. The immediate results were good in both patients. The lesion was still well control without complications (Fig. 5) in the first year after treatment but unfortunately, the first patient died from heart disease. The other one was still well controlled until now, 30 months after treatment with no morbidity.

DISCUSSION

The nature of oral cancer is loco-regional disease with only 7-15% of distant metastasis.⁹ In a small lesion, radiation is as effective as surgery but provides less morbidity. Wang report a best local control by intraoral cone, 86% compared to 54% by interstitial implantation.¹⁰⁻¹¹ Akine et al showed better control rates by implantation than the intraoral cone and Korb reported no difference between these two procedures.^{12,13} There were a great number of patients with head and neck cancer treated by brachytherapy in

Institut Gustave Rouss.¹⁵ Two hundred and six patients with carcinoma of floor of mouth were treated by implantation. The various techniques of brachytherapy have their own advantages and limitations. In case of superficial lesion, mould therapy is one of the non-invasive procedure and easy to perform. The important factor for mould therapy in oral cavity is how to fit the radionuclides sources to the region to be treated. The mould must be fit to the tumor site and the patient's anatomy. This means that the treatment must be individualized for each patient. Wax is one of the material that is cheap and easy to make a mould for the patient due to the low melting point and also can be re-usable.

Iridium-192 is a HDR range of radiation, so the treatment time is short and can be treated as the out-patient basis. The pellet source and flexible tube is very useful in case of curve anatomy.

The radiation dose was calculated by TDF formula.¹⁴ This formula is useful and effective. But there are also other methods of calculation, the LQ model, that is used in pulse therapy for definitive radiation by brachytherapy alone in the larger lesion.^{14,16-18}

CONCLUSION

Iridium-192 mould therapy is a method with 3 advantages.

1. It is easy to perform and reproducible.
2. It is safe for the personels and patients.
3. It can be used as a booster or main treatment in early stage of floor of mouth carcinoma

Further study for radiation dose and schedule should be considered.

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