
A retrospective analysis on flap design used in mandibular carcinoma - a hospital-based study

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Abstract: The squamous cell carcinoma is by far the most commonly found tumour of the oral cavity. This includes the tongue, floor of mouth, retromolar trigone, and lips. The mainstay of treatment for these patients in the surgical resection, neck dissection, radiation, and local nodal basins in the neck. The aim of the study is to investigate the flap design used in Mandibular carcinoma among the patients who visited the Department of oncology between June 1st 2019- 1st April 2020. Data was extracted by reviewing patient records. Out of 57 patients 22 patients were diagnosed with mandibular carcinoma. There was male predominance with 90.91% followed by females with 9.09%. The age group of 51-60 (50%) followed by 41-50 years (36.36%) was affected by mandibular carcinoma. Buccal carcinoma (77.27%) was the most commonly affected site. Cheek splitting was the most common flap used to excise the carcinoma. (63.64%) followed by lingual-releasing flap (16.16%), lip-splitting flap (9.09%) and visor flap (9.09%). Regarding the site of carcinoma and type of approach used, cheek splitting approach was used predominantly for buccal carcinoma lesions; lingual releasing approach was used to operate retromolar trigone carcinomas; Lip-splitting approach and visor flap approach were used for tongue carcinomas. The association between the design of flap used and site of occurrence of lesion was found to be statistically significant (p value- 0.02).

Keywords: Buccal Carcinoma; Cheek Splitting; Excision-Flap; Innovative technique; Mandibular Carcinoma

INTRODUCTION

Squamous cell carcinoma (SCC) in the oral cavity is a common disease that is associated with several risk factors, including smoking, alcohol use, viral infection, immunosuppression, malnutrition, chronic irritation as well as previous disease such as odontogenic cyst. SCC associated with odontogenic cysts are extremely rare, and those arising within the jawbones occur with an incidence of approximately one or two persons per thousand (Siegel et al., 2014). Cancers of the oral cavity may involve any single one of these specialized types of tissue or more than one. As noted, tissues in this area include bone, teeth, muscle, nerves, a rich supply of blood vessels, numerous saliva glands, and the specialized lining called mucosa. Although tumors may arise in any of these types of tissues they are most commonly related to changes in the lining of the mouth. The most common cancer of the oral cavity is called squamous cell carcinoma and arises from the lining of the oral cavity. Over 95 percent of oral cavity cancers are squamous cell carcinomas and these cancers are further subdivided by how closely they resemble normal lining cells: well differentiated, moderately differentiated and poorly differentiated. Other types of cancers of the oral cavity include cancers of the salivary glands such as mucoepidermoid carcinoma and adenoid cystic carcinoma, sarcomas (tumors arising from bone, cartilage, fat, fibrous tissue or muscle), and melanomas. (Parkin et al., 2005; Siegel et al., 2014). It affects the mandible in 61% of the cases.

Histopathologically it presents with deep invasion, neural spread, lymph node metastasis, invasion of blood vessels and the presence of multiple separate cancers in the area. Metastatic tumours from other sites usually spread to the jaw through the paravertebral plexus. In 2005, oral carcinoma occurred around 3,75,000 people leading to 1,77,000 deaths in India. The mandibular carcinoma has a survival rate of 65% when diagnosis was localised cancer, 39% of the survival rate when it spreads to the different parts of the body. (Lindberg and Jesse, 1968). The survival rate is dependent upon the location of disease in the mouth. The removal of the carcinoma from the oral cavity and neck is primarily achieved by surgery. (Rodu and Jansson, 2004). The squamous cell carcinoma is by far the most commonly found tumour of the oral cavity. This includes the tongue, floor of mouth, retromolar trigone, and lips. The mainstay of treatment for these patients in the surgical resection, neck dissection, radiation, and local nodal basins in the neck. (Byers, Wolf and Ballantyne, 1988). To achieve good

surgical results, an excellent exposure and access to carcinoma is essential and for this a proper approach has to be made, with least morbidity rate (Byers, Wolf and Ballantyne, 1988; Ow and Myers, 2011). During the removal of disease in the oral cavity, an attempt is achieved by removing 1-1.5 cm soft tissue around the tumour. The two important decisions are to approach the mandibular tumour by lip splitting along with visor flap or transoral approach and the lingual releasing approach.

Our department is passionate about research we have published numerous high quality articles in this domain over the past years (Abraham et al., 2005; Devaki, Sathivel and BalajiRaghavendran, 2009; Neelakantan et al., 2010, 2015; Arja et al., 2013; Ramshankar et al., 2014; Sumathi et al., 2014; Surapaneni and Jainu, 2014; Surapaneni, Priya and Mallika, 2014; Ramamoorthi, Nivedhitha and Divyanand, 2015; Manivannan et al., 2017; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; J et al., 2018; Ravindiran and Praveenkumar, 2018; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Krishnaswamy et al., 2020; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020) This article aims to study about the types of flap designs used to remove the mandibular carcinoma in a private dental college.

MATERIALS AND METHODS

Subjects where the patients who visited saveetha dental college and hospitals and are grouped according to the flap design used to treat the mandibular carcinoma. The gender participated in the study was also evaluated.

This study was approved by the ethical committee for research at saveetha dental college. SDC/SIHEC/2020/DIASDATA/0619-0320.

Data was collected by reviewing patient records and analysing the data of 86,000 patients between June 2019-April 2020. 57 carcinoma patients were identified among which 22 patients (39%) reported with mandibular carcinoma. The patients intra oral photos, history of presenting illness, systemic disease was accessed.

Inclusion criteria

Patient with the mandibular carcinoma

- ❖ Squamous cell carcinoma
- ❖ Osteosarcoma
- ❖ Gain cell tumour
- ❖ Ewing tumour
- ❖ Multiple myeloma

Exclusion criteria

- Maxillary carcinoma
- ❖ Squamous cell carcinoma
- ❖ Verrucous carcinoma
- ❖ Lymphoma
- ❖ Mucosal melanoma
- ❖ Kaposi sarcoma
- ❖ Odontogenic sarcoma
- Physically challenged patients
- People with diabetes
- People of age less than 18 years of age.

Statistical analysis: The data was tabulated and analysed using IBM SPSS version 2.0. Non-parametric data were analysed using descriptive statistics measuring percentage and frequency. The association between Type of flap used in Mandibular Carcinoma, age, and gender was done with Pearson's Chi-square test

RESULTS AND DISCUSSION

A total of 57 patients were identified as carcinoma patients, in this 22 patients (39%) reported with mandibular carcinoma. This study showed a male predominance of 20 patients (90.91%) when compared to female 2 patients (9.09%) [Figure 1]. The age group commonly affected was 51-60 years followed by the age group of 41-50 years and 61-70 years [Figure 2]. The site of involvement includes the tongue (18.18%), buccal mucosa (77.27%), retromolar trigone region (4.55%) [Figure 3]. Cheek-splitting flap design was commonly used in the buccal carcinoma (63.64%) followed by visor flap and lingual releasing flap [Figure 4]. The association between flap design and site of carcinoma affected in the population was assessed using Chi-square test and was found to be statistically significant [chi square value-10.099; p value- 0.02(p<0.05)]. [Figure 5].

The analysis was aimed to investigate the flap design used to excise mandibular carcinoma. Males (90.91%) and people in their 5th decade (50%) were most commonly affected which corresponds to the high risk due to chronic usage of quid, the betel nuts chewing, tobacco chewing along with alcohol consumption. Most commonly affected

site of occurrence was buccal mucosa(77.27%), primarily due to the pouching habit noted among the Indian population. Tongue and retromolar trigone were the other commonly affected sites. Approaches that were used were cheek splitting approach, lingual releasing approach, lip splitting approach and visor flap, among these cheek splitting was most commonly used. Regarding the site of carcinoma and type of approach used, cheek splitting approach was used predominantly for buccal carcinoma lesions; lingual releasing approach was used to operate retromolar trigone carcinomas; Lip-splitting approach and visor flap approach were used for tongue carcinomas. The association between the design of flap used and site of occurrence of lesion was found to be statistically significant (p value- 0.02). Rassekh et al mentioned that cheek splitting and modified lip-splitting methods are able to obtain a frontal view of the lesion, avoiding injury to the lingual nerve due to the tip of the reciprocating saw and perform resection through a slightly curved incision, successfully preventing pathological fracture. He also showed that these techniques provided excellent cosmetic results with minimal complications (Rassekh, Janecka and Calhoun, 1995; Okura et al., 2012). Modified chevron lip splitting technique showed the excellent aesthetic results of the lip. (Plaass, no date)

The mandibular lingual releasing approach is used for surgical management of oral and oropharyngeal tumour provides excellent visualisation of the mandibular carcinoma. It allows the surgeon to approach the lower region of the mandible without involvement of lip splitting. The study conducted by Stringer in 1987-1991 with the follow up of 15 patients had clear margins of resection and provided excellent results without any recurrence rate(Stringer et al., 1992). In our study carcinoma was resected in 19% of the cases by using the lingual releasing flap. Few comparative studies mention that there was no significant difference in the rate of recurrence when lip splitting and visor flap technique were used. In the postoperative phase lip splitting technique presented with fistula formation in many cases and hence in order to avoid this modified techniques are also followed(Okura et al., 2012) (Siegel et al., 2014).

Advanced carcinoma lesions require resection and the reconstruction. Planning on large resections in the oral cavity can be challenging and several approaches exist to achieve these procedures with the least functional and the cosmetic defects. The study done by Okura et al does not show any significant difference in the margins achieved when compared among various approaches. (Okura et al., 2012).

Considerable studies have been conducted in the field of Surgery with relevance to the current population under study(Jesudasan, Abdul Wahab and Muthu Sekhar, 2015; Christabel et al., 2016; Kumar and Sneha, 2016; Patturaja and Pradeep, 2016; Kumar, 2017a, 2017b, 2017c; Kumar and Rahman, 2017; Packiri, 2017; Patil et al., 2017; Marimuthu et al., 2018; Rao and Santhosh Kumar, 2018; Abhinav et al., 2019; Abhinav, Sweta and Ramesh, 2019; Jain et al., 2019). This study is based on a limited sample size visiting a private dental college, performed in a shorter span of one year. To improve the scope of the research, in future studies can be planned including a larger population and longer follow up.

CONCLUSION

Within the limitations of this study, we conclude that surgical management of mandibular carcinoma was performed for 22 patients, predominantly males(90.91%) and most common age groups which underwent surgical treatment for the same were in the age group of 51 to 60 years(50%). Among various flaps used to resect the tumour, Cheek splitting approach was used in the majority of cases (76.47%), followed by lip splitting, lingual releasing and visor flap. Cheek splitting approach satisfies the objectives of a good approach which include preserving the vital structures, improving the ease of operating technique, access and excellent cosmetic results with minimal complications.

AUTHORS CONTRIBUTION

First author (Harini G) performed analysis, and interpretation and wrote the manuscript. Second author (Dr.Kathiravan Selvarasu) contributed to conception, data designs, analysis, interpretation and critically revised the manuscript. Third author (Dr.Bala Krishnan R N) participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

Conflict of interest: There are no conflicts of interest

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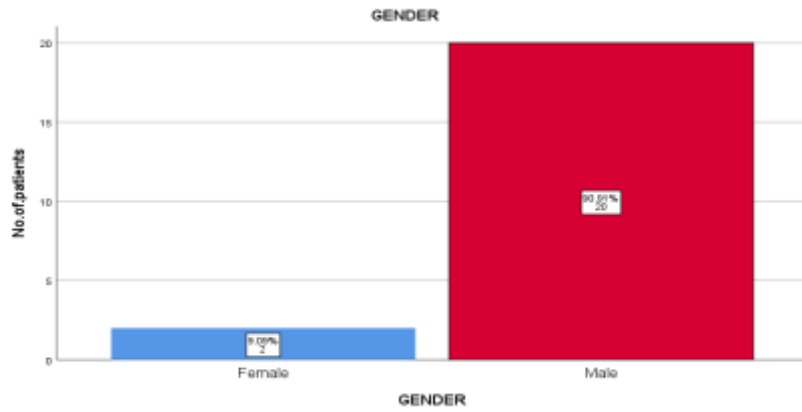


Fig.1: Bar Graph showing the gender distribution. X axis corresponds to the gender and Y axis corresponds to the number of patients with mandibular carcinoma. Red denotes males and blue denotes females. A male predominance was noted. Males - 90.91%, Females - 9.09%

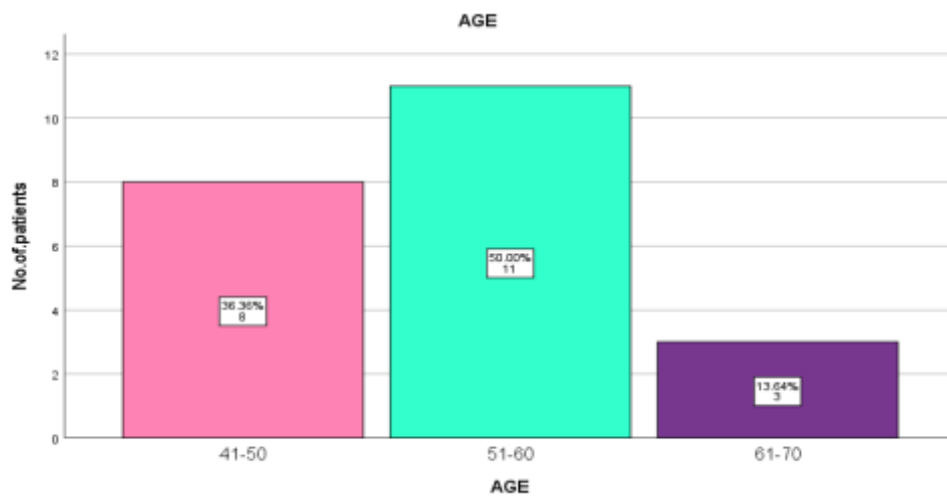


Fig.2: Bar Graph showing the age distribution. X axis corresponds to the age and Y axis corresponds to the number of patients with mandibular carcinoma. The colour pale pink denotes 41-50 years, pastel green denotes 51-60 years and violet denotes 61-70 years of age. The highest number of patients were seen between the ages of 51-60 years of age (50%).

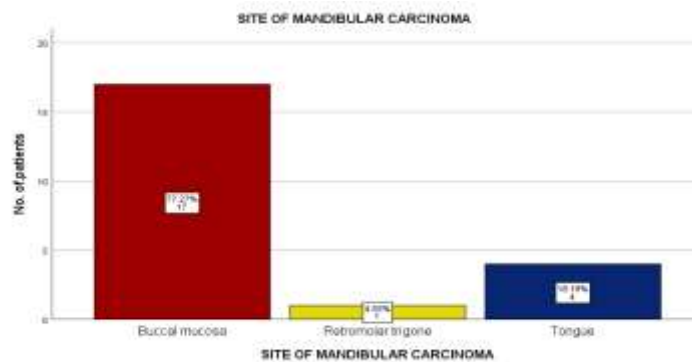


Fig.3: Graph showing the site affected in patients with mandibular carcinoma. X axis corresponds to the site affected and Y axis corresponds to the number of patients. The colour brown denotes buccal mucosa, mustard denotes retromolar trigone and dark blue denotes tongue,. The most commonly affected site was buccal mucosa which was among 17 patients (77.27%) followed by tongue among 4 patients (18.18%) and retromolar trigone in 1 patient (4.55%).

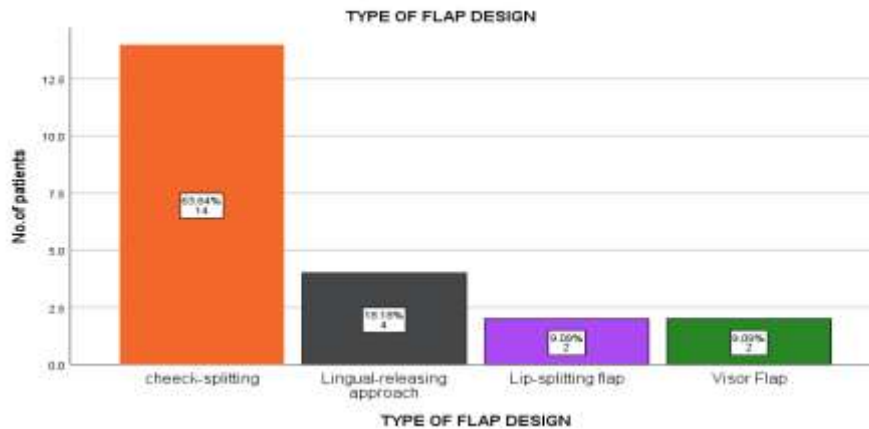


Fig.4: Bar Graph showing the flap design used in mandibular carcinoma. X axis corresponds to the design of flap and Y axis corresponds to the number of patients. The orange colour denotes Cheek-splitting, black colour denotes Lingual-releasing approach, purple denotes lip-splitting flap and green denotes Visor flap. The most commonly used flap was Cheek-splitting (63.64%).

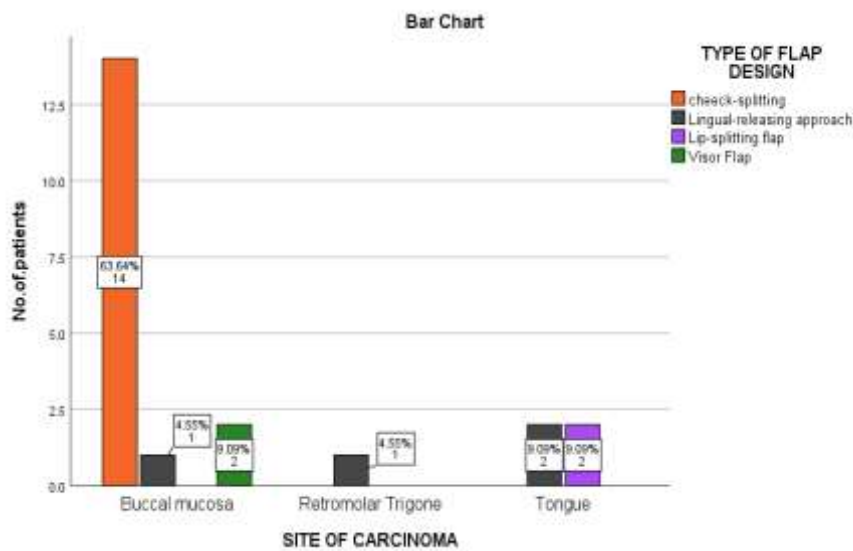


Fig.5: Bar graph showing the association between flap design and site of carcinoma population. X axis corresponds to the site affected and Y axis corresponds to the number of patients. Buccal carcinoma was majority operated by Cheek-splitting (orange), Chi-square test was done to find the association between site and flap design and was found to be statistically significant [chi square value-10.099; p value- 0.02 (p<0.05)].