ABSTRACT

Introduction: Lichen planus is a human exclusive, chronic inflammatory disease affecting skin and mucosa, particularly oral mucosa affecting the stratified squamous epithelia. Epithelial alterations in oral lichen planus (OLP) may lead to superimposed Candida infection, especially the normal flora Candida albicans. Therefore, this study was designed to assess the prevalence of Candida infection in OLP lesions.

Materials and methods: Thirty-four OLP patients were subjected to clinical, mycological and histopathological investigations for the presence of candidal organisms. The data obtained was analyzed statistically using Chi-square test and Student’s t-test.

Results: Among the 34 patients in the study group 15 (44.11%) showed positive candidal culture on Sabouraud’s dextrose agar medium and none of the 34 histological sections of OLP showed candidal hyphae on Periodic acid-Schiff staining. No significant association of positive candidal culture with respect to symptoms and patterns of lichen planus were found.

Conclusion: Candidal infection in OLP is insignificant.

Keywords: Oral lichen planus, Candida, Sabouraud’s dextrose agar, Periodic acid-schiff, Culture, Hyphae.


MATERIALS AND METHODS

Study Population

This prospective study group comprised of 34 OLP patients (23 males, 11 females with a mean age of 37.9 ± 15.6 years, range 16-76 years) attending the Department of Oral Medicine and Radiology, College of Dental Sciences, Davangere, and the study was undertaken after the approval of ethical committee. These patients were diagnosed as OLP on the basis of history and characteristic clinical features of the disease with histopathological confirmation and were included in the study only after obtaining written consent by them. Individuals with dentures/with antibiotic treatment/ with steroid treatment over the past 3 months, patients who received/had received any treatment with antifungal agents within the latest 3 months or had been hospitalized and patients who were diagnosed to be suffering from diabetes mellitus were excluded from the study.

Swabs were collected over the most severe mucosal or ulcerous parts of OLP lesions and swabs were avoided in areas of biopsy, as they can remove surface epithelial layers. Immediately after the collection of samples, the swabs were cultured on Sabouraud’s dextrose agar (SDA) medium at 37°C for 48 hours. Growth of Candida was registered as positive if creamy, convex colonies were observed and negative if colonies were not developed. An incisional biopsy was performed from adequate site of the lesion and

There is strong controversy in scientific literature regarding the colonization of Candida in OLP lesions. The significance of fungal infection in OLP is underestimated as the infection may not be obvious clinically and many times it is a subclinical infection which is detected on biopsy or microscopic examination. A histopathological report of unexpected fungal infection is likely to be acted on clinically and may affect the patient’s management and prognosis. Further in OLP patients, it was noted that erosive lesions often changed to reticular lesions with clinical improvement and relief of symptoms after antifungal therapy. Therefore, the purpose of this study is to determine the prevalence of Candida infection in OLP patients by mycological and histopathological investigations and to compare prevalence of Candida in OLP patients of this study with that of the previous studies. Also, an attempt was made to see any significant positive correlation of Candida organisms in OLP with burning sensation as well as erosive and nonspecific types of OLP.
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was sent for histopathologic examination which was stained with hematoxylin and eosin (H&E) for evaluation of OLP and Periodic acid-Schiff (PAS) technique for the evaluation of Candida organisms. The presence or absence of Candida was based on positive or negative findings of hypha–or pseudohypha like PAS-positive structures respectively and the biopsy specimen was also examined for features of epithelial dysplasia.

**Statistical Analysis**

The categorical data was analyzed by Chi-square test and Student t-test for the continuous data. A p-value of less than or equal to 0.05 was considered for statistical significance.

**RESULTS**

In the present study, 15 patients (44.11%) showed positive and 19 (55.88%) showed negative candidal culture on SDA medium among the total of 34 patients (p = 0.53; Table 1). All the 34 histological sections of OLP were negative for candidal hyphae on PAS staining. Twenty-five out of 34 OLP patients experienced burning sensation and among them candidal culture was positive in 12 patients and negative in 13 patients. Among the nine patients who were not having any symptoms, three patients showed positive candidal culture whereas six patients showed negative culture (p = 0.45; Table 2).

Twenty-six patients were diagnosed as having nonerosive type of OLP while the remaining eight patients were diagnosed as having erosive type. In the nonerosive group the candidal cultures were found to be positive in 10 patients and negative in 16 patients whereas in the erosive group, the candidal cultures were found to be positive in five patients and negative in three patients (p = 0.23; Table 3).

**DISCUSSION**

This study was primarily designed to examine the Candida infection in patients with OLP. We found that 15 (44.11%) of 34 OLP patients showed positive candidal cultures on SDA growth medium (Table 1). This is in accordance with findings of Lundstrom, Krogh, Simon, Vuckovic et al (44.44%),10 Lundstrom et al (44%) and other studies like in 26 (41.93%) out of 62 OLP patients,11 in 14 (50%) out of 28 OLP patients and 40 (29%) of the 137 healthy controls12 and in nine (42%) out of 21 OLP patients,13 Krough et al (37%) where they reported candidal infection in 37 to 50% cases of OLP through culture studies. But a slight lower prevalence of Candida in OLP was observed in other studies conducted by Silverman et al (25%), Gorsky et al (32%) and Silverman et al (31%).15-17 This difference among prevalence rates of Candida in our study with that of other studies could be explained on the basis of the different culture methods used by different investigators. However, the majority of studies including our study have shown that there is no major difference between the prevalence of Candida in OLP patients and normal healthy individuals.4,18

All 34 histological sections of OLP were negative for candidal hyphae on PAS staining. This is in accordance with the findings of Holmstrup, Lundstrom, Krogh who reported candidal infection ranging from 0.0 to 7.7% in the histological sections of OLP.9 The results of our study is

<table>
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<tr>
<th>Table 1: Candidal culture on SDA medium</th>
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<tbody>
<tr>
<td><strong>Total number of patients</strong></td>
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<tr>
<td>-------------------------------------</td>
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<tr>
<td>34 (100%)</td>
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χ² = 0.40; p = 0.53; NS: Not significant

<table>
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<th>Table 2: Comparison of symptoms with candidal culture in OLP patients</th>
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<tr>
<td><strong>Symptoms (burning sensation)</strong></td>
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<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td>Positive</td>
</tr>
<tr>
<td>Negative</td>
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<tr>
<td>Total</td>
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χ² = 0.58; p = 0.45; NS: Not significant

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<th>Table 3: Comparison of patterns of OLP with candidal culture</th>
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<td><strong>Pattern</strong></td>
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</tr>
<tr>
<td>Nonerosive OLP</td>
</tr>
<tr>
<td>Erosive OLP</td>
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<tr>
<td>Total</td>
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χ² = 1.43; p = 0.23; NS: Not significant
also similar to the study of histochemical analysis where 20 sections of OLP were stained with PAS and none of the histological sections showed candidal hyphae and similar findings were also reported by Sumanth et al and Krogh et al who found no evidence of candidal hyphae in 30 and 19 biopsies of OLP respectively. In contrast to the findings of our study Candida infection was evident in other studies conducted by Holmstrup et al (2.32%), Vuckovic et al (22.22%), Hatchuel et al (16.6%) and Lundstrom et al (7.6%). This difference between the findings of our study and these studies could be explained by the fact that noninvasive hyphae and fungi diagnosed in the smears and in the culture could be lost during the laboratory handling of the biopsy specimen, leading to a negative result in histopathologic examination with PAS staining. This is in accordance with the opinion of Barrett et al who stated that the fungal infection, as assessed by PAS staining, are lower than those obtained by culture and by using the PAS stain there is a 13% chance of missing fungal infection, particularly if hyphae are scarce or only one section is analyzed which may be the fact in our study.

In the present study, comparison was made to see any relationship between symptoms and the presence of Candida as Kalmar and Huber were of the opinion that infection with Candida may exacerbate the signs and symptoms of OLP leading to burning sensation. But in our study it was observed that amongst the 25 symptomatic patients 12 were found to be positive and 13 were negative for the candidal culture also experienced burning sensation (Table 2). So a definite relationship between burning sensation and the presence of Candida could not be established in our study and this the opinion of Kalmar and Huber was not accepted in our study.

A comparison was taken up to assess the presence or absence of Candida organisms with the nonerosive and erosive groups of OLP, as Kalmar had an opinion that Candida can consume keratin and since this substance is readily available in the keratotic papules and striae produced by OLP, Candida infection can occur in the keratotic or nonerosive group of OLP. In our study in the nonerosive group, the negative candidal culture (61.5%) was more, whereas converse was true for the erosive group (Table 3). In the erosive group the Candida-positive culture (62.5%) was more than the negative culture (37.5%). These findings are similar to the observations made by Silverman et al who found less prevalence of Candida in the reticular type when compared with the atrophic and erosive group. So a definite relationship of presence of Candida organisms with the specific pattern of OLP could not be established in our study as well as in the previous studies.

CONCLUSION

The prevalence of Candida (44.11%) obtained in our study was similar to that expected in the normal population without any mucosal diseases. But still there may be a chance of candidial infection in OLP as it is one of the local predisposing factor for candidiasis. Some of the encouraging results of treatment with antifungals that markedly reduced the symptoms as well as reduction in the size and patterns of lesions definitely may indicate some extent of Candida infection in OLP lesions. We often overlook this entity as the infection may not be obvious clinically. In conclusion, we did not find any significant association of Candida in OLP lesions. However, the possible presence of fungi should be considered on examination of OLP and candidal infection should be confirmed or excluded by laboratory tests. In case of any such infection, it should be controlled with topical polyene or azole antifungotics.

REFERENCES

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