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Results of 2 Dimensional Postoperative Radiotherapy Treatment in Carcinoma Buccal Mucosa Patients: A Regional Cancer Centre Experience

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ABSTRACT

Purpose/Objective(s): In India > 1 million new cases of cancer diagnosed every year. 40-50% of these cases are of head and neck cancer because of tobacco overuse. In our institute we have almost 1000-1300 new cases of Carcinoma Buccal Mucosa reported every year. From which 70-75% are surgically operable. For post-operative Radiotherapy treatment, we treat most of our patients by 2 Dimensional conventional treatments. Purpose of this study is to assess toxicity & long term results of postoperative carcinoma buccal mucosa cases treated by 2 Dimensional conventional treatment planning.

Materials/Methods: From January 2009 to January 2012, almost 1980 postoperative cases of Carcinoma Buccal mucosa were referred for radiotherapy treatment. From which 1584 cases were suitable for postoperative 2 Dimensional Conventional planning. In selected cases, 71%, 18%, 11% cases were of Stage IV, III, II (close margin) respectively. Postoperative chemotherapy and radiotherapy was indicated in 475 patients. For all patients Plaster of Paris cast was prepared & X-ray was taken on Simulator machine. Target volume was drawn on x-ray & treatment plan generated on contour drawn with 90-95% isodose line covering the target, with hot spot of +10% on 2D Plato treatment planning system. All patients were treated with unilateral Anterior Posterior Lateral wedge pair technique for buccal mucosa and unilateral lower neck was given in indicated patients. Dose prescribed was 60 Gy/30#, 2Gy/#, 5 days a week, total 6 weeks treatment. Treatment plan verified on day 2 and treatment started. In patients where postoperative chemotherapy and radiotherapy was used, chemotherapy was given Cisplatin 30mg/m2 every weekly for 6 weeks. In most of the patients, treatment break was not required. All patients completed treatment successfully. Patients were assessed for locoregional control, acute & late toxicity and followed up for 3 years for disease free survival and overall survival.

Results: Grade II & III acute mucositis was 82% & 18% respectively in 1109 patients who received only postoperative radiotherapy. For patients who received postoperative radiotherapy and chemotherapy Grade II and Grade III acute mucositis was seen in 75% & 25% respectively and side effects related to Cisplatin were managed conservatively. Almost all patients had Grade II skin reactions. Grade III skin reactions were observed in 8% of patients on post operative radiotherapy alone and 19% of patients on postoperative radiotherapy and chemotherapy but were manageable. All patients tolerated treatment well. For 1584 patients, follow up dropout rate was 20%. None of the patients developed significant late toxicity. As opposite parotid spared, no late complication of xerostomia observed. For 1268 patients, 1-, 2-, 3- year locoregional control rates were 82%, 75%, 68% respectively. Disease free survival rate was 63% (799 patients) & overall survival was almost 55% (697 patients) at median follow up for 40 months.

Conclusion: 2D Conventional Radiotherapy Treatment Planning in our set up has shown very good results with almost 50% survival rates. It is less toxic treatment with fewer complications & less time consuming. It is highly cost effective treatment approach & results are very much encouraging.

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BACKGROUND

The presentation of carcinoma of the buccal mucosa is the most common site in oral cancers in India. In India > 1 million new cases of cancer diagnosed every year. Tobacco and alcohol use are major risk factors for carcinoma of buccal mucosa. In our country, India

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most commonly used pan which is basically combination of lime and tobacco in betel leaves is responsible for major carcinogen exposure resulting in causation of oral cancer.[1,2] In our country 5 year survival rates are 80% in stage I compared to 5-15% for locally advanced cases.[3,4] Locoregional recurrence 30-80% is a major cause of failure of treatment in such cases.[4] There are many poor prognostic features which lead to treatment failure like advanced T stage, perineural invasion, bone involvement, surgical margin positivity, lymph node positive and perinodal extension or vascular involvement. In such high risk cases usually radical surgery is done first followed by adjuvant postoperative radiotherapy (PORT) in order to decrease recurrence rates.[5] Additionally in few cases according to the adverse features present chemotherapy has been added to improve locoregional control.

In our institute we have almost 1000-1300 new cases of Carcinoma of Buccal Mucosa reported every year. From which 70-75% are surgically operable. For post-operative Radiotherapy treatment, we treat most of our patients by 2 Dimensional conventional treatments. We conducted this study to assess toxicity & results of postoperative cases of carcinoma of buccal mucosa treated by 2 dimensional conventional treatment planning. Hence, we conducted this study with the endpoints primarily to study locoregional disease control and secondarily to study disease-free survival, overall survival and toxicity profile.

METHODS

Patients and Stage Classification

From January 2009 to January 2012, 1980 patients diagnosed with buccal mucosa carcinoma were retrospectively reviewed. From which 1584 cases were suitable for postoperative 2 Dimensional Conventional planning. Out of these 1026 patients were males. The age most common age presentation was in 41-50 age groups (Figure 1). In selected cases, 71%, 18%, 11% cases were of Stage IV, III, II (close margin) respectively (Figure 2). In relation to American Joint Committee on Cancer, 6th edition cancer staging was done. Postoperative concurrent chemotherapy and radiotherapy was indicated in 475 patients.

A dental/oral treatment plan needs to be implemented before radiotherapy and should include the following: 1) eliminating potential sources of infection; 2) performing any dental extractions at least 2 weeks before RT; 3) treating active dental caries and periodontal disease; 4) treating oral candidiasis; and 5) educating patients about preventive strategies.[6,7]

For all patients plaster of Paris cast was prepared (Figure 3) & X-ray was taken on Simulator machine (Figures 4 and 5).

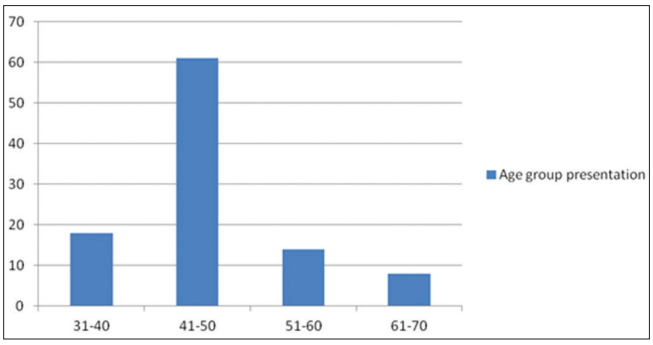

Figure 1: Age group presentation

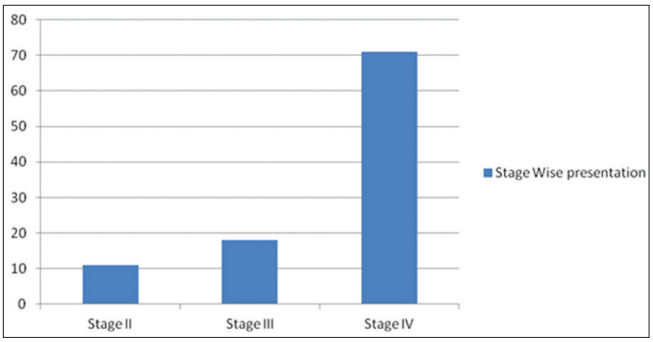

Figure 2: Stage wise presentation

Figure 3: Patient undergoing plaster of paris cast preparation

Target volume was drawn on x-ray & treatment plan generated on contour drawn with 90-95% isodose line covering the target, with hot spot of +10% on 2D Plato treatment planning system. All patients were treated with unilateral Anterior Posterior Lateral wedge pair technique for buccal mucosa and unilateral lower neck was given in indicated patients (Figure 6). Dose prescribed was 60 Gy/30#, 2Gy/#, 5 days a week, total 6 weeks treatment. Treatment plan verified on day 2 and treatment started. In patients where postoperative radiotherapy and chemotherapy was used, Cisplatin 30mg/m2 was given every weekly for 6 weeks. In most of the patients, treatment break was not required. All patients completed treatment successfully. Patients were assessed for locoregional control, acute & late toxicity and followed up for 3 years for disease free survival and overall survival.

Figure 4: Patient undergoing simulator planning

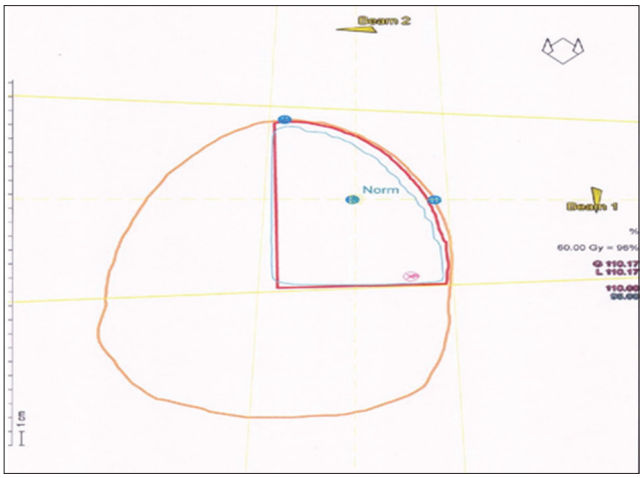

Figure 6: 2D plan on plato treatment planning system

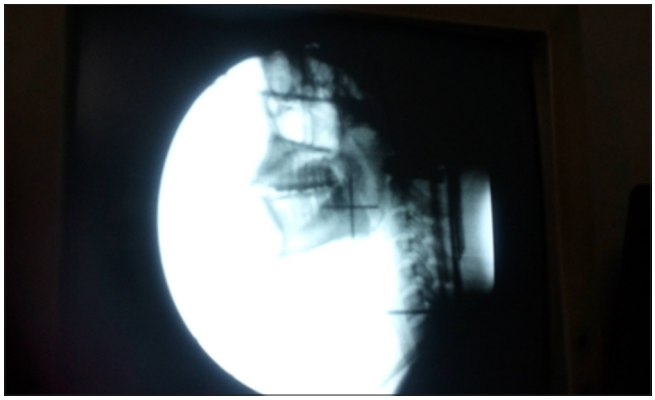

Figure 5: Simulator planning

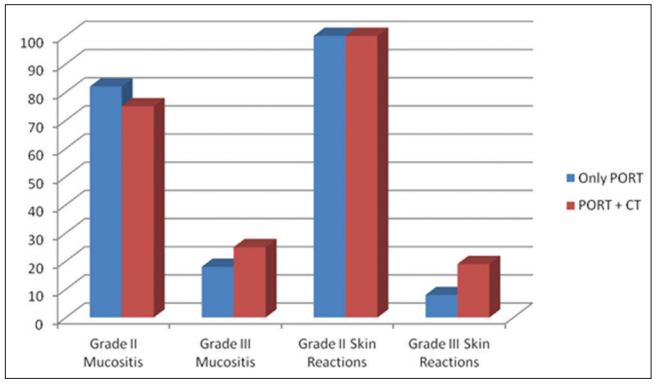

Figure 7: Reactions – Mucositis and skin reactions in patients under postoperative radiotherapy only and under postoperative radiotherapy and chemotherapy

RESULTS

Grade II & III acute mucositis was 82% & 18% respectively in 1109 patients who received only postoperative radiotherapy. For patients who received postoperative radiotherapy and chemotherapy Grade II and Grade III acute mucositis was seen in 75% & 25% respectively and side effects related to Cisplatin were managed conservatively. Almost all patients had Grade II skin reactions. Grade III skin reactions were observed in 8% of patients on post operative radiotherapy alone and 19% of patients on postoperative radiotherapy and chemotherapy but were manageable (Figure 7). However all patients tolerated treatment well. For 1584 patients, follow up dropout rate was 20%. None of the patients developed significant late toxicity. As opposite parotid spared, no late complication of xerostomia observed.

For 1268 patients, 1-, 2-, 3- year locoregional control rates were 82%, 75%, 68% respectively. Disease free survival rate was 63% (799 patients) & overall survival was almost 55% (697 patients) (Figure 8) at median follow up for 40 months.

DISCUSSION

Carcinoma of the buccal mucosa is an aggressive cancer of the oral cavity as it can spread through multiple routes to alveolar ridge, palate, maxillary sinus or pterygoid muscles. Majority of cases present with disease extension beyond buccal mucosa. The primary echelon groups of nodes are submandibular nodes. The high incidence of carcinoma of the buccal mucosa in our country is because of overuse of tobacco and thus mostly these patients present in advanced stages in more than 70% of cases. Singh et al[8] published early results of carcinoma of buccal mucosa from India in 1966.

For locally advanced lesions of buccal mucosa surgery is done first followed by postoperative radiotherapy according to presence of high risk features. In 1989, Pradhan et al discussed the treatment response of these cancers in detail.[3] Sixty six percent of patients in this series had T4 lesions. At 18 months follow-up, it was reported that with post operative radiotherapy (PORT) disease free survival was far better. Author also reported that patients with poorly differentiated squamous cell tumors fared worse (no survivor at 18 months of follow up). Similar experience

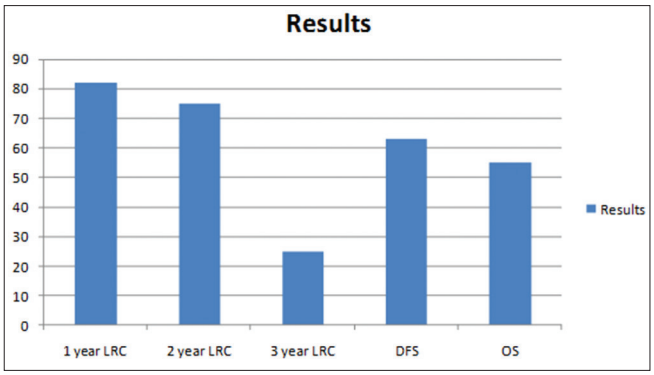

Figure 8: Results of patients in terms of locoregional control, disease free survival and overall survival

was reported by Mishra et al.[9] Those patients who received postoperative radiotherapy fared better in terms of survival even with T3 and T4 Buccal Mucosa cancer from 38% to 68%. Krishnamurthy et al from Cancer Institute, Adyar reported t heir experience on Buccal Mucosa cancers in 1971.[10] Ninety three percent of patients in this series had T3 and T4 lesions and 5 year survival with single modality treatment was 19-20%. Dinshaw et al reported a relapse rate of around 50% in oral cavity tumors after post operative radiotherapy in locally advanced disease.[11]

Bahadur et al[12] from the AIIMS New Delhi shared their experience of treatment outcomes with surgery and adjuvant postoperative radiotherapy in locally advanced head and neck cancers. They treated 252 cases of stage III and IV head and neck cancers either with pre or post operative radiotherapy and surgery. 193 patients could complete the entire planned treatment protocol. 58 cases (33.5%) failed either at the primary or regional sites or both. Nine cases (5%) had distant metastasis. Absolute and determinate 4-year disease free survival was seen in 55% and 61% of cases respectively. They concluded that with combined modality therapy primary and regional failures were less. Post operative Radiotherapy became standard of care in locally advanced disease in India.

The role of chemoradiotherapy or post operative chemoradiotherapy specifically for the subset of patients with Buccal Mucosa cancer have not been studied in randomized trials. The data available from studies in head and neck cancers in general show that combined modality treatment i.e. concurrent chemoradiotherapy is better than radiotherapy alone, both in the definitive and adjuvant settings [MACH-NC meta-analysis].[13-15] Adjuvant chemo radiation (CT+RT) is to be offered to all patients with multiple node positive disease, extra capsular spread or margin positive disease.

We have evaluated 1584 patients in this study who were given postoperative radiotherapy according to the indications of adjuvant radiotherapy. Our hospital being a busy regional cancer centre and with major bulk of patients having financial constraints, these patients were treated with simple 2 Dimensional conformal radiotherapy. Nowadays newer conformal techniques have come up in big way in order to reduce the side effects.[16,17] In this study we thus tried to study the locoregional control of these patients along with toxicity profile. Our toxicity profile was acceptable with Grade II and Grade III acute mucositis in 82% and 18% of patients out of total 1109 patients taken for only postoperative radiotherapy. For patients who received postoperative radiotherapy and chemotherapy Grade II and Grade III acute mucositis was seen in 75% & 25% respectively and side effects related to Cisplatin were managed conservatively. Almost all patients had Grade II skin reactions. Grade III skin reactions were observed in 8% of patients on post operative radiotherapy alone and 19% of patients on postoperative radiotherapy and chemotherapy but were manageable. There were no issues in tolerating the treatment as the toxicity profile was very much within the acceptable range.

For 1584 patients, follow up dropout rate was 20%. None of the patients developed significant late toxicity. As opposite parotid spared, no late complication of xerostomia observed. For 1268 patients, 1-, 2-, 3- year locoregional control rates were 82%, 75%, 68% respectively. Disease free survival rate was 63% (799 patients) & overall survival was almost 55% (697 patients) at median follow up for 40 months.

Thus with all above results we were happy to see that 2 Dimensional treatment planning is very much acceptable treatment with acceptable toxicity profile and adequate locoregional control especially when we are having financial and time constraints with heavy workload. With the advancements in technology of radiation oncology planning we have now started using Computed Tomography scan based 2 D planning for carcinoma buccal mucosa patients offering more better target coverage and additionally reasonably lesser toxicity rates. Thus such type of 2D planning also offers a reasonable dose distribution plan and at the same time treating a large number of patients on scale with heavy workload.

CONCLUSION

Thus we conclude that 2D Conventional Radiotherapy Treatment Planning in our set up has shown very good results with almost 50% survival rates. It is less toxic treatment with fewer complications & less time consuming. It is highly cost effective treatment approach & results are very much encouraging.

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