International Journal of Recent Advances in Multidisciplinary Topics
Volume 2, Issue 7, July 2021
https://www.ijramt.com | ISSN (Online): 2582-7839

Clinical and Histopathological Correlation in a Group of Patients with Oral Submucous Fibrosis- A Prospective Study

Devi Presanna*
Senior Lecturer, Department of Oral Medicine and Radiology, NIMS Dental College, Trivandrum, India

***Abstract*: Aim: Clinical and histopathological correlation in a group of patients with oral submucous fibrosis. *Materials and Methods*: Total of 45 OSMF patients clinical and histopathological staging was noted based on criteria given by Chandramani More et al & Pindborg and Sirsat (1966). The correlation between clinical staging and histopathological grading analyzed statistically using Spearman's correlation coefficient & chi-square test. *Results*: We found a statistically significant positive correlation between clinical staging and histopathological grading in OSMF patients. 14 cases clinically diagnosed as stage S2M2 (31.1%) had histopathological grading early OSMF. 15 cases clinically diagnosed as stage S2M3 (33.3%) had histopathological grading moderately advanced OSMF. 9 cases clinically diagnosed as stage S3M3 (20%) also had histopathological grading moderately advanced OSMF. 7 patients clinically diagnosed as stage S3M4 (15.6%) had histopathological grading advanced OSMF. There was progressive limitation in mouth opening as the stages and grades advanced. *Conclusion:* There is statistically significant positive correlation between clinical staging and histopathological grading of OSMF.**

Keywords: Oral submucous fibrosis, clinical staging, histopathological grading.

1. Introduction

Oral Submucous fibrosis is the condition that leads to the limitation of mouth opening. It is an uncommon disease affecting a large population in Asian countries especially in Indian subcontinent. 1In 1966 Pindborg and Sirsat defined OSMF as an insidious chronic disease affecting any part of the oral cavity and sometimes the pharynx, occasionally preceded by and/or associated with vesicle formation , it is always associated with a juxta-epithelial inflammatory reaction followed by fibro-elastic changes of lamina propria, with epithelial atrophy, leading to stiffness of the oral mucosa causing trismus and inability to eat. It is one of the most prevalent premalignant conditions in India which is easy to diagnose but difficult to manage. At present it is considered irreversible and incurable 2. In ancient medicine, Shrusrutha described the condition similar to oral submucous fibrosis as "Vidari" under mouth and throat diseases. In 1952, Schwartz described five Indian women from Kenya with a condition of oral mucosa including palate and pillar of fauces Which he called "atrophica idiopathica mucosa oris". Later it was termed Oral Submucous Fibrosis by Joshi in 1953.3 Worldwide estimates of oral submucous fibrosis indicate that more than 5 million people are affected, with most concentrated in Indian subcontinent, especially Southern India.4 It is widely prevalent in all age groups and across all socioeconomic strata in India. A sharp increase in incidence in OSMF was noted after paan parag came to market and incidence continues to increase. Migration of endemic betel quid chewers has made OSMF a public health issue in many parts of the world, including United kingdom, South Africa and many South East Asian countries.5 In India prevalence of OSMF has increased over the past 4 decades from 0.03% to 6.42%. Data published has reported an estimate of 5 million OSMF patients in India, commonly in males between 20 and 40 years of age. Prior to 2000, incidence of OSMF in Karnataka was 0.2-1%. After 2000, there has been a jump from 2-5% in the incidence of OSMF, mostly in age groups 15-35 years.6

The main cause of the disease is excessive consumption of products such as gutkha, pan masala, khaini, mava etc made of areca nut and other tobacco containing products. Although there are regional variations in the type of areca nut products in India, the betel quid was the most popular and prevalent habit in ancient Indian culture.3 But in 1980 , both areca quid products such as pan masala (areca quid) and gutkha (areca quid + tobacco) were introduced in Indian market as commercial preparations. Since then there has been an increase in the use of pan masala and gutkha in the younger age groups which has led to increased incidence of OSMF 3 . Karnataka state itself grows about 65% of the total areca nut produced in the country7 which makes them easily available in the market with no ban through proper channel. Studies conducted by Kiran Kumar K et al,8 DE.Ceena et al, 2 Shruti Pandya et al,9Saurabh Goel et al10, Ganiga Channaiah Shivakumar et al, 11 BR.Smitha et al,12 Fareedi Mukram Ali et al, 13Sunit B Patil

*Corresponding author: devipresanna@yahoo.co.in

et al14, Neha Modak et al, 15 Shwetha Singh et al, 16Abhayjeet Singh et al17 have correlated clinical staging and histopathological grading in OSMF patients. But till date, in this part of North Karnataka region, no study has been done on correlating the clinical staging and histopathological grading of OSMF based on the criteria laid down by Chandramani More et al and Pindborg and Sirsat (1966) . Hence the present study is the first of its kind to correlate clinical and histopathological findings in OSMF patients by utilising the above criteria.

2. Materials and Methods

A total of 45 OSMF patients, irrespective of the gender with age ranging from 18-50 years were recruited in the study.

- *Inclusion criteria:* Clinically diagnosed and untreated patients with oral submucous fibrosis. Patients above the age of 18 years were considered in the study.
- *Exclusion criteria:* Patients with any other systemic conditions that cause fibrosis of oral mucosa leading to restriction in mouth opening like scleroderma were excluded.

All patients were explained about the procedure involved and informed consent was obtained . The clinical staging was determined according to Chandra Mani More et al classification. The clinical features that were analysed include blanching of buccal mucosa, presence of palpable fibrous bands in buccal mucosa, presence of palpable fibrous bands in other parts of oral cavity (i.e labial mucosa, retromolar area, soft palate),presence of stomatitis, vermillion border atrophy, shrunken uvula, restriction of tongue movements, presence of circum oral bands around rima oris , tongue depapillation, presence of burning sensation on having spicy food and restriction of mobility of soft palate.

Clinical staging was performed as follows:

- *S1:* stomatitis and/or blanching of oral mucosa.
- *S2:* Presence of palpable fibrous bands in buccal mucosa and/or oropharynx with / without stomatitis.
- *S3:* Presence of palpable fibrous bands in buccal mucosa and/or oropharynx, and in any other part of oral cavity, with/ without stomatitis.
- *S4:* a: Any one of the above stage along with other potentially malignant disorders eg: oral leukoplakia, oral erythroplakia.

Any one of the above stage along with carcinoma.

The OSMF cases were clinically categorized into four stages according to their ability to open mouth:

- M1: Interincisal mouth opening up to or greater than 35mm.
- M2: Interincisal mouth opening between 25-35mm.
- M3: Interincisal mouth opening between 15-25mm.
- M4: Interincisal mouth opening less than 15mm.

A blood investigation including Hb%, BT, CT and RBS was performed for each patient. An incisional punch biopsy was taken with complete aseptic technique.

1) Procedure

Punch biopsy of buccal mucosa was performed. Sections of 5 micrometer thickness were used for haematoxylin and eosin (H and E) staining. These sections were studied under binocular light microscope. The histopathological grading of the lesion was done according to Pinborg and Sirsat (1966) classification.

- *Very Early stage*: Finely fibrillar collagen dispersed with marked edema. Plump young fibroblasts containing abundant cytoplasm. Blood vessels are dilated and congested. Inflammatory cells, mainly polymorphonuclear leukocytes with occasional eosinophils are found.
- *Early stage*: Juxta- epithelial area shows early hyalinisation. Collagen still in separate thick bundles. Moderate number of plump young fibroblasts are present. Dilated and congested blood vessels. Inflammatory cells are primarily lymphocytes, eosinophils and occasional plasma cells.
- *Moderately advanced stage*: Collagen is moderately hyalinised. Thickened collagen bundles separated by slight residual edema. Fibroblastic response is less marked. Blood vessels are either normal or compressed. Inflammatory exudate consists of lymphocytes and plasma cells.
- *Advanced stage*: Collagen is completely hyalinised. Smooth sheets with no separate bundles of collagen seen. Edema is absent. Hyalinised area is devoid of fibroblasts. Blood vessels are completely obliterated or narrowed. Inflammatory cells are lymphocytes and plasma cells.

2) Statistical analysis

The correlation of each clinical feature with clinical staging and histopathological grading was performed using Pearson's chi –square test and the p-value and significance were calculated. The correlation between clinical staging and histopathological grading of OSMF was performed using Spearman correlation coefficient and chi-square test.

3. Results

The present study was undertaken to correlate the clinical staging with histopathological grading in a group of patients with oral submucous fibrosis. The clinical staging of OSMF patients were noted according to the criteria given by Chandramani More et al. Four clinical stages were noted- S2M2, S2M3, S3M3, S3M4. Histopathological evaluation was done based on the criteria given by Pindborg and Sirsat (1966). Histopathologically 3 stages were determined- Early OSMF, Moderately advanced OSMF and Advanced OSMF. After statistical analysis, the following inferences were drawn from the study: There was progressive limitation of inter-incisal mouth opening as the clinical stages and histopathological grades advanced. Blanching of buccal mucosa was observed in all the 45 OSMF cases. Fibrous bands were also palpable in right and left buccal mucosa in all the 45 OSMF cases. Patients who presented with clinical features like palpable fibrous bands

Table 1
Clinical staging and histopathological grading

Correlation between clinical staging and histopathological grading analysed by Spearman's correlation coefficient test (n=45)						
Histopathological grading of OSMF	Clinical Stages with percentage within each histopathological grade				Total and percentage within each histological staging	Out of grand total
	Stage 1 (S2M2)	Stage 2 (S2M3)	Stage 3 (S3M3)	Stage 4 (S3M4)		
Early OSMF	14	0	0	0	14	14
	100.0%	0.0%	0.0%	0.0%	100.0%	31.1%
Moderately advanced OSMF	0	15	9	0	24	24
	.0%	62.5%	37.5%	0.0%	100.0%	53.3%
Advanced OSMF	0	0	0	7	7	7
	0.0%	0.0%	0.0%	100.0%	100.0%	15.6%
Total	14	15	9	7	45	45
	31.1%	33.3%	20.0%	15.6%	100.0%	100%
Spearman's correlation coefficient value : 0.940, p-value <0.001, Significant						
Interpretation: There is a statistically significant positive correlation between the Clinical stages and histopathological grading. This indicates that as the clinical stage of a person increases the histopathological grade also increases.						

in other parts of oral cavity (i.e labial mucosa, retromolar area, soft palate), stomatitis, vermillion border atrophy, shrunken uvula, restriction of tongue movements, circum oral bands around rima oris, tongue depapillation and restriction in mobility of soft palate had significantly higher clinical stages and histopathological grades. Burning sensation on having spicy food was a clinical feature that did not show any significant relationship with clinical staging. This clinical feature was present in almost all clinical stages, 14 cases had histopathological grading early OSMF and clinical staging S2M2 (31.1%), 24 cases had histopathological grading moderately advanced OSMF (53.3%) in which 15 had clinical staging S2M3 and 9 had clinical staging S3M3. 7 cases were graded histopathologically as advanced OSMF (15.6%) with clinical staging S3M4. Chi-square test was applied and spearman's correlation coefficient was 0.94. P-value was < 0.001. There is statistically significant positive correlation between clinical staging and histopathological grading. As the clinical staging of a patient increases, histopathological grading also increases.

4. Discussion

Correlating the clinical staging with histopathological grading can aid us in deciding whether clinical features observed are the indicators to show the progression of the disease with its advancement in histopathological grading. Hence, this can serve as a deterministic factor in deciding the treatment and improve the prognosis of the condition. In cases where advanced clinical staging is noted, surgery can be performed before the disease undergoes malignant transformation. A better understanding of the correlation between clinical staging and histopathological grading can provide to be a good marker for the diagnosis, prognosis and treatment planning for OSMF. The age range of subjects included in the present study was 18-50years. The average age of diagnosis of OSMF in the present study group was 33.31years. The disease is seen in younger age group more often. This may be due to the increased availability of products containing tobacco and arecanut like gutkha and mawa. There is early exposure to these products in schools and colleges as it readily available in the market and as the youngsters think chewing is safer than smoking 6. There is a wide range of male: female ratio of OSMF patients in India which varies from 6:1 to 19:1. In the present study the male:female ratio was 14:1 which might be attributed to the fact that females of this geographic region have less or no gutkha chewing habit. Most other studies have also shown a male predominance which is in accordance with present study. The mouth opening showed a range between 13 – 34 mm. Maximum number of patients had mouth opening between 15- 25mm . Similar findings were noted by Shruti Pandya et9 al (20-30mm) and Ganiga Channaiah Shivakumar et al 11 (16-25mm). The studies conducted by Saurabh Goel 10et al (20-44mm), Kiran Kumar K et al8 (20-44mm), Sarmistha Debnath et al67 (20-44mm) and Ganapalli Ashalatha et al66 (20-44mm) have shown higher range of mouth opening compared to the present study. In the present study all the 45 cases showed palpable fibrous bands in right and left buccal mucosa which was similar to most other studies. Fibrous bands were even felt in other parts of oral cavity i.e. soft palate, retromolar area, upper and lower labial mucosa , in 9 Moderately advanced OSMF cases with clinical staging S3M3 and 7 Advanced OSMF cases with clinical staging S3M4 . These patients with fibrous bands which were palpated in other parts of the oral cavity had higher clinical staging and histopathological grading which was in accordance to the studies conducted by Shruti Pandya et al9 and BR. Smita et al 12. The present study is the first of its kind to document the presence of stomatitis, vermillion border atrophy, shrunken uvula, restriction of tongue movement, circular bands around rima oris, tongue depapillation, burning sensation on having spicy food and restriction of mobility of soft palate in OSMF patients. Stomatitis was noticed in 10 patients (22.2%), vermillion border atrophy in 29 patients (64.4%), shrunken uvula in 9 patients (20%), restriction of tongue movement in 27 patients (60%), circum oral bands around rima oris in 7 patients (15.6%), depapillation of tongue in 32 patients (71.1%), restriction of mobility of soft plate in 10 patients (22.2%) . The patients with these clinical manifestations had significantly higher clinical staging as well as histopathological grading. Burning sensation was present in 42 patients (93.3%). Burning sensation on having spicy food

did not show any significant correlation with clinical staging as it was present in almost all stages. The studies conducted by Kiran Kumar K et al 8 , Shruti Pandya et al 9, Saurabh Goel et al10, Manish Narayan et al68, Neha Modak et al15 and DE Ceena et al 2 did not find any association between clinical staging and histopathological grading in OSMF cases. This difference between the present study and other studies could be attributed to the differences in criteria employed for assessing clinical staging and histopathological grading of OSMF cases.

In the study conducted by DE Ceena et al 2 clinical and functional staging of OSMF was done according to criteria laid down by Haider20 et al. In the study conducted by Neha Modak et al15 also clinical and functional staging was recorded according to the guidelines given by Haider SM, Merchant et al 20(2000). The basis for the presence of palpable fibrous bands is the thickness of collagen bundles and hyalinisation of collagen. The severity of limitation in mouth opening also depends on fibrosis of mucosa.15 This could be the reason of obtaining a statistically significant positive correlation when the OSMF cases were graded clinically according to Chandramani More et al18 criteria and histopathologically according to Pindborg and Sirsat19 criteria. According to Chandramani More18 at al criteria, there is progressive increase in palpable fibrous bands in oral cavity with limitation of mouth opening as the stages advanced. According to Pindborg and Sirsat19 criteria there is progressive increase in collagen fibre thickness and hyalinisation as stages advanced. A positive correlation does exist between clinical staging and histopathological grading in OSMF patients when we employ Chandramani More 18et al and Pindborg and Sirsat19 classifications. Hence we would like to conclude that one need not always carry out an invasive procedure like biopsy in established cases of OSMF as the clinical staging itself will give an idea of the severity of the disease. Nevertheless biopsy and histopathological confirmation is must when we are suspecting any malignant transformation among OSMF patients.

References

[1] Vanaja Reddy, PV Wanjari, Naveen Reddy Banda. Oral Submucous Fibrosis: Correlation of clinical grading to various habit factors. International J of Dental Clinics, vol. 3, no. 1, pp. 21-24, 2011.

[2] Denny.E.Ceena, TS Bastian, Ashok L. Comparative study of clinicofunctional staging of oral submucous fibrosis with qualitative analysis of collagen fibres under polarizing microscopy. Indian J Dent Res, vol. 20, no. 3, 2009.

[3] Syeda Arshiya Ara, Vini Arora, Syed Zakaullah, Syed Ahmed Raheel. Correlation of habits and clinical findings with histopathological diagnosis in oral submucous fibrosis. Asian Pacific J of Cancer Prevention, vol. 14, no. 2, 2013.

[4] Cox SC, Walker DM. Oral submucous fibrosis: a review. Aust Dent J vol. 41, no. 5, pp. 294-9, 1996.

[5] Paul RR, Makheijer A, Dutta PK. A novel wavelet neural network based pathological detection technique for oral precancerous conditions. J Clinc Pathol, vol. 58, no. 9, pp. 932-8, 2005.

[6] Mohammed Sami ahmed, SA Ara. Epidemiology and etiology of oral submucous fibrosis among gutkha chewers of Patna, India. J Clinc Pathol vol. 20, no. 4, 2014.

[7] S.Gurudath, PB.Habbar, R Sheshaprasad. Oral submucous fibrosis in India: are we progressing?. Indian J of Cancer, vol. 51, no. 3, pp. 221-6, 2014.

[8] K Kiran Kumar, TR Saraswathi, K Ranganathan.Oral submucous fibrosis: A clinic-histopathological study in Chennai. *Indian J Den Res* vol. 18, pp. 106-11, 2013,

[9] Shruti Pandya, Ajay Kumar Chaudhary, Mamata Singh. Correlation of histopathological diagnosis with clinical findings in oral submucous fibrosis.J Head and Neck Oncology, vol. 10, no. 1, 2009.

[10] Saurabh Goel, Junaid Ahmed, Mohit Pal Singh.Oral submucous fibrosis: A clinico-histopathological comparative study in population of Southern Rajasthan. J Carcinigene Mutagene, vol. 1, no. 2, 2010.

[11] Ganiga Channaiah Shivakumar, Shivakumar Sahana. Correlation between the functional and histological staging of oral submucous fibrosis. J of Indian Academy of Oral Medicine and Radiology, vol. 22, no. 3, pp. 133-35, 2010.

[12] BR Smitha, Mandana Donoghue. Clinical and histopathological evaluation of collagen fibre orientation in patients with oral submucous fibrosis. J of Oral and Maxillofac Pathol, vol. 15, no. 2, pp. 154-60, 2011.

[13] Fareedi Mukram Ali, Vinit Aher, MC Prasant. Oral submucous fibrosis: comparing clinical grading with duration and frequency of habit among areca nut and its product chewers. J Can Res Ther, vol. 9, pp. 471-6, 2013.

[14] Sunit B Patil, Vandana S Shah, Dharmesh S Vasavada. Clinical and histopathological evaluation of collagen fibre orientation using picorius red stain with polarizing microscope in patients having oral submucous fibrosis. EJDTR, vol. 3, no. 2, pp. 213-16, 2014.

[15] Neha Modak, Sandhya Tamgadge, Avinash Tamgadge. Comparative study of clinical staging of oral submucous fibrosis with qualitative analysis of collagen fibres under polarized microscopy. Iranian J of Pathology, vol. 10, no. 2, pp. 111-19, 2015.

[16] Shweta Singh, Pravin Gaikwad, Gaurav Sapra. Clinico-pathological evaluation and correlation of stages of oral submucous fibrosis with different habits. J Interdiscipl Med Dent Sci, vol. 3, no. 2, 2015.

[17] Abhayjeet Singh, Rama Brahmam Lanke, Rakhith Shetty. Effects of habits on clinical and histopathological staging in patients with oral submucous fibrosis. J of Clinical and Diagnostic Research, vol. 9, no. 10, 2015.

[18] More Chandramani, Das Sunanda, Patel H et al. Proposed clinical classification for oral submucous fibrosis. J Oral Oncology; In Press.

[19] Ranganathan K, Gauri Mishra. An overview of classification schemes for OSMF, vol. 10, no. 2, pp. 57-68, 2006.

[20] Haider SM, Merchant AT, Pikra FF etal. Clinical and functional staging of oral submucous fibrosis. *Journal of Oral and Maxillofacial Surgery*, 38:12-15, 2000.