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Research Article

Reliability of Colposcopic Descriptive Appearances in Oral Pre-Cancers-A Clinico-Patho-Colposcopic Study

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Abstract

Context: The single most important factor that is known to improve the end result of head and neck cancer is the early diagnosis of these cancers while they are still localized and can be treated with a high probability of cure. Early diagnosis of cancer plays a life saving pivotal role in overall management. The technique of colposcopy enables evaluation of changes in surface topography and vascular patterns of the lining mucosa thus, aiding in selecting the most appropriate site of biopsy ruling-out the possibility of taking biopsy from the most representative area supposed to reveal epithelial dysplasia. In view of intra-oral application of micro-colposcopy, it was felt that colposcopy might provide a useful aid for the early enough diagnosis of oral pre-cancerous and cancerous lesions and conditions affecting the oral mucosa to improve the prognosis.

Aim: To clinico-pathologically correlate cases of oral pre-cancers; correlate the surface characteristics revealed by micro-colposcopy with the histopathological diagnoses of the sites under observation; and map out the areas of surface dysplasia to indicate the full extent of epithelial changes before taking the biopsy specimen to take specimen from areas most representatives of dysplasic features (guided biopsies).

Settings and Design: Methods and Material: A total 27 subjects were studied including 10 cases each of oral submucous fibrosis and hyperkeratotic lesions including homogeneous and non-homogeneous leukoplakias, 6 cases of oral lichen planus and a case of clinically suspected oral squamous cell carcinoma.

Results: In the present study, a sensitivity of colposcopic screening test came-out to be about 71% while specificity was about 92%. Positive predictive value was 91%.

Conclusion: Although the degree of abnormality in colposcopic findings can be predicted by the vascular patterns of the lesion, the major advantage of colposcopy is to outline the most suspicious lesion for histologic diagnosis by directed biopsy which is the mainstay in establishing the correct diagnosis. Colposcopy is valuable in the detection of early cancerous lesions; however the final diagnosis must rely on a meticulous histopathological examination by an expert pathologist.

Keywords: Colposcopy; Oral pre-cancerous lesions and conditions; Histopathological

Key Message

In the study of dysplasia, the essential role of colposcopy is to locate the site, to define the peripheral limits of lesions and to indicate the most appropriate biopsy site, rather than to attempt to reach a histological diagnosis.

Introduction

The single most important factor that is known to improve the end result of head and neck cancer is the early diagnosis of these cancers while they are still localized and can be treated with a high probability of cure. Early diagnosis of cancer plays a life saving pivotal role in overall management. Tremendous amount of research has been done in this area, especially stressing clinical and radiological diagnosis and recognition, in order to facilitate successful treatment. However, there is dearth of specialized, yet simple technique which might give us diagnostic and/or prognostic pointers on this perplexing disease [1,2].

In the oro-facial region, the need for non-invasive techniques for the early detection of changes in the oral tissues has long been recognized. With current methods of examination, surface characteristics have not been shown to have a specific relationship to possible changes in the subsurface layers, particularly at the epithelial/lamina propria junction. The micro-colposcope appears to have many features that would be favorable for observing and documenting the surface topographic changes of the oral tissues [3]. The technique of colposcopy provides an optical method for examining the illuminated cervix and lower genital tract in higher magnification. Essentially the colposcopic examination involves the visualization of the lining layer

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of vagina, cervix and lower endo-cervical canal [4].

The stereoscopic magnification in colposcopy enables evaluation of changes in surface topography and vascular patterns of the lining mucosa thus, aiding in selecting the most appropriate site of biopsy ruling-out the possibility of taking biopsy from the most representative area supposed to reveal epithelial dysplasia [4-7].

In view of intra-oral application of micro-colposcopy, it was felt that colposcopy might provide a useful aid for the early enough diagnosis of oral pre-cancerous and cancerous lesions and conditions affecting the oral mucosa to improve the prognosis.

Materials and Methods

The study was conducted in Department of Oral Medicine and Radiology. The patients were selected from those attending OPD of Department of Oral Medicine and Radiology during the period of May 2013-May 2014. The protocol of the study was approved by Institutional Ethics Committee. A total 27 subjects (Figure 1a-e) were studied including 10 cases each of oral submucous fibrosis and hyperkeratotic lesions including homogeneous and non-homogeneous leukoplakias, 6 cases of oral lichen planus and a case of clinically suspected oral squamous cell carcinoma. The significance of the number of samples was analyzed statistically before their inclusion into the study. For each of the subjects, a detailed case history and thorough clinical examination was carried out and under good illumination, intra-oral examination of the lesion was performed. Inspection and palpatory findings were recorded in a prepared proforma. Following clinical and followed by colposcopic examination (Figure 2) of the lesions, the most representative site of the lesions were selected for biopsy. When the area selected for biopsy by clinical criteria and colposcopic examination was superimposed, then only one common biopsy sample was obtained. When two different areas were selected from the same lesion, two different areas which were marked with different colors were biopsied and subjected to histopathological examination. Comparison of the histo-pathlogical diagnosis obtained with routine clinical examination and direct intra-oral microscopy was performed, and the data was subjected to statistical analysis.

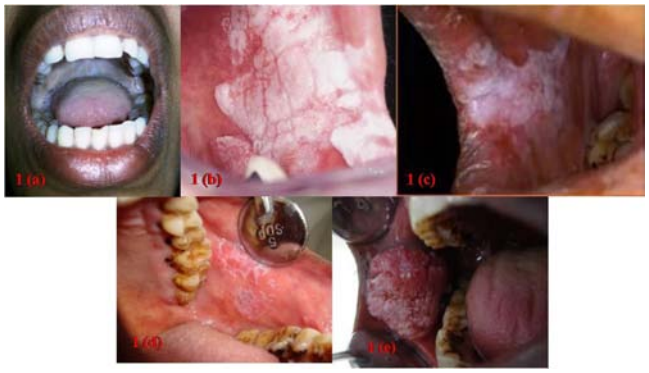

Figure 1a-e: Different oral pre-cancerous lesions and conditions included in the study:
Figure 1a: Oral submucous fibrosis; **Figure 1b:** Homogenous leukoplakia; **Figure 1c:** Speckled leukoplakia; **Figure 1d:** Lichen planus; **Figure 1e:** Oral squamous cell carcinoma.

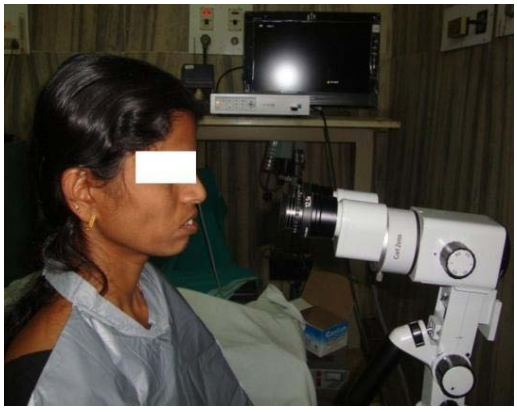

Figure 2: Patient positioning for Colposcopic examination.

Results

The present study was conducted in Department of Oral Medicine and Radiology. The patients were selected from those attending outpatient Department in the Department of Oral Medicine and Radiology during the period of May 2013-May 2014. The prospective observations were performed with the aim of offering information on the surface morphology of the oral tissues of an individual having oral pre-malignancies and an attempt towards correlating the histopathological appearances of the guided sites in such cases. In addition, it might also serve for a useful documentation in the clinical management in such conditions.

A total 27 subjects were studied including 10 cases each of oral submucous fibrosis and hyperkeratotic lesions including homogeneous and non-homogeneous leukoplakias, 6 cases of oral lichen planus and a case of clinically suspected oral squamous cell carcinoma (Table 1). The histopathological findings in such patients were as follows:

l) Oral submucous fibrosis: On application of 2% acetic acid, the lesions appeared as faint pink to orange in color. The Lugol's iodine application didn't show uniform uptake. At places, it was iodine negative (Table 2). On histopathological examination, 5 cases revealed mild dysplasia, 1 was with moderate and 4 cases didn't reveal any sign of epithelial dysplastic features (Table 3).

2) Hyperkeratotic lesions: The lesions appeared aceto-white with 2% acetic acid and iodine negative and straw-colored with Lugol's iodine (Table 2). On histopathological examination, 4 cases revealed mild dysplasia, 3 were with moderate, and 2 cases revealed severe dysplasia and 1 case revealed a non-specific inflammatory reaction (Table 3).

3) Oral lichen planus on colposcopic examination, the lesions appeared as aceto-white raised striae with intermediate areas showing few thin vessels (Table 2). On histopathological examination, only

Table 1: Histopathological grouping of patients.

Sr.No.	Lesion	No.s
1	Oral submucous fibrosis	10
2	Hyperkeratotic lesions	10
3	Oral lichen planus	6
4	Oral squamous cell carcinoma	1

Table 2: The correlation of clinical diagnosis, colposcopic appearance and histopathological diagnosis.

Sr.No.	Clinical Diagnosis	Total no. of Patients	Colposcopic Appearance		
			After application of acetic acid	After Lugol's iodine Application	H/P diagnosis
1.	Oral Submucous fibrosis	10	Faint pink or orange in color	No uniform take up	OSMF
2.	Homogenous Leukoplakia	7 1	Aceto-white positive White raised lesion with papillary border Aceto-white & iodine negative central area surrounded by raised white plaque.	Iodine negative straw colored after application	Hyperkeratotic Lesion
3.	Speckled Leukoplakia	1 1	Punctation Punctation & at place mosaic	Iodine negative Iodine negative	Hyperkeratotic Lesion
4.	Oral Lichen planus	2 4	Mosaic Aceto-white raised striae area. Intermediate area showed few thin vessels	Striae area Iodine negative. Intermediate areas iodine positive.	Oral lichen planus

Table 3: No. of patients with dysplasia in each group.

Sr. No.	Histopathological Diagnosis	Total no. of Patients	Dysplasia			Chronic non-specific inflammatory reaction
			Mild	Moderate	Severe	
1	Oral submucous fibrosis	10	5	1	-	-
2	Hyperkeratotic lesion	10	4	1	2	1
3	Oral lichen planus	6	1	-	-	-

Table 2 and 3 show the clinical and histopathological efficiency of abnormal colposcopic appearances as a diagnostic test in oral pre-cancers

1 case revealed mild epithelial dysplasia while the remaining cases didn't reveal any sign of epithelial dysplastic features (Table 3).

4) Well-differentiated squamous cell carcinoma Colposcopically, the lesion was aceto-white and iodine negative revealing high grades of epithelial dysplastic features on subsequent histopathological examination (Table 2,3).

Discussion

The term oral cancer encompasses all malignancies that originate in the oral tissues. Squamous cell carcinoma of the oral mucosa and lips however comprises 90-95 per cent of all oral malignancies. Oral cancer is one of the ten leading cancers in the world. The incidence of oral cancer is high in several countries including India, amounting to about 40% of all malignancies. Therefore the importance of early diagnosis is of prime importance in arriving at a correct diagnosis at an early enough stage when the prognosis can be improved improving the over-all 5-year survival rates in such patients [1,2]. The time honored decision on the exclusiveness of exfoliative cytology and colposcopy in the diagnosis of cervical intraepithelial neoplasia has further given place to view as to their complementariness increasing the significance of colposcopy in the near future [8].

Colposcope was invented in 1925 in Germany by Hans Hinselmann. He used it to detect microcarcinomas, small invasive carcinomas which were believed to be the earliest forms of carcinoma of the uterine cervix, invisible to the naked eye in the early stages because of a lack of obvious clinical features [5,6]. Over the last 3 decades, the colposcopic technique has gained popularity and has been recognized as an important adjunctive technique to cytologic testing in the investigation of genital tract epithelium [8]. There are, however disciplines other than gynecology in which the micro-colpo-hysteroscope may offer advantage over currently available instruments [2]. In the oro-facial region, the need for non-invasive techniques for early detection of degenerative/malignant changes in the oral tissues has long been recognized [4]. Cytologic smear preparations, similar to those used in gynecology, have been proposed as a means of detecting dysplastic change in the oral mucosa. However, because the process of cell maturation in oral mucosa is different from that of the cervical epithelium, this method needs further substantiation based on evidence-based studies to establish the exact role colposcopy can have in the early diagnosis of such lesions [2,8].

The present study was undertaken with the intention of:

1) Observation and recording of the surface morphology by micro-colpo-hysteroscopy of the oral tissues in different oral pre-malignant lesions and condition; and

2) Attempting predictability of early changes suggestive of malignant transformation.

A total 27 subjects were studied including 10 cases each of oral submucous fibrosis and hyperkeratotic lesions including homogeneous and non-homogeneous leukoplakias, 6 cases of oral lichen planus and a case of clinically suspected oral squamous cell carcinoma.

In cases of oral submucous fibrosis, on application of 2% acetic acid, the lesions appeared as faint pink to orange in color. The Lugol's iodine application didn't show uniform uptake. At places, it was iodine negative. On histopathological examination, 5 cases revealed mild dysplasia, 1 was with moderate and 4 cases didn't reveal any sign of epithelial dysplastic features.

White raised lesions with raised, papillary borders, a feature of leukoplakia, a consistent finding observed by Albert Schmitt (1959) [5], Malcolm Coppleson (I960) [6], Rene Cartier (1977) [9], John Marlow (1979) [10] and Philip J Disaia and Willium T Creasman (1982) [11] was also confirmed in our study. The lesions appeared aceto-white with 2% acetic acid and iodine negative and straw-colored with Lugol's iodine. The directed biopsy sites revealed 4 cases mild

epithelial dysplasia, 3 with moderate, 2 cases with severe dysplasia and 1 case with a chronic non-specific inflammatory reaction. However, there are ought to be limitations in the technique as in cases of leukoplakia and other hyperkeratotic lesions, hyperkeratosis may obscure the actual histopathological findings of epithelial dysplasia in the sub-surface layers of the epithelia, mandating all leukoplakic lesions to be guidedly biopsied with the help of colposcopic examination or, taking multiple biopsy specimens or, repeat biopsy procedures in cases with high suspicion (Rene Cartier 1977 [9]).

On colposcopic examination of the lesions associated with oral lichen planus, the lesions appeared as aceto-white raised striae with intermediate areas showing few thin vessels. On histopathological examination, only 1 case revealed mild epithelial dysplasia while the remaining cases didn't reveal any sign of epithelial dysplastic features.

Before applying acetic acid, the lesion in the case of oral squamous cell carcinoma appeared as an erythematous area with scattered, large red dots, sometimes projecting above the surface under colposcope. At a magnification of 15 to 20 times, the vessels caliber of the capillaries was found to unequal while the distribution of the budding blood vessels was seen in bundles or cork screw appearances. The vascular hypertrophy was not symmetrical with progressively smaller blood vessels. The finding was explained by the fact that malignant epithelium with its increased metabolic rate is accompanied by an increased growth of blood vessels. After application of acetic acid, the vessels remain visible since the overlying epithelium was very thin. The histopathological picture was of well-differentiated squamous cell carcinoma. The findings were consistent with findings of Rene Cartier [9], Adolf Stafl and Richard F Mattingly [7] who reported that alterations in the vascular network reflect biochemical and metabolic changes in cervical tissue. Malcolm Coppleson [6] has stated that atypical vessels are corkscrew or comma shaped in appearance indicating greatly increased vascularity. The typical corkscrew shaped' vessels represent immature vessels which are the result of increased blood requirements necessary to keep pace with the growth of atypical epithelium. This greatly increased vascularity is much better seen on colposcopic examination than in any histological section. John Marlow [10] has also reported that malignant epithelium, with its increased metabolic need, is accompanied by an increased growth of blood vessels. This vascular hypertrophy is not symmetrical with progressively smaller blood vessels. In contrast to the benign arborized or tree like branching, the vessels in invasive cancers make sharp angulations and corkscrew or hairpin turns. Very rightly discussed by Rene Cartier [9] on the basis of colposcopic findings, it is sometimes possible to suspect the malignancy of a lesion; however, it is not always feasible to draw a clear and definitive distinction between benign or malignant lesions. A homogenous white area can either be due to a mild to severe dysplasia or even, a carcinoma-in-situ.

Also, the image obtained is often considered the result of the reciprocal relationship between the epithelium and the underlying connective tissue stroma wherein the epithelium acts as a filter through which both the incident and the reflected light pass. The stroma appears red because of its rich vascularity. The intensity of colour represents the ratio of reflected and absorbed light and is related to the thickness of the epithelium; the optical density of the epithelium

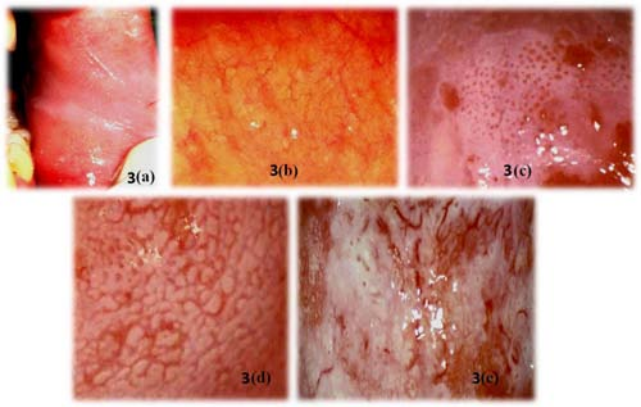

Figure 3a-e: Vascular patterns seen in colposcopy:
Figure 3a: Hair pin capillary pattern; **Figure 3b:** Network capillary pattern; **Figure 3c:** Punctation vessel pattern; **Figure 3d:** Mosaic pattern; **Figure 3e:** Atypical vessel pattern

(i.e., the morphology and the organization of the epithelial cells); the vascularity and the nature of the underlying stroma; the amount of haemoglobin; and the concentration of the tissue chromophores. The similar criteria described in colposcopic literature in relation to genital mucosa can be used for selecting biopsy sites even for the oral mucosa. These include the surface pattern, colour tone and opacity, the clarity of demarcation of the mucosal lesions in addition to the vascular pattern and the inter-capillary distance. The whiter and more opaque appearance of the lesions associated with dysplasia or carcinoma in situ can also be distinguished [12].

In the normal oral or, genital mucosa, two basic types of vascular patterns, network capillaries, and hair pin capillaries and can be seen. Some principal abnormal findings include [9,10,11]:

Punctation: wherein the tips of the terminal vessels in the stroma reach the surface of the epithelium through stromal papillae and appear as red dots prior to the application of acetic acid; wherein the fine punctuation are suggestive of a low grade CIN, cervical intra-epithelial neoplasia; while coarse punctuation suggests a high grade CIN or a frank malignant degeneration;

Mosaic: wherein the vessels do not reach the epithelial surface and extend only partially into the epithelium appearing as red lines surrounding blocks of epithelium. The appearance is further accentuated after application of acetic acid. Also, the finer the mosaic, the more likely the lesion is low grade CIN or metaplasia; while the coarser, wider and the more irregular mosaic suggests a high-grade CIN or invasive carcinoma; and

Atypical vessels: wherein these vessels appear to be running on or parallel to the surface of the epithelium and are of irregular calibre and are branching appearing as coarse wide hairpins and commas, corkscrews, waste paper, coarse and calibre tree-like and root-like forms or spaghetti-like forms usually indicative of invasive carcinoma (Figure 3a-e).

Important points to be considered in the assessment and interpretation of abnormal colposcopic findings include surface contour and margin of lesion; response to acetic acid; appearance of gland openings; iodine uptake; and keratosis and the varied vascular

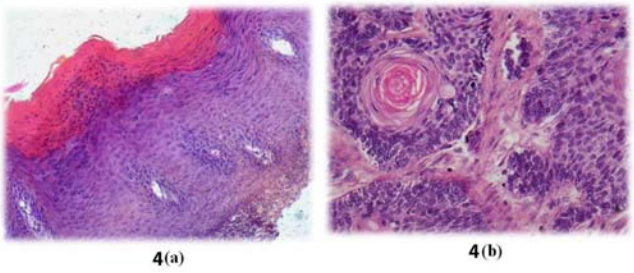

Figure 4a-b: A well-differentiated squamous cell carcinoma appreciable in a biopsy specimen obtained by Colposcopic examination.

patterns including the appearance of blood vessels (including atypical blood vessels) suggestive more of the higher grades of dysplasia (Figure 4a-b).

Nevertheless, a certain number of signs can help an experienced colposcopist in suspecting the gravity of a lesion. Such signs might include [10,11]:

1) Localized congestion of the connective tissue that can be considered as the most reliable factor in determining such a suspicion. A red area which whitens after the application of acetic acid and is iodine negative on Schiller test is rarely a benign dysplasia. Nevertheless, this congestion is not constant and may be absent or difficult to be seen in small and early enough lesions.

2) Vascular changes in the connective tissue: Increase in the number of red spots, their unequal distribution, their difference in size, corkscrew vessels slightly raising the surface of the epithelium and a micro - villous appearance are also suggestive of a suspected lesion;

3) The polymorphous character of the lesions: Combination of all the above appearances and their anarchic mixture, however, these signs in isolation are only of presumptive value since they merely reflect changes in the thickness of the mucosa and the structure of the connective tissue and this seems to hold true with the oral cavity also. Occasionally, definite colposcopic lesions may be present without significant changes in tissue histology too. These lesions may represent epithelium with a potential risk of malignancy and require a close monitoring and a meticulous follow-up for possible development of dysplasia, carcinoma-in-situ or invasive carcinoma in the future (Coppleson M 1970 [6]).

The sensitivity of a colposcopic examination is defined as the proportion of patients with the disease whose colposcopic appearances are positive for the disease. A sensitive test will rarely miss people with the disease process in progress. The specificity of a diagnostic test, on the other hand, is the proportion of subjects without the disease and whose colposcopic appearances are negative for the disease. A specific test will rarely misclassify people without the disease as diseased. The predictive value of a test (i.e. probability of being abnormal/ normal if the test is positive/negative) represents the usefulness of such a test for screening purposes. The sensitivity of the colposcopic screening test in the current study came-out to be about 71%, while specificity was 92%. The positive predictive value (+ve) came as 91% (Table 4). It can be stated from the above cited findings that 'colposcope' as a screening tool can prove to be one of

Table 4: The accuracy of colposcopic findings compared to histopathological diagnosis.

		Histopathological diagnosis		
		Positive	Negative	Total
Colposcopic findings as a screening test	Positive	10	01	11
	Negative	04	11	15
Total		14	12	26

The direct diagnostic test requirement i.e. sensitivity was 71% and specificity was 92%. However, positive predictive value (+PV) was 91%.

the most important adjunctive diagnostic adjuncts useful to confirm the sites from where a biopsy specimen can be obtained ruling-out the probability of missing an area of epithelial dysplasia wherein obvious clinical features are lacking.

Conclusion

The prospective observations were performed with the aim of offering information on the surface morphology of the oral tissues of an individual having oral pre-cancerous lesions and conditions and frank malignant degenerations and an attempt towards correlating the histopathological appearances of the guided sites, in addition to the probability of providing useful documentation in the clinical management of such dreaded cases with poor prognosis and where a late or, missed diagnosis can prove to be fatal for the life of the patient or, if not fatal, can leave the patient with persistent/lifelong morbidities if the patient survives from the cancers.

The study aimed at the need for a non-invasive technique for early detection of changes in the oral tissues concluding micro-colposcope to have many features that would be favorable for observing and documenting the surface topographic changes in the oral tissues. This study also showed that the micro-colpo-hysteroscope allows a non-invasive examination of the oral tissues in-situ at high magnification and good resolution. The depth of the field of the instrument allows simultaneous viewing of the surface topography and sub-mucosal blood vessels.

In the present study, a sensitivity of colposcopic screening test came-out to be about 71% while specificity was about 92%. Positive predictive value was 91%. Although the degree of abnormality in colposcopic findings can be predicted by the vascular patterns of the lesion, the major advantage of colposcopy is to outline the most suspicious lesion for histologic diagnosis by directed biopsy which is the mainstay in establishing the correct diagnosis. Colposcopy is valuable in the detection of early cancerous lesions; however the final diagnosis must rely on a meticulous histopathological examination by an expert pathologist. Selected spot biopsies in the areas showing atypical colposcopic patterns under direct colposcopic guidance will give the highest possible accuracy in the diagnosis and evaluation. Areas of surface dysplasia could be mapped to indicate the full extent of epithelial changes before the biopsy is done, in addition to, getting an idea of the comparative effects of different modalities of treatment as radiation and chemotherapy, on the junction between the tumor and normal tissues.

Colposcopy is a method which cannot be separated from the findings of history and clinical examination. In the study of dysplasia, the essential role of colposcopy is to locate the site, to define the

Histopathological findings in the biopsies in relation to criteria of epithelial dysplasia.

Sr.No.	Biopsy No.	Histopathological findings in relation to epithelial dysplasia														H/P Diagnosis
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1	B/4945/95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	OLP
2	B/4952/95	-	-	+	-	-	-	+	+	+	+	+	-	-	-	OSMF with mild dysplasia
3	B/4972/95	+	-	++	-	-	-	+	+	-	+	-	-	-	-	Hyperkeratotic lesion with mild dysplasia
4	B/4982/95	+	-	++	-	-	+	+	+	+	-	-	-	-	-	Verrucous hyperplasia + OLP+ OSMF with mild dysplasia
5	B/4983/95	+	+	+	+	-	+	+	+	-	+	-	-	-	+	OLP with mild dysplasia
6	B/4984/95	-	-	+	-	-	+	-	-	-	-	-	-	-	-	OSMF
7	B/4985/95	-	+	+	-	-	+	+	+	-	-	-	-	+	-	OSMF with mild dysplasia
8	B/5018/95	-	+	+	-	-	-	+	-	+	+	-	-	+	-	Hyperkeratotic lesion with mild dysplasia
9	B/5019/95	-	-	-	-	-	+	-	-	-	-	-	-	-	-	Non specific inflam-matory lesion
10	B/5020/95	-	+	-	-	+	+	-	+	-	+	-	-	+	-	OSMF with mild dysplasia
11	B/5021/95	+	-	+	-	-	+	-	+	-	+	-	+	+	-	OLP with moderate dysplasia
12	B/5023/95	-	-	+	-	+	+	-	+	-	+	-	-	-	-	OSMF with mild dysplasia
13	B/5024/95	+	+	+	+	+	++	+	-	-	+	+	-	+	+	Hyperkeratotic lesion with moderate dysplasia
14	B/5025/95	+	+	+	+	-	+	+	+	-	-	-	-	++	+	OSMF with moderate dysplasia
15	B/5027/95	-	-	-	-	-	+	-	-	+	-	-	-	-	-	Hyperkeratotic simplex
16	B/5028/95	-	-	+	-	-	+	-	-	-	-	-	-	-	-	OSMF
17	B/5032/95	-	-	+	-	-	+	+	-	-	+	-	-	+	-	OSMF with mild dysplasia
18	B/5034/95	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Well diff.Sq.Cell Ca.
19	B/5036/95	-	-	-	-	-	+	-	-	-	-	-	-	-	-	OSMF
20	B/5041/95	-	-	+	-	-	+	-	+	-	-	-	-	-	-	OSMF with mild dysplasia
21	B/5044/95	-	-	-	-	-	+	-	-	-	-	-	-	-	-	OLP
22	B/5046/95	-	-	+	-	-	+	-	-	-	-	-	-	-	-	OLP
23	B/5063/95	-	-	+	-	-	+	-	-	-	-	-	-	-	-	Erosive OLP
24	B/5065/95	-	-	+	-	-	+	-	-	-	-	-	-	-	-	Hyperkeratotic simplex
25	B/5072/95	-	+	+	-	-	+	-	+	-	+	-	-	-	-	Hyperkeratotic lesion with mild dysplasia
26	B/5099/95	+	-	+	-	-	+	-	+	+	+	+	+	+	-	Hyperkeratotic lesion with severe dysplasia
27	B/5116/95	+	+	+	+	+	++	-	+	+	+	+	+	+	++	Hyperkeratotic lesion with severe dysplasia

peripheral limits of lesions and to indicate the most appropriate biopsy site, rather than to attempt to reach a histological diagnosis.

The conclusions drawn from above study are as follows

1) The colposcope's greatest value is in directing the biopsy to the area that is most likely to yield the most significant histologic pattern indicative of epithelial dysplasia;

2) High specificity and positive predictive value of 'colposcopic examination' as a screening test is useful to confirm the diagnosis that has been suggested by other diagnostic methods;

3) It is useful in defining atypical sites and in directing the histologic examination;

4) It is helpful in ruling-out epithelial dysplasia in the early enough lesions when the clinical changes have not become obvious;

5) Correlation of the surface characteristics revealed by micro-colpo-hysteroscopy and biopsy findings as a necessary step in the evaluation of the instrumentation as a diagnostic tool;

6) An important area of application may well be also in the diagnostic evaluation and monitoring of treatment of oral cancer;

7) Another important aspect of colposcopy is that the extent of the different types of lesions can be determined much more precisely than by naked eye inspection or by Schiller's test.

With the help of colposcopy, it is possible to:

1) Distinguish between benign, pre-invasive and invasive lesions;

2) Increase the malignancy detection rate by picking-up the cases; and

3) Pinpointing the site of taking biopsies; and

4) In determining the therapy of preference by a more exact evaluation of the extent of the lesion.

To perform colposcopy, it is essential to devote time to a careful and methodical examination. It is also true that colposcopy is not always helpful in the diagnosis as well as in assessing the prognosis of these pre-cancerous lesions. Also, a thorough knowledge of the

histopathology is necessary in order to understand colposcopic appearances. Colposcopy must be learnt in the pathology laboratory with a microscope. Rather, colposcope may bridge the gap between microscopic examination of the surface morphology of the oral tissues and histologic examination. The accuracy of the method is directly related to the expertise of the person who uses it. For oral examination, the instrument in its present form has two major disadvantages including the length of the instrument and its forward oblique tip. The major limitations of the study were the constraints inflicted upon because of difficulty in easy accessibility to the instrument and the expertise needed to comment upon the still higher magnification images of the above studied conditions which probably restricts the accuracy of the procedure and needs further study.

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