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DERMOSCOPIC PATTERNS OF ORAL MUCOSAL LESIONS: NEW DIMENSIONS TO MUCOSCOPY

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Abstract

Background: Dermoscopy can act as an alternative diagnostic method to mucosal biopsy for diagnosis of various oral mucosal lesions.
Aim: To study the dermoscopic and histopathological characteristics of oral mucosal lesions.
Methods: The present prospective study was conducted among 53 patients of oral mucosal lesions presenting to the indoor and outdoor facilities in Department of Dermatology, Venereology and Leprosy. After performing routine investigations, dermoscopic evaluation was done in all the cases and recorded in the prestructured proforma. Oral mucosal lesions were evaluated by using non-contact videodermatoscope (AM7515MZT Dino-Lite), polarised mode. It was followed by mucosal biopsy from the same site.
Results: Nonvascular findings were the predominant features on dermoscopy. Structureless grey areas was the most common finding, seen in 72.41% patients of lichen planus. In lichen planus, it is suggested that structureless grey areas on dermoscopy corresponded histologically to hyperkeratosis. Vascular findings in form of light to intense red areas was seen in all patients of pemphigus vulgaris as well as both cases of aphthous ulcer and in each case of actinic cheilitis, bullous pemphigoid, disseminated discoid lupus erythematosus.
Conclusion: Theresultsof this rare pioneer study revealed that dermoscopy of mucosa may prove to be a valuable tool for diagnosis and may obviate need for mucosal biopsy.

Keywords: Oral mucosal lesions, dermoscopy, histopathology

Introduction

Oral mucosal lesion (OML) is any abnormal alteration in colour, surface, presence of swelling, or loss of integrity of the oral mucosal surface[1]. The main function of oral mucosa is to act as a protective barrier against trauma, pathogens and carcinogenic agents[2].With increasing age, oral mucosa gets thinner and the collagen synthesis by connective tissue gets slower, which further makes the mucosa susceptible to toxic substances. So, oral mucosal lesion is a riveting subject of interest in the recent literature[3].

The diagnostic process of a patient presenting with oral mucosal lesion involves a systematic approach which starts with obtaining thorough medical history that includes review of the patient's chief complaint. Based on the pertinent clinical information obtained, further investigations are carried out to support the diagnosis. Traditionally, histopathologic examination is the gold standard of diagnosis in dermatology. But in recent years, dermoscopy has become non-invasive diagnostic tool though it is generally interpreted that it is not an alternative or competitive method to histopathology, but a complementary tool that adds important clues to the diagnosis[4].

Some dermoscopic patterns are observed specifically in certain diseases which could be used for their diagnosis. So this simple, outpatient based procedure may obviate the need for a skin biopsy[5]. Scarce literature is available regarding its use in oral mucosal lesions, thus, dermoscopy (referred to as mucoscopy in mucosal lesions) still remains an elusive subject in dermatology. This study aims to explore the dermoscopic patterns in oral mucosal lesions.

Methods: The present prospective study was conducted among 53 patients of oral mucosal lesions presenting to the indoor and outdoor facilities in Department of Dermatology, Venereology and Leprosy after taking approval from the Institutional Ethics and Thesis Committee. Patients not willing for biopsy, patients with abnormal bleeding and clotting time, on anticoagulants pregnant and lactating mothers were not included in the study.

Pre-procedural protocol: A pre-informed written consent was taken and recorded. After that, detailed history of the patient was taken regarding age, sex, occupation, duration of illness, chief complaints, associated symptoms, any systemic complaint, history of drug intake, family and personal history. This was followed by

systemic and mucocutaneous examination. All routine and specific investigations, wherever required, were done. The findings were recorded on a prescribed proforma. The materials required were:

1) AM7515MZT Dino-Lite Edge videodermoscopy with 20x-220x magnification and 5M pixels (2592x1944) resolution attached to Dell laptop via USB 2.0.
2) Punch/excision biopsy instrument.

Procedure: After doing all required pre-procedure protocol, dermoscopic evaluation of oral mucosal lesions was done by non-contact videodermoscopy(AM7515MZT Dino-Lite), polarized mode. Few cases like Melanotic Macule and Fordyce Spots were evaluated with non-polarized mode before proceedings to polarized mode. Under proper sterile conditions, after giving local anaesthesia, punch/excision biopsy of the same lesion was taken. In case of punch biopsy, it was gently rotated with firm downward pressure and pushed down until the subcutaneous fat is reached. The column of tissue in punch yielded a core of tissue that was gently handled (usually with a needle) to prevent crush artefact during the pathological evaluation. Large punch biopsy/excision site wherever needed was closed with a suture. The specimen biopsied was collected in a sterile formalin container and was sent to the Department of Pathology, Government Medical College, Amritsar for histological examination. All dermoscopic and histological findings were recorded and correlated.

Statistical analysis: Results were tabulated and presented as frequency, percentage, mean, standard deviation using descriptive analysis. Association among variables was calculated using Chi-Square test. Measure of agreement was calculated using Kappa statistics. P value <0.05 was taken as statistically significant and $p < 0.001$ as highly significant. All analysis was done using SPSS 24.0 version.

Results

Out of fifty three patients, 36(67.92%) were in the age group of 30-59 years, with mean age of 46.68±14.71 years. The mean duration of illness was 10.30±10.17 months. There were 41(77.4%) females and 12(22.6%) males (M:F=0.29:1). The most common chief complaint was intolerance to hot and spicy food in 24(45.3%) followed by painful erosions in 11(20.8%) patients. The most common site involved was bilateral buccal mucosa, which was seen in 37(69.8%) patients. The other sites included lips, tongue, hard palate, soft palate, gingival and alveolar mucosa. Amongst the group of patients with other associated diseases, 3
(5.7%) had diabetes mellitus, 5(9.4%) were hypertensive, 2(3.8%) had both diabetes mellitus and hypertension and in 1(1.9%) case, hypothyroidism was diagnosed. 1(1.9%) patient was found to be HCV positive and 1(1.9%) was reactive for both HCV and HIV. Addiction was seen in 8(15.1%) patients. Only alcohol as addiction in 2(3.8%), both alcohol and smoking in 1(1.9%), smoking alone in 1(1.9%), tobacco chewing in 2(3.8%), and both smoking and tobacco chewing was seen in 2(3.8%) patients.

In our study, the most common lesion found was lichen planus (LP) which comprised 29 (54.7%) cases followed by pemphigus vulgaris (PV) comprising 7(13.2%) patients. In 5(9.4%) cases, no confirmatory histopathological diagnosis could be established (Table 1).

On dermoscopy, patterns were studied as non-vascular and vascular findings with the former being the predominant feature in majority of patients (table 2). Histopathological findings observed are shown in table 3.

In our study, histological counterpart of structureless grey areas (p= 0.002) and structureless white areas (p=0.228) appears to be hyperkeratosis. Brown globules (p=0.036) appears to correspond histologically to pigment incontinence. On chi square analysis, significant correlation was found between structureless grey areas and hyperkeratosis, brown globules and pigment incontinence (Table 4).

Table 1: Histopathological diagnosis in patients with OML

Histopathological Diagnosis	**N**	**%**
Actinic Cheilitis	1	1.9
Aphthous Ulcer	2	3.8
Bullous pemphigoid	1	1.9
Disseminated Discoid Lupus Erythematosus	1	1.9
Fordyce Spots	1	1.9
Leukoplakia	2	3.8
Lichenoid Reaction	1	1.9
Lichen Planus	29	54.7
Melanotic Macule	1	1.9
Post Inflammatory Hyperpigmentation	1	1.9
Pemphigus Vulgaris	7	13.2
Squamous Cell Carcinoma	1	1.9
Non-specific	5	9.4

Total	53	100.0

Table 2: Dermoscopic findings in the patients with OML

Dermoscopic findings	**LP (n=29) n, %**	**PV (n=7) n, %**	**LEP (n=2) n, %**	**AP (n=2) n, %**	**AC (n=1) n, %**	**BP (n= 1) n, %**	**DDLE (n=1) n, %**	**FS (n=1) n, %**	**Lich (n= 1) n, %**	**MM (n=1) n, %**	**PIH (n= 1) n, %**	**SCC (n= 1) n, %**
Nonvascular Findings												
Structureless grey areas	21(72.41)	0	1 (50)	0	0	0	1(100)	0	0	0	1(100)	0
Structureless white areas	18(62.06)	0	2(100)	0	1(100)	0	1(100)	0	0	0	0	0
White band	5 (17.24)	0	0	0	0	0	0		0	0	0	0
Brown globules	22 (75.86)	0	1(50)	0	0	0	0	0	0	1(100)	0	0
Clods	3(10.34)	0	2(100)	0	0	0	0	0	0	0	0	0
Dots	5(17.24)	0	0	0	0	0	0	0	1(100)	1(100)	1(100)	0
Milky red structureless area	0	0	0	0	0	0	0	0	0	0	0	1(100)
Keratin scales	0	0	0	0	0	0	0	0	0	0	0	1(100)
Loss of papillae	2 (6.8)	0	0	0	0	0	0	0	0	0	0	0
Blunting ofpapillae	2(6.8)	0	0	0	0	0	0	0	0	0	0	0
Vascular Findings												
Light to intense red area	3 (10.34)	7(100)	0	2(100)	1(100)	1(100)	1(100)	0	0	0	0	0
Dotted vessels	1(3.44)	0	0	0	0	0	0	0	0	0	0	1(100)
Linear vessels	0	0	0	0	0	0	1(100)	0	0	0	0	1(100)

Table 3: Histopathological findings in the patients with OML

Histological findings	**LP (n=29) N, %**	**PV (n=7) N, %**	**LeP (n=2) (N, %**	**AP (n=2) N, %**	**AC (n=1) N, %**	**BP (n=1) N, %**	**DDLE (n=1) N, %**	**FS (n=1) N, %**	**Lich (n=1) N, %**	**MM (n=1) N, %**	**PIH (n=1) N, %**	**SCC (n=1) N, %**
Hyperkeratosis	17(58.62)	0	2(100)	1(50)	0	0	0	0	0	0	1(100)	0
Parakeratosis	9(31.03)	0	0	1(50)	0	0	1(100)	0	0	0	0	0
Hypergranulosis	10(34.48)	0	0	0	0	0	0	0	0	0	0	0
Acanthosis	16(55.17)	0	2(100)	0	1(100)	0	1(100)	0	0	0	0	0
Atypical keratinocytes	0	0	0	0	1(100)	0	0	0	0	0	0	1(100)
Intraepidermal pustules	0	0	0	1(50)	0	0	0	0	0	0	0	0
Bullae Intraepithelial	0	4(57.14)	0	0	0	0	0	0	0	0	0	0
Subepithelial	0	0	0	0	0	1(100)	0	0	0	0	0	0
Acantholytic cells	0	7(100)	0	0	0	0	0	0	0	0	0	0
Vacuolar degeneration	19(65.51)	0	0	0	0	0	0	0	0	0	0	0
Necrotic keratinocytes	13(44.82)	0	0	0	0	0	1(100)	0	0	0	0	0
Saw toothed rete ridges	6(20.68)	0	0	0	0	0	0	0	0	0	0	0
Pigment incontinence	18(62.06)	0	2(100)	0	0	0	0	0	0	1(100)	1(100)	0
Infiltrates Mild Moderate	13(44.82) 16(55.17)	6(85.71) 1(14.28)	1(50) 1(50)	1(50) 1(50)	0 1(100)	1(100) 0	1(100) 0	0 0	0 1(100)	0 0	1(100) 0	0 0
Pattern of infiltrates Band like	24(82.75) 5(17.24) 0	0 2(28.57) 5(71.42)	0 0 2(100)	0 0 2(100)	0 0 1(100)	0 1(100) 0	0 1(100) 0	0 0 0	0 0 1(100)	0 0 0	0 0 1(100)	0 0 0

Perivascular Diffuse												
Type of cells Lymphocytes Histiocytes Plasma cells Neutrophil Eosinophil	29(100) 8(27.58) 8(27.58) 0 0	7(100) 0 0 2(28.57) 1(14.28)	2(100) 2(100) 0 0 0	2(100) 2(100) 1(50) 1(50) 0	1(100) 1(100) 1(100) 1(100) 1(100)	1(100) 1(100) 0 0 0	1(100) 0 0 0 0	0 0 0 0 0	1(100) 0 1(100) 0 1(100)	0 0 0 0 0	1(100) 0 0 0 0	0 0 0 0 0

Table 4: Correlation of dermoscopic and histological findings in patients with oral lichen planus

Dermoscopic finding	**Histological finding**	**Kappa value**	**P value**
Structureless grey areas (21/29)	Hyperkeratosis (17/29)	.552	.002*
Structureless grey areas (21/29)	Hypergranulosis (10/29)	-.029	.833
Structureless white areas (18/29)	Hyperkeratosis (17/29)	-.223	.228
Structureless white areas (18/29)	Hypergranulosis (10/29)	.230	.149
White band (4/29)	Hyperkeratosis (17/29)	-.042	.706
White band (4/29)	Hypergranulosis (10/29)	.110	.482
Brown globules (22/29)	Pigment incontinence (18/29)	.370	.036*

*: statistically significant

Discussion

Comprehensive approach is required to evaluate a patient with OML which begins with systematic and thorough examination of the oral mucosa in conjunction with detailed medical and dental history. In addition, diagnostic tests including biopsy and microbiologic samples are usually required[6].Histopathology examination is the gold standard of diagnosis, dermoscopy/mucoscopy, if proven clinically accurate, can be a noninvasive inexpensive substitute for biopsy. To the best of our knowledge, ours is one of the pioneer study to evaluate the diagnostic efficacy of dermoscopic characteristics of oral lesions.

The most commonly affected age group in our study was >40 years (36, 67.9%), similar to Kamble*et al*.[3]and Patil*et al*.[7]The latter mentioned association between oral mucosal disorders and ageing which can be due to infections, nutritional factors, metabolic changes, medications, prosthetic use and habits of alcohol or tobacco. But Cebeci*et al*.[8]found that age is not the only factor correlating with diseases of the oral mucosa; other factors such as trauma, the effects of medications and oral hygiene may also play a role.

Females dominated the study (41,77.4%) with M:F=0.29:1, similar to that reported by Al-Mobeeriek*et al*.[9]In contrast, Patil*et al*.[7]and Yadav*et al*.[2]had shown male dominance. The female predominance seen in our study in contrast to the others may be due to the differences in the demography, socioeconomic status, occupation, less prevalence of risky habits like smoking, tobacco chewing and cultural constraints in Punjab state as compared to rest of the Indian states.

The most common site involved was bilateral buccal mucosa in 37(69.8%) patients similar to that reported by Yadav*et al*.[2]and El Hamd*et al*.[10]This may be related to shearing forces, tongue bite, dental amalgam and being the frequent site of tobacco chewing.

On dermoscopy of 29(54.7%) cases of LP, the most frequent pattern seen was brown globules in 22(75.86%) followed by structure-less grey areas in 21(72.41%) and structureless white areas in 18(62.06%) cases. A case study by Sonthalia*et al*.[11]has described the dermoscopic findings for lichen planus lesions over the tongue as a tri-color pattern constituted by structure-less veil-like grey-white to bluish-white areas, bright red slightly depressed areas and interspersed violaceous-to-brown clods. The dermoscopic finding from buccal mucosa were mentioned as diffusely spread violaceous clods[11].

In our study, histological counterpart of structureless grey areas (p= 0.002) and structureless white areas (p=0.228) appears to be hyperkeratosis. Brown globules (p=0.036) appears to correspond histologically to pigment incontinence. Not many studies correlating the dermoscopic and histopathological findings in oral lichen planus are available. However, in cutaneous lichen planus, Garg*et al*.[12]suggested that the white structures on dermoscopy corresponded histologically to hyperkeratosis and grey-blue dots or brown punctate areas represented melanophages in dermis.

In the present study, histopathology revealed acantholytic cells in 7(100%) and intraepithelial bullae in 4 (57.14%) cases. Similar dermoscopic finding was seen in one case of bullous pemphigoid with subepithelial bullae on histopathology. Nayak*et al*.[13]described dermoscopic findings of cutaneous pemphigus vulgaris as erythema on base and rounded structures with well/ill-defined border and of bullous pemphigoid as well-defined

structure with brown black dots in the center. But to the best of our knowedge, there is no study available in the current literature describing dermoscopic findings of oral lesions of pemphigus vulgaris and bullous pemphigoid.

Dermoscopic findings in two cases of leukoplakia included structureless grey and structureless white areas, brown globules and white clods. Histopathological findings revealed hyperkeratosis, acanthosis and mild to moderate diffuse infiltrates. The findings were similar to most of those mentioned by Okamoto *et al*.[14]who proposed that areas with hyperkeratosis were opaque and white and that longer the rete ridges, whiter the lesion looked on dermoscopy.

Dermoscopic findings in a single case of lichenoid reaction were brownish dots and histopathology showed moderate diffuse infiltrate. On research in literature, we did not find any dermoscopic study on lichenoid reaction, however, Schlosser *et al*.[15]have described histological features which may favor the diagnosis of oral lichenoid reaction that include a deep and diffuse subepithelial mixed infiltrate of lymphocytes, plasma cells and neutrophils with or without eosinophils.

In the only case of Fordyce spots (FS), dermoscopy revealed yellowish bunch like round to ovoid structures. Histological findings revealed normal sebaceous glands but lacking any ductal communication with surface. Our findings were in concordance with the study done by Jakhar*et al*.[17]They revealed that mucoscopy with non-polarizing light showed slightly raised yellowish papules, while polarized light mucoscopy showed whitish to yellowish discrete ovoid structures surrounded by linear and branching vessels.

On dermoscopy of squamous cell carcinoma (SCC) who presented with verrucous growth over the left buccal mucosa, we found presence of milky red structureless areas, keratin scale, polymorphous (dotted and linear) vessels as shown in figure 1. Histology revealed atypical keratinocytes and horn pearl formation. Our dermoscopic findings were similar to the study by Elmas*et al*.[17]who showed presence of milky red structureless background and keratin scale in all the lesions.

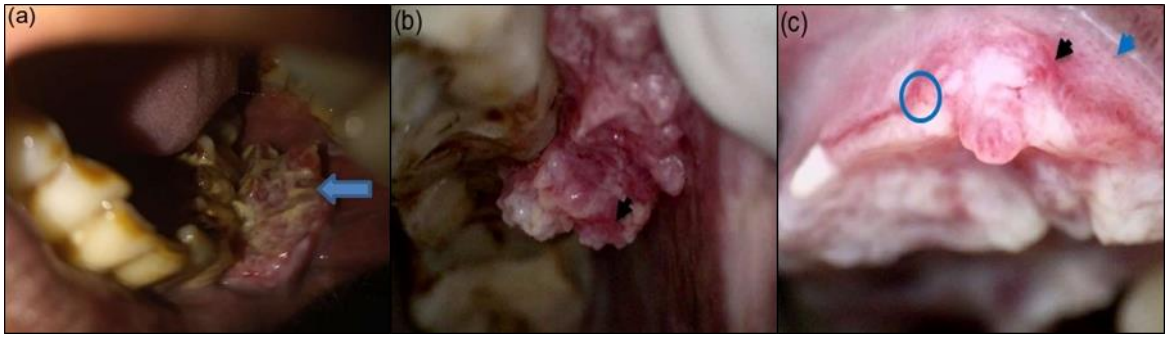

Fig 1:(a) Clinical image of verrucous growth of SCC over left buccal mucosa (blue arrow) (b) Dermoscopy (polarized x38.2) showing milky red structureless areas (black arrow) Dermoscopy (polarized x58.2) showing milky red structureless areas (black arrow), linear vessels (blue circle) and dotted vessels (blue arrow)

We encountered certain limiting factors like patient finding it ddifficult to open mouth for long time especially in erosive lesions or growth, lens becoming hazy due to breathing, requirement of long tubes to focus at the posterior most areas. Also, mucous secretions may give artefacts. Thus, for the evolution of mucoscopy, there is a need to develop dermoscopes which can address these limitations.

Conclusion

Dermoscopy has been extrapolated from studying patterns of cutaneous lesions of hair and nail but its study in mucosal lesions is still under observation. The results of this study revealed significant association between dermatoscope and histopathological diagnosis in area of oral mucosal lesions. However due to limited number of cases and to draw conclusive recommendations, more studies with a larger sample size are required.

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