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Histopathological Profile of Tumor and Tumor Like Lesions of Oral Cavity at A Tertiary Care Center in Nepal

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ABSTRACT

Background

Tumor and tumor like lesion of the oral cavity is any abnormal growth or mass with varied histopathological spectrum ranging from non-neoplastic reactive to benign to potentially malignant and malignant. Ulcero-proliferative lesions that can mimic cancer pose a diagnostic challenge. Final diagnosis can be made by histopathological examination.

Methods

This cross-sectional study was conducted on 148 cases of biopsies of oral cavity lesions received from January 2022 to December 2024. Lesions were categorized as non-neoplastic, benign, oral potentially malignant disorders (OPMD) and malignant. Age, gender, age group, site of lesion, category of lesion, clinical diagnosis and histopathological diagnosis were calculated. Association between category of clinical diagnosis and histopathological diagnosis was sought.

Results

Age of the patients ranged from 5 to 83 years with mean 42.9 years. Female male ratio was 1.02:1. The most common site was tongue comprising 43(29.1%) cases. 49(33.1%) cases were non-neoplastic, 24(16.2%) cases were benign, 55(37.2%) cases were OPMDs and 20(13.5%) cases were malignant. Mucocele was the most common non neoplastic lesion comprising 13(8.8%) cases. Squamous papilloma was the most common benign lesion comprising 7(4.7%) cases. Keratosis consistent with leukoplakia was the most common OPMD comprising 30(20.3%) cases and all 20(13.5%) malignant cases were squamous cell carcinoma.

Conclusions

Biopsy and histopathological examination serve as important tool in diagnosing or ruling out malignancy in tumor and tumor like lesions of oral cavity and guiding in further management.

Keywords: carcinoma; squamous cell; keratosis; leukoplakia; mucocele; oral cavity.

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INTRODUCTION

Tumor and tumor like lesion of oral cavity refers to any abnormal growth ranging from benign growths like fibromas, mucoceles and papillomas to potentially malignant lesions like leukoplakia and malignant cancers like squamous cell carcinoma.[1] Cancer of lip and oral cavity is 16th most common and 15th most common incidence and mortality wise globally. Asia shares the highest burden with respect to incidence, prevalence and mortality.[2] Ulcero-proliferative lesions that can mimic cancer pose diagnostic challenge. Moreover, patients with lower socioeconomic conditions tend to avoid dental visits due to perceived higher cost.[3] Diagnosis can be made by various clinical and radiological features, however, final diagnosis is based on histopathological examination.[4,5] Hence, this study is undertaken to find out histopathological profile of tumor and tumor like lesions of oral cavity, age, gender and site distribution of these lesions and association between clinical and histopathological diagnoses.

METHODS

This cross-sectional study was conducted in Department of Pathology, College of Medical Sciences and Teaching Hospital (COMS-TH), Bharatpur, Chitwan, Nepal. Ethical clearance was obtained from institutional review committee (IRC) of College of Medical Sciences and Teaching Hospital (Reference No. COMSTH-IRC/2025-032). Minimum sample size calculated was 140 with 3.7% prevalence of oral cavity lesions quoted in study by Karki et al.[6] 148 cases of biopsies of ulcerative, proliferative, plaque or tumor like lesions of oral cavity (labial surfaces of both lips, gingiva, buccal mucosa, maxilla, mandible, mobile tongue, hard palate, soft palate and floor of mouth) received from otorhinolaryngology and oral and maxillofacial surgery departments were included in the study duration of 3 years from January 2022 to December 2024. Recurrent cases and suboptimal biopsies were excluded. Biopsies from tonsils, uvula and pharyngeal walls were also excluded. Age, gender, site of lesion, clinical diagnosis and histopathological diagnosis were noted from histopathology requisition forms into a predesigned proforma. Lesions were categorized as non-neoplastic, benign, oral potentially malignant disorders (OPMD) and malignant according to WHO classification of head and neck tumors (fifth edition).[7] Statistical analysis was done by SPSS 16. Age, gender, age group, site of lesion, category of lesion, clinical diagnosis and histopathological diagnosis were expressed as frequency and percentages. Association between category of clinical diagnosis and histopathological diagnosis was sought using Chi square test and Likelihood ratio was calculated and p-value < 0.05 was considered statistically significant at 95% confidence interval.

RESULTS

Age of the patients ranged from 5 to 83 years with mean ± standard deviation of 42.9 ± 19.7 years with maximum 28(18.9%) cases in 41-50 years age group (Table 1). There were 75(50.7%) females and 73 (49.7%) males with female male ratio of 1.02:1. The most common site was tongue comprising 43 (29.1%) cases followed by buccal mucosa in 37(25.0%) cases (Figure 1).

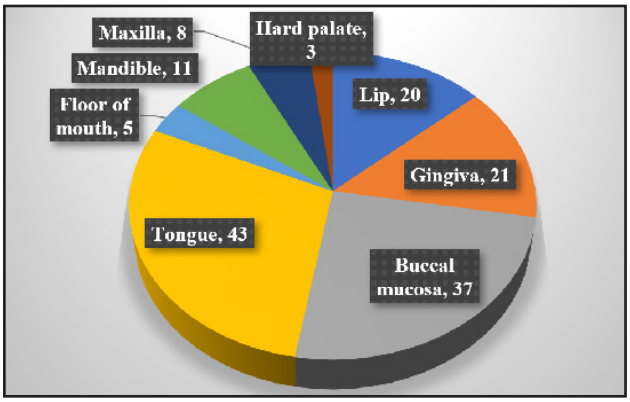

Figure 1. Site distribution of lesions.

49(33.1%) cases were non-neoplastic, 24(16.2%) cases were benign, 55(37.2%) cases were OPMDs and 20(13.5%) cases were malignant. Maximum 11(7.4%) cases of non-neoplastic lesions were seen in 21-30 years age group, 14(9.5%) cases of OPMDs in 31-40 years age group and 6(4.2%) cases of malignant lesions in 61-70 years age group (Table 1).

Table 1. Distribution of non-neoplastic, benign, OPMDs and malignant lesions in various age groups. (n=148)					
Age group (years)	**Non-neoplastic n(%)**	**Benign n(%)**	**OPMDs n(%)**	**Malignant n(%)**	**Total**
<10	3(2.0)	3(2.0)	-	-	6(4.1)
11-20	8(5.4)	4(2.7)	4(2.7)	-	16(10.8)
21-30	11(7.4)	4(2.7)	7(4.7)	-	22(14.9)
31-40	5(3.4)	4(2.7)	14(9.5)	1(0.7)	24(16.2)
41-50	8(5.4)	3(2.0)	12(8.1)	5(3.4)	28(18.9)
51-60	3(2.0)	4(2.7)	8(5.4)	4(2.7)	19(12.8)
61-70	6(4.1)	2(1.4)	5(3.4)	6(4.1)	19(12.8)
71-80	4(2.7)	-	5(3.4)	4(2.7)	13(8.8)
>80	1(0.7)	-	-	-	1(0.7)
Total	49(33.1)	24(16.2)	55(37.2)	20(13.5)	148(100)

Out of 20 malignant cases, 16(80.0%) cases were seen in males (Figure 2).

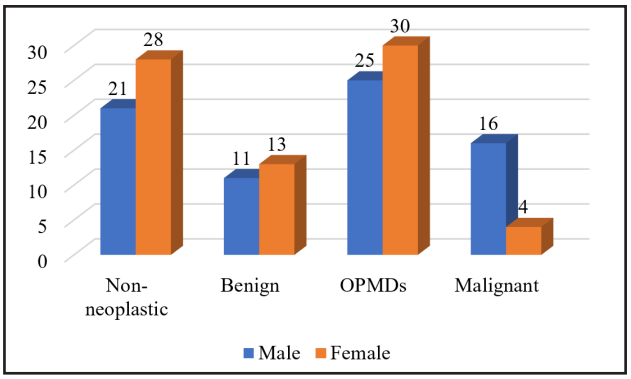

Figure 2. Distribution of non-neoplastic, benign, OPMDs and malignant lesions in both genders.

Lip was the most common site for non-neoplastic lesions comprising 12(8.1%) cases. Tongue was most common site for benign and malignant lesions comprising 8(5.4%) and 10(6.8%) cases respectively. Buccal mucosa was most common site for OPMDs comprising 29(19.6%) cases (Table 2).

Mucocele (Figure 3) was the most common neoplastic lesion comprising 13(8.8%) cases. Squamous papilloma was the most common benign lesion comprising 7(4.7%) cases. Keratosis consistent with leukoplakia was the most common OPMD comprising 30(20.3%) cases and all 20(13.5%) malignant cases were squamous cell carcinoma (Figure 4) (Table 3).

Out of 4 cases of ameloblastoma, 2(50.0%) cases were follicular type and 2(50.0%) cases were unicystic type. Out of 20 cases of squamous cell carcinoma, 14(70.0%) cases were well differentiated, 3(15.0%) cases were moderately differentiated and microinvasive each. Out of 30 cases of keratosis consistent with leukoplakia 4(13.3%) cases had dysplasia ranging from mild to moderate. Out of 3 cases of epithelial dysplasia, 2(66.7%) cases were severe dysplasia and 1(33.3%) case had mild dysplasia. Out of 4 cases of ameloblastoma, 2(50.0%) cases were follicular type and 2(50.0%) cases were unicystic type.

Table 2. Distribution of non-neoplastic, benign, OPMDs and malignant lesions in various sites. (n=148)					
Site	**Non neoplastic n(%)**	**Benign n(%)**	**OPMDs n(%)**	**Malignant n(%)**	**Total**
Lip	12(8.1)	2(1.4)	5(3.4)	1(0.7)	20(13.5)
Gingiva	7(4.7)	3(2.0)	6(4.1)	5(3.4)	21(14.2)
Buccal mucosa	5(3.4)	1(0.7)	29(19.6)	2(1.4)	37(25.0)
Tongue	10(6.8)	8(5.4)	15(10.1)	10(6.8)	43(29.1)
Floor of mouth	3(2.0)	1(0.7)	-	1(0.7)	5(3.4)
Mandible	5(3.4)	5(3.4)	-	1(0.7)	11(7.4)
Maxilla	5(3.4)	3(2.0)	-	-	8(5.4)
Hard palate	2(1.4)	1(0.7)	-	-	3(2.0)
Total	49(33.1)	24(16.2)	55(37.2)	20(13.5)	148(100)

Table 3. Histopathological diagnosis of non-neoplastic, benign, OPMDs and malignant lesions. (n = 148)	
Histopathological diagnosis	**Frequency (%)**
Non-neoplastic	
Mucocele	13(8.8)
Irritation fibroma	8(5.4)
Non-specific chronic ulcer	5(3.4)
Pseudoepitheliomatous hyperplasia	3(2.0)
Mucormycosis	2(1.4)
Plasma cell granuloma (Figure 5)	2(1.4)
Granulation tissue	1(0.7)
Arteriovenous malformation	1(0.7)
Thrombus	1(0.7)
Keratosis with eosinophilia	1(0.7)
Alveolar ridge keratosis	1(0.7)
Epithelial hyperplasia	1(0.7)
Dentigerous cyst	4(2.7)
Radicular cyst	4(2.7)
Lingual cyst	1(0.7)
Odontogenic keratocyst	1(0.7)
Benign	
Squamous papilloma	7(4.7)
Ameloblastoma	4(2.7)
Fibroepithelial polyp	4(2.7)
Pyogenic granuloma	2(1.4)
Adenomatoid odontogenic tumor	2(1.4)
Odontogenic myxofibroma	1(0.7)
Complex odontoma	1(0.7)
Benign lymphoepithelial lesion	1(0.7)
White sponge nevus	1(0.7)
Skeletal muscle hemangioma	1(0.7)
OPMDs	
Keratosis consistent with leukoplakia	30(20.3)
Lichen planus (Figure 6)	20(13.5)
Epithelial dysplasia	3(2.0)
Submucosal fibrosis	2(1.4)
Malignant	
Squamous cell carcinoma	20(13.5)

Clinical diagnosis was not mentioned in 23 requisition forms. In the remaining 125 cases, 48(38.4%) cases were suspected as non-neoplastic, 21(16.8%) cases were suspected as benign, 37(29.6%) cases were suspected as premalignant and 19(15.2%) cases were suspected as malignant (Table 4).

There was statistically significant association between category of clinical diagnosis and histopathological diagnosis (p-value<0.05). However, 5(4.0%) cases

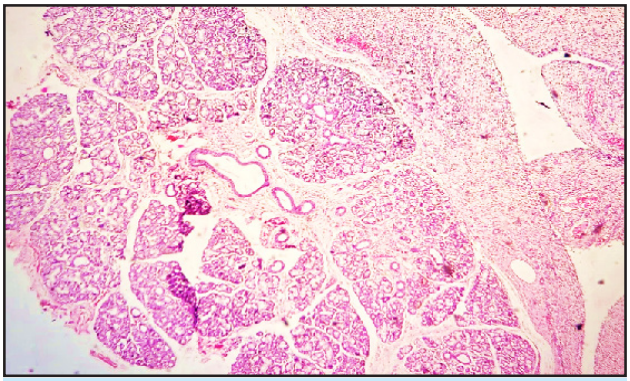

Figure 3. Mucocele showing area of granulation tissue with muciphages and surrounding salivary tissue with ectatic ducts (Hematoxylin and Eosin x 40X).

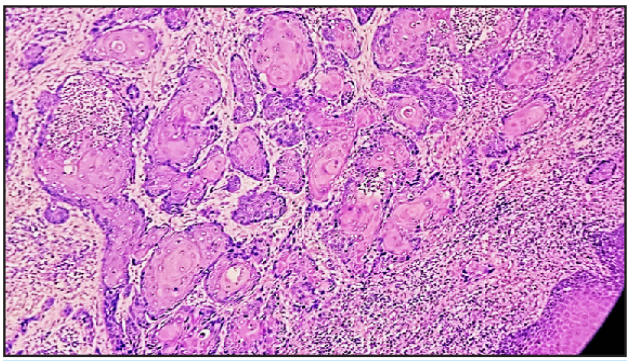

Figure 4. Squamous cell carcinoma, moderately differentiated (Hematoxylin and Eosin x 100X).

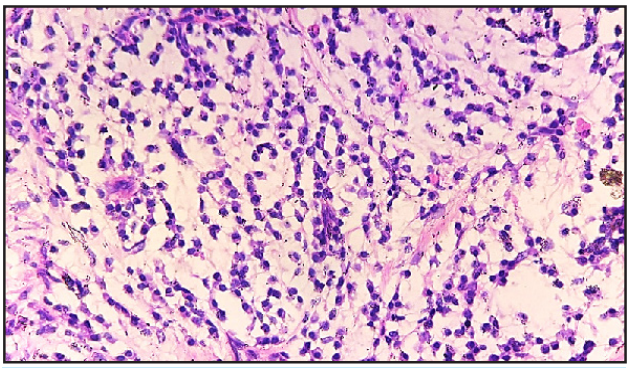

Figure 5. Plasma cell granuloma (Hematoxylin and Eosin x 400X).

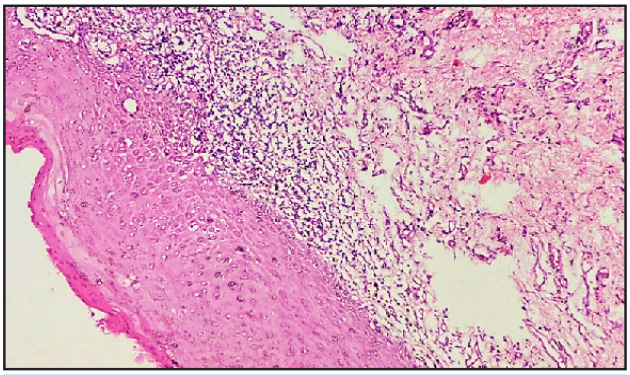

Figure 6. Lichen planus (Hematoxylin and Eosin x 100X).

were not clinically suspected as malignant and turned out to be malignant and 8(6.4%) cases clinically suspected as malignant did not turn out to be malignant (Table 5).

Table 4. Clinical diagnosis of non-neoplastic, benign, premalignant and malignant lesions. (n=125)	
Clinical diagnosis	**Frequency (%)**
Non-neoplastic	
Mucocele	11(8.8)
Irritation fibroma	7(5.6)
Non healing ulcer	11(8.8)
Dentigerous cyst	6(4.8)
Cystic lesion	3(2.4)
Radicular cyst	2(1.6)
Ranula	2(1.6)
Odontogenic keratocyst	1(0.8)
Fungal infection	2(1.6)
Osteomyelitis	2(1.6)
Traumatic keratosis	1(0.8)
Benign	
Squamous papilloma	8(6.4)
Ameloblastoma	2(1.6)
Pyogenic granuloma	5(4.0)
Adenomatoid odontogenic tumor	1(0.8)
Odontogenic tumor	1(0.8)
White sponge nevus	1(0.8)
Hemangioma	1(0.8)
Intramucosal nevus	1(0.8)
Lipoma	1(0.8)
Premalignant	
Leukoplakia	13(10.4)
Lichen planus	22(17.6)
Verrucous leukoplakia	1(0.8)
Submucosal fibrosis	1(0.8)
Malignant	
Squamous cell carcinoma	18(14.4)
Mucoepidermoid carcinoma	1(0.8)

DISCUSSION

Oral cavity includes the lips, the hard palate, the upper and lower alveolar ridge, the anterior two thirds of the tongue, sublingual region, the buccal mucosa, the retromolar trigone and the floor of the mouth.[8] Poor oral hygiene, removable dentures, tobacco consumption, mechanical irritation, alcohol can lead to various reactive lesions as well as tumor development. Moreover, it contains a variety of tissue types making it liable for various pathologies of different origins.[1, 9]

In the present study, 33.1% cases were non-neoplastic, 16.2% cases were benign, 37.2% cases were OPMDs and 13.5% cases were malignant. In a study conducted by Bastakoti et al. in Nepal, 16.7% cases were non-neoplastic, 15.6% cases benign, 12.2% cases premalignant and 55.5% cases were malignant.[10] In study conducted by Halder et al., 43.8% cases were non-neoplastic, 26.7% cases benign, 3.8% cases premalignant and 25.7% cases were malignant.[11] In study conducted by Rauf and Sonwane, 72% cases were malignant, 12% cases were benign and non-neoplastic each and 4% cases were premalignant.[12] Age of the patients ranged from 5 to 83 years with mean 42.9 years and female male ratio 1.02:1. Age range was similar to study conducted by Rauf and Sonwane with 4 to 84 years. However, male female ratio was 2.3:1.[12] This could have been because malignant cases were more common in their study and oral squamous cell carcinoma is more common in males.[7] Even in present study, male female ratio in malignant cases was 4:1. In study conducted by Blochowiak et al., age ranged from 5 to 91 years with mean of 52.6 years and female male ratio was 1.04:1 which was

Table 5. Association between category of clinical diagnosis and histopathological diagnosis. (n=125)					
Clinical diagnosis category	**Histopathological diagnosis category**				**Total**
	Non-neoplastic n(%)	**Benign n(%)**	**OPMDs n(%)**	**Malignant n(%)**	
Non-neoplastic	35(28)	4(3.2)	5(4.0)	4(3.2)	48(38.4)
Benign	4(3.2)	15(12.0)	1(0.8)	1(0.8)	21(16.8)
Premalignant	1(0.8)	-	36(28.8)	-	37(29.6)
Malignant	5(4.0)	1(0.8)	2(1.6)	11(8.8)	19(15.2)
Total	45(36.0)	20(16.0)	44(35.2)	16(12.8)	125(100)
Likelihood ratio = 153.43, p-value = <0.001					

similar to our study.[1] In study conducted by Halder et al., age ranged from 11 to 75 years with mean of 40.5 years and female male ratio of 1.1:1. However, in malignant cases, males were more affected similar to our study with male female ratio of 1.7:1.[11] Male female ratio in malignant cases was 3.5:1 in study conducted by Bastakoti et al. similar to our study.[10] Female hormones may increase the tissue response to mechanical irritation, especially in reactive lesions which was also reflected in present study with female preponderance in non-neoplastic reactive lesions.[1] Maximum 6(30%) malignant cases occurred in 61-70 years age group. In study conducted by Bastakoti et al., 38.5% malignant cases were seen in 46-60 years age group.[10] In study conducted by Rauf and Sonwane, 34.7% malignant cases occurred in 51-60 years age group.[12] Also, in study conducted by Halder et al., 51.8% malignant cases occurred in 51- 60 years age group.[11] Later presentation in our study may have occurred because of lack of awareness of symptoms or access to medical facilities. Early diagnosis in oral cancer plays a crucial role in prognosis as survival in early stage cancer is 90% compared to 5-20% in advanced cancer.[13] Larger sample size may be required for better results.

Tongue was the most common site comprising 29.1% cases. However, lip was the most common site for non-neoplastic lesions comprising 24.5% of non-neoplastic cases. Tongue was most common site for benign and malignant lesions comprising 33.3% and 50.0% cases respectively. Buccal mucosa was most common site for OPMDs comprising 52.7% cases. In study conducted by Halder et al., tongue was the most common site comprising 34.3% cases similar to our study, however, tongue was the most common site (41.3%) for non-neoplastic lesions, gingiva was the most common site (21.7%) for benign lesions, palate was the most common site (50%) for premalignant lesions and tongue was the most commonly affected site (40.7%) for malignant lesions in their study.[11] In study conducted by Rauf and Sonwane, buccal mucosa was the most commonly affected site overall comprising 31% cases and tongue was second most common comprising 23% cases. Maximum 31.9% malignant cases were seen in buccal mucosa.[12] In study conducted by Bastakoti et al., buccal mucosa was the most common site for malignant lesions comprising 45% cases followed by tongue in 20% cases.[10]

Mucocele is the most common benign minor salivary gland lesion, caused due to mechanical trauma to the excretory duct of the gland occurring most commonly in the lower lip.[14] It was the most common non-neoplastic lesion comprising 26.5% cases which was similar to study conducted by Blochowiak et al.[1] However, in study conducted by Halder et al., inflammatory fibrous hyperplasia was the most common non-neoplastic lesion comprising 45.6% cases followed by mucocele comprising 32.6% cases.[11] Irritation fibroma also known as focal fibrous hyperplasia is an inflammatory hyperplastic lesion of the oral connective tissue occurring as response to repeated trauma.[15] It was the second most common non-neopalstic lesion in our study comprising 16.3% cases. Squamous papilloma was the most common benign lesion comprising 29.2% cases which was similar to study conducted by Rauf and Sonwane and Blochowiak et al., where it was most common benign lesion comprising 41.7% cases and 27.6% cases respectively.[1, 12] However, hemangioma was the most common benign tumor in study conducted by Halder et al., comprising 50% followed by squamous papilloma comprising 28.6% cases.[11] Ameloblastoma comprised 16.7% of benign cases in the present study. Ameloblastoma is one the most common odontogenic tumors of the jaw comprising 10% tumors arising in maxilla and mandible. Though placed in benign epithelial odontogenic tumor category in 2022 WHO classification of Head and Neck Tumors, it is slow growing tumor but has characteristics of being locally invasive, high recurrence rate and a metastatic potential.[7, 16]

OPMDs convey that not all lesions and conditions described under this term may transform to cancer, rather there is a family of morphologic alterations among which some may have an increased potential for malignant transformation.[17] In the present study, highest number of cases were OPMDs comprising

37.2% cases. In study conducted by Blochowiak et al., premalignant conditions comprised 17.5% of cases.[1] However, in study conducted by Rauf and Sonwane, this group comprised only 4% of cases.[12] In study conducted by Halder et al. also, premalignant lesions comprised only 3.8% of cases.[11] In a systematic review and meta-analysis conducted by Mello et al., global prevalence was 4.5%. However, Asian population had a higher prevalence of 10.5%.[18] In one study conducted in Eastern part of Nepal, prevalence of OPMDs was found to be 14.6%.[19] A study conducted by Bhalekar et al., in India found 24.3% premalignant conditions.[20] The differences in prevalence could be attributed to differential tobacco consumption between the study participants, availability of local products, and lack of oral health awareness in various countries or various regions of the same country.[21] Most common premalignant condition was Keratosis with histopathological findings consistent with leukoplakia in 54.5% cases of OPMDs. In study conducted by Halder et al., leukoplakia comprised 100% of premalignant conditions.[11] Oral leukoplakia, a whitish lesion that cannot be characterized clinically as any other definable lesion is the most common OPMD with annual risk of malignant transformation of 2-3%.[22]

In the present study 20(100%) malignant cases were squamous cell carcinoma. 70.0% cases were well differentiated, and 15.0% cases moderately differentiated and microinvasive each.. In study conducted by Bastakoti et al., 95% malignant cases were squamous cell carcinoma with 75% well differentiated, 20.5% moderately differentiated and 4.5% cases of poorly differentiated histological grade.[10] In study conducted by Rauf and Sonwane 83.3% cases were squamous cell carcinoma with 81.7% well differentiated, 15% moderately differentiated and 3.3% poorly differentiated.[12] All cases could be squamous cell carcinoma in present study due to small sample size of malignant cases. 15.0% cases of malignant tumors were microinvasive squamous cell carcinoma in present study. Microinvasive oral squamous cell carcinoma is the early stage of oral cancer that shows a breach in the basement membrane, and the depth of invasion of the tumour is limited to 0.5-2 mm into the underlying stroma.[23] These lesions have a varied clinical presentation, minimal lymphatic involvement and a better prognosis. However, there is no clear consensus on their diagnosis and subsequent management.[24]

Limitations

This study was based on findings of Haemotoxylin and Eosin-stained sections only. This is a hospital-based study. So, the results may not be generalized.

CONCLUSIONS

Tumor and tumor like lesions in oral cavity have a varied histopathological spectrum. Non-neoplastic pathologies and OPMDs are also encountered often. Biopsy and histopathological examination serve as an important tool is diagnosing or ruling out malignancy and guiding in further management.

Conflict of interest: None

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