

CURATIVE INTERSTITIAL BRACHYTHERAPY FOR EARLY STAGE CARCINOMA LIP

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ABSTRACT

Brachytherapy is potentially useful in the treatment of head-and-neck cancers, because most tumor sites, such as the lip, tongue, floor of mouth, tonsil, pharynx, nasopharynx, sinuses, and neck, are accessible for the placement of afterloading applicators and catheters.¹

It has the advantage of delivering a higher radiation dose to the tumor while sparing surrounding normal tissue from radiation. Furthermore, the overall treatment duration is shorter, and the dose distribution confirms to tumor shape.

Brachytherapy is used as “monotherapy” for the treatment of small primary tumors or recurrent disease after external beam radiation therapy (EBRT).

Small cancers of the lip (less than 2 cm) are treated equally well with surgery or radiation therapy with excellent cosmetic and functional results seen in radiation therapy.²

We treated an 18-year old male diagnosed as stage I carcinoma lip with curative interstitial brachytherapy. He was treated to a dose of 3 Gy per fraction, two fractions per day at interval of 6 hours between the two fractions for 6 days. He therefore received a total dose of 36 Gy with High Dose Rate (HDR) Brachytherapy, which is equivalent to 58.36 Gy conventional radiotherapy dose.

At two months follow, the patient is clinically disease free and has no complaints.

Key Words: Radiation Therapy, Interstitial Brachytherapy, Carcinoma Lip, Curative Treatment.

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INTRODUCTION

Brachytherapy (brachy, from the Greek for short distance) consists of placing sealed radioactive sources very close to or in contact with the target tissue. Because the absorbed dose falls off so rapidly with increasing distance from the sources, high doses can be safely delivered to a localized target region. The procedure of surgically inserting radioactive sources or applicators designed to hold them is known as implantation or insertion in the case of intracavitary brachytherapy.¹

Implantation techniques or brachytherapy may be broadly characterized in terms of surgical approach to the target volume (interstitial, intracavitary, transluminal, or mold techniques), the means of controlling the dose delivered (temporary or permanent implants), in terms of source loading technology (preloaded, manually afterloaded, or remotely afterloaded) and in terms of the dose rate used (low, medium, or high).

Brachytherapy, used as an integral part of cancer treatment for almost a century, sustained a rapid growth with the development of afterloading devices and the introduction of artificial radionuclides.^{3,4}

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Small cancers of the lip (less than 2 cm) are treated equally well with surgery or radiation therapy with excellent cosmetic and functional results seen in radiation therapy.²

METHOD

An 18-year-old male presented to the hospital in July 2005 with complaints of a small ulcer over the upper lip near the left angle of the mouth of 2 months duration. Examination revealed a well-circumscribed lesion over the left upper lip, measuring 1 cm x 1 cm x 1 cm, with everted edges, not involving the skin, with no regional lymph node involvement. Wedge biopsy of the lesion was positive



Fig. 1: Pre-Treatment Lesion.

for moderately differentiated squamous cell carcinoma. Routine investigations were done, including complete blood picture, serum urea, creatinine and a chest-x-rays and were normal. He was thus diagnosed as a case of carcinoma upper lip and staged as stage T1N0M0 (Fig.1) and referred to the department of radiation oncology for opinion regarding further management.

After examination, the pros and cons of curative treatment with surgery versus interstitial brachytherapy were discussed with the patient and he opted for treatment with brachytherapy.

He was then started on prophylactic antibiotics and one day prior to the procedure, he underwent pre-anesthetic

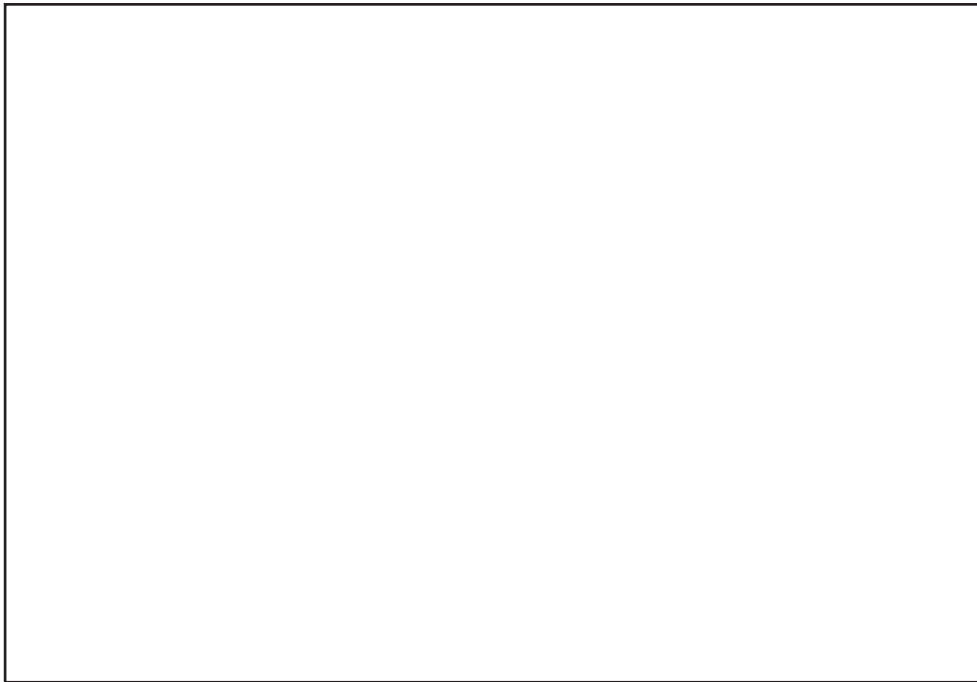


Fig. 2: Insertion of Needle.



Fig. 3: Securing with Buttons.

clearance. Under general anesthesia, 3-Alpha Omega implant 14 gauge size needles were inserted vertically by percutaneous after loading technique at a distance of 0.5 cm from each other (Fig.2). Through these needles, the remote after loading catheters were passed and the needles removed. These catheters were then secured in place with the help of metallic buttons (Fig.3).

Once the procedure was over, the patient was shifted to the simulator room where orthogonal films were taken with guide wire in situ (placed in the catheters) (Fig.4). These films were then transferred to treatment planning system via the Vidar Scanner and a computerized treatment plan was generated (Fig.5).

Once a satisfactory plan was generated, the patient was shifted to the treatment room and the guide wires were removed and the catheters were connected to the HDR (High dose rate) brachytherapy machine and treatment commenced (Fig.6).

He was treated to a dose of 3 Gy per fraction, two fractions per day at a minimum interval of 6 hours between the two fractions for 6 days. He therefore received a total dose of 36 Gy with HDR.

During the entire treatment, he was hospitalized and given prophylactic antibiotics, anti inflammatory drugs and a special attention was paid to his diet (high protein liquid diet).

On completion of the treatment, the catheters were removed with caution while watching for any possible bleeding. He tolerated the entire treatment well, without any untoward incidence or any treatment related complications.

The patient came for follow up one and half month after completion of treatment and clinical examination revealed only mild discoloration of the primary disease site with no evidence of disease (Fig.7).

DISCUSSION

A decision on the treatment choice depends on the size and site of the primary lesion, presence or absence of metastatic cervical lymphadenopathy, expected morbidity associated with a given therapeutic regimen, other medical co morbidity factors, preference, skill, and experience of the surgeon and the radiation oncologists at a given institution, and finally, the wishes of the patient.¹

Interstitial brachytherapy consists of surgically implanting



Fig. 4: Anterior Simulator Film.

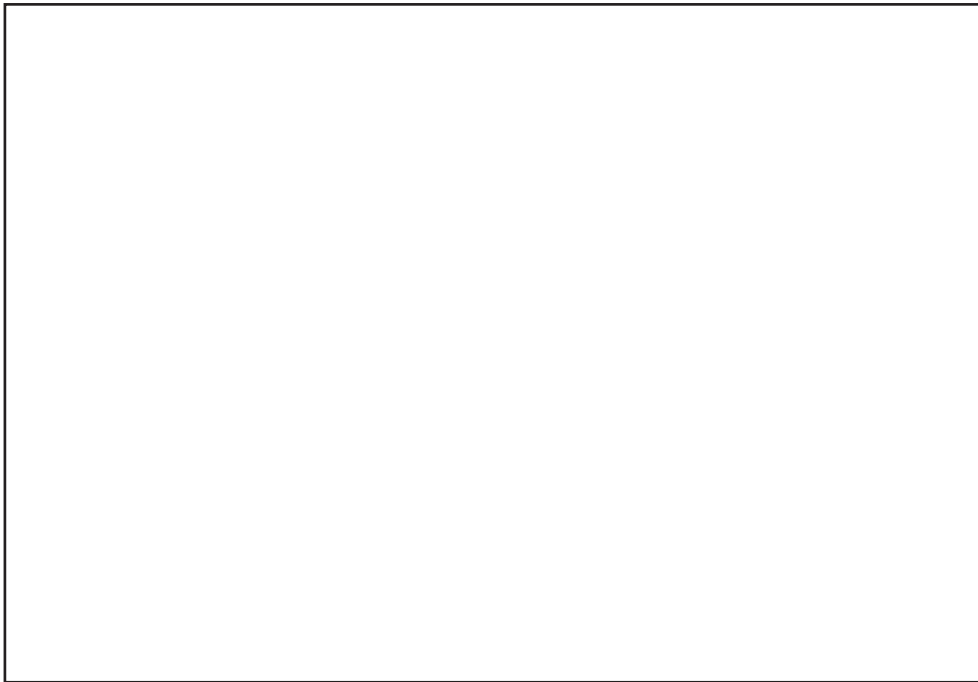


Fig. 5: Computerised Plan

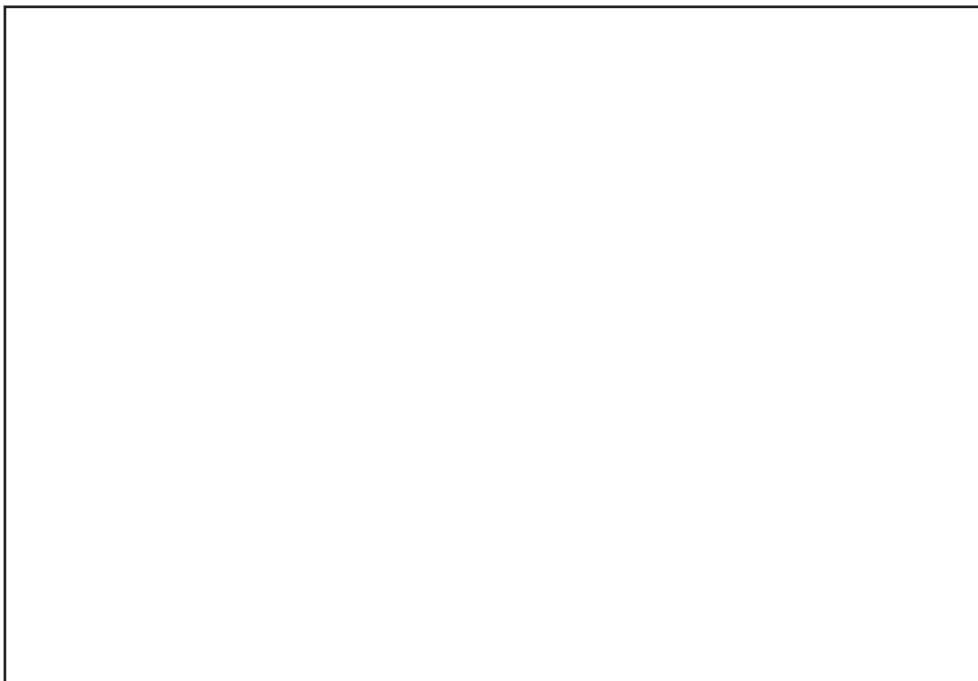


Fig. 6: Treatment.

small radioactive sources directly into the target tissues.

Depending on the volume of the implant, single-plane, double-plane, or volume implants have been used to cover the tumor volume with at least a 0.5- to 1-cm margin as the extent of the lesion is often wider than it is supposed

to be at the initial examination.⁵ The most commonly used technique is percutaneous afterloading technique with ¹⁹²Ir.⁶ The implant can be done manually or by using individually constructed templates.



Fig. 7: Comparison.

Interstitial implant either alone (for small T1 and T2 tumors lip cancers) or after external-beam irradiation yields good results with excellent cosmetic and functional results seen in radiation therapy as compared to surgical treatment.⁷

Irradiation dose is generally determined by the tumor site, target volume, fractionation schema, technique of delivery, and tolerance of the surrounding normal tissue structures.⁸ Brachytherapy is the method of choice to treat lip cancers because the radiation tolerance is very good in this region. The various organs comprising the oral cavity manifest different tolerances to irradiation. The musculature of the tongue and lips manifests a high tolerance to irradiation, whereas the alveolar ridge and mandible have the lowest tolerance.

Patients treated with interstitial brachytherapy should receive prophylactic antibiotics to reduce the risk of secondary infections. Corticosteroids may be used to reduce postoperative swelling.

CONCLUSION

Early stage lip carcinoma cases can be successfully treated with brachytherapy alone yielding excellent functional and cosmetic results.

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