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EVALUATION OF CANDIDAL HYPHAE IN POTENTIALLY MALIGNANT DISORDERS – DO THEY HAVE A ROLE IN EPITHELIAL DYSPLASIA??

Dental Science

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ABSTRACT

Oral Squamous Cell Carcinoma (OSCC) accounts for 90% of all oral cancers. It may affect any anatomical site in the mouth, but most commonly the tongue and the floor of the mouth. Regardless of the treatment modality and advances in diagnostic research and therapeutic sciences the survival rate is poor resulting in untimely death. The yeast-like fungus Candida albicans and a few other Candida species are capable of producing skin, mucous membrane, and internal infections. The exact pathologic significance of fungal, mainly the candidal infection is still unknown, but leukoplakia could be a potentially malignant oral mucosal lesion, and the Candida infection is generally accepted as the main etiologic factor for the occurrence of oral epithelial neoplasia. The present study was formulated to evaluate the presence of candidal hyphae in cases of potentially malignant disorders.

KEYWORDS

Potentially malignant disorders, candidal hyphae.

INTRODUCTION

Oral cancer is the eighth most common cancer worldwide. The most important risk factors for OSCC are use of tobacco or betel quid and regular drinking of alcoholic beverages. However, infection with high-risk Human papillomavirus (HPV) geno-types, and a diet low in fresh fruits and vegetables have also recently been implicated in the etiopathogenesis of OSCC. The highest incidence and prevalence of OSCC is found in the Indian subcontinent where the risk of developing OSCC is increased by the very prevalent habits as mentioned. In the last 30 years, the 5-year survival rate of patients with OSCC has not improved despite advances in diagnostic techniques and improvements in treatment modalities. Indeed, the incidence and prevalence of OSCC are increasing, particularly in younger persons.[1] Lack of improvement in prognosis over the years is due to the fact that a significant proportion of OSCC is not diagnosed or treated until they reach an advanced stage. Although arising *de novo* in many instances a significant proportion of OSCC develop from potentially malignant disorders such as leukoplakia, Oral submucus fibrosis (OSMF) and lichen planus. Few studies have also indicated that presence of candidal infection increases the risk of malignant transformation in potentially malignant disorders.[2] Identification and treatment of these potentially malignant disorders is very important in order to prevent them from undergoing malignant transformation.

Oropharyngeal candidiasis is the most common fungal infection affecting humans. The presence of candida is almost universal, as it is frequently isolated from various mucosal surfaces in healthy individuals. Symptom free oral carriage of candida organisms has been detected and a prevalence of 3 to 48% has been reported in the clinically normal mouths of healthy adults. The association of Candida with various precancer and cancer lesions has been reported as a causative agent. [3]

This persistent candidal infection along with any other factors may also induce epithelial atypia and dysplasia leading to malignant change.[4] It appears that the risk of carcinoma developing in these disorders depends on the presence of epithelial dysplasia and degree of dysplasia and possibly the method of management adopted for the treatment. Studies linking the association of dysplasia and related lesions with Candida are very few in literature. Hence, this study was designed to evaluate the prevalence of candidal hyphae in potentially malignant disorders such as leukoplakia and OSMF and to find out a correlate ion, if any with their presence or absence with epithelial dysplasia.

AIMS AND OBJECTIVES: To determine and compare the prevalence of candidal hyphae in cases of leukoplakia, OSMF and to assess the possible association between the epithelial dysplasia and presence of candidal hyphae.

MATERIALS AND METHODS: Total number of 20 (n=20) cases constituted the study group of which 5 cases were of normal mucosa taken as control, 5 diagnosed cases of oral submucous fibrosis and 15 diagnosed cases of leukoplakia (5 mild, moderate, and 5 severe dysplasia) cases, formalin fixed paraffin embedded blocks were retrieved from the archives of Department of Oral and Maxillofacial Pathology, SVS Institute of Dental Sciences, Mahabubnagar, Telangana.

Two sections of 5µm thickness of each sample were stained employing periodic acid–Schiff's reagent (PAS) and Grocott's methenamine silver (GMS) and were observed for the presence of candidal hyphae under light microscope. The significant fields of histopathological sections were recorded with the help of photomicrograph using Lawrence & Mayo research microscope with camera. The results thus obtained were statistically analysed using Chi square analysis. P-value < 0.05 was considered statistically significant.

RESULTS: On observation under light microscope fungal hyphae stained with PAS appeared magenta red and with GMS they appeared brownish black in colour. In leukoplakia cases out of 15 cases 5 cases showed positivity for the presence for fungal hyphae and in OSMF out of 5 cases two showed dysplasia and of two one showed positivity for fungal hyphae. Therefore out of total of twenty cases in study group 17 cases showed dysplasia (5 mild, 5 moderate, 5 severe and 2 OSMF and 3 cases showed no dysplasia. Of 17 cases of dysplasia 6 cases showed presence of candidal hyphae and of 3 cases of no dyplasia no evidence of fungal hyphae was observed.

Figure:1- PAS & GMS staining both showing presence of fungal hypha:

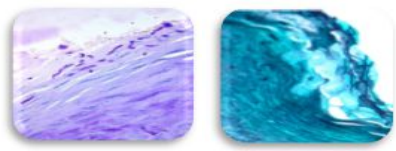

Table 1: Distribution of prevalence of fungal hyphae in each study group with or without dysplasia in total cases

Total no of cases with dysplasia	No of cases with presence of fungal hyphae
17	6
Total no of cases without dysplasia	No of cases with presence of fungal hyphae
3	0

Table 2: Prevalence of fungal hyphae in various study groups:

STUDY GROUP	TOTAL NO OF CASES	PRESENCE OF FUNGAL HYPHAE (%)	ABSENCE OF CANDIDAL HYPHAE (%)
Normal mucosa	5	0 (0%)	5 (100%)
Mild dysplasia	5	2 (40%)	3 (60%)
Moderate dysplasia	5	1 (20%)	4 (80%)
Severe dysplasia	5	2 (40%)	3 (60%)
OSMF	5	1 (20%)	4 (80%)

Prevalence of fungal hyphae in each group as seen as in table- 2 above in which normal mucosa showed complete absence for fungal hyphae accounting for 0% and in mild dysplasia of 5 cases 2 showed presence of fungal hyphae accounting for 40%, and in moderate dysplasia of 5 cases 1 showed fungal hyphae accounting for 20%, in severe dysplasia of 5 cases 2 showed fungal hyphae accounting for 40% and in OSMF of 5 cases 2 showed dysplasia and of 2 one showed presence of fungal hyphae.

On analysis no statistical significance was obtained with p value of 0.5. Even though statistical significance was not seen but we could observe the association between epithelial dysplasia and prevalence of fungal hyphae as of 17 cases of dysplasia 6 cases were associated with fungal hyphae accounting for 35%. And of 3 cases with no dysplasia complete absence of fungal hyphae was noticed accounting for 0%.

DISCUSSION: C. albicans, is a polymorphic organism that resides as a commensal and an opportunistic pathogen in the oral cavity. Oral candidiasis is a collective name given to a group of diseases caused by Candida spp. in the oral cavity. Colonization of the mouth by candida species has a long recorded history. it is well known that Candida species are keratophilic and they tend to colonize thick layers of keratin.[5] The role played by various Candida species in initiating oral epithelial lesions is ill understood.

The concept of carcinogenic potential of candida has received support from a study which demonstrated that certain C. albicans biotypes are capable of producing carcinogenic nitrosamine N-nitrosobenzyl methylamine from its precursors. They also showed that strains with high nitrosation potential were associated with lesions showing more advanced precancerous changes. Treatment with antimycotics has often resulted in partial or complete resolution of leukoplakias[6]

The presence of epithelial dysplasia is more important in predicting malignant development than the clinical characteristics. Oral leukoplakia is the best known precursor lesion. Follow up studies have shown that between <1 and 18% of oral potentially malignant disorders will develop into oral cancer and few clinical subtypes of leukoplakia are at a higher risk for malignant transformation than others. [1]

Biopsy based studies in literature have reported candidal hyphae to constitute 7–50% in leukoplakia.[7] In our study, out of total cases (n=25), 15 cases were leukoplakia cases of which 33.33% prevalence of presence of fungal hyphae was observed.

This finding was in close approximation with the findings of the other studies, such as studies by Krogh et al., 1987 (50%) Roed-Pertersen et al.,1970 (31%); Rindum et al.,1994 (47%); Dorko et al.,2001 (35.9%); and Kumar et al.,2009 (46.66%).[8]

Similarly, we found 50% prevalence of fungal hyphae in cases of oral submucous fibrosis with or without dysplasia. Lack of published data on the occurrence of fungal hyphae in biopsy-based studies of oral submucous fibrosis makes comparison of our data with other studies difficult.

In the study we could see the association between dysplasia and presence of fungal hyphae accounting 35% in both PAS and GMS staining. As seen in studies done by Bhagyalaxmi et al (2015).[1]

CONCLUSION: Prevalence of candidal hyphae in dysplasia cases of leukoplakia and OSMF was significant indicating a definite relation between candidal hyphae and epithelial dysplasia. Therefore presence of candidal hyphae in potentially malignant disorders may prove their role in dysplasia, increase with dysplasia to be a useful indicator in predicting malignant transformations. Study did not include species specification of candida. Further studies involving larger sample size and species isolation in potentially malignant disorders may bring about a revolution in the early detection, prevention, management and prognosis and prevent malignant transformation of these disorders into oral cancers.

REFERENCES

1. Hongal, B. P., Kulkarni, V. V., Deshmukh, R. S., Joshi, P. S., Karande, P. P., & Shroff, A. S. (2015). Prevalence of fungal hyphae in potentially malignant lesions and conditions—does its occurrence play a role in epithelial dysplasia?. Journal of oral and maxillofacial pathology: JOMFP, 19(1), 10.
2. Neville, B. W., & Day, T. A. (2002). Oral cancer and precancerous lesions. CA: a cancer journal for clinicians, 52(4), 195-215.
3. Vučković, N., Bokor-Bratić, M., Vučković, D., & Pićurić, I. (2004). Presence of Candida albicans in potentially malignant oral mucosal lesions. Archive of Oncology, 12(1), 51-54.
4. Reibel, J. (2003). Prognosis of oral pre-malignant lesions: significance of clinical, histopathological, and molecular biological characteristics. Critical Reviews in Oral Biology & Medicine, 14(1), 47-62.
5. Reichart, P. A., Samaranayake, L. P., & Philipsen, H. P. (2000). Pathology and clinical correlates in oral candidiasis and its variants: a review. Oral diseases, 6(2), 85-91.
6. Krogh, P., Hald, B., & Holmstrup, P. (1987). Possible mycological etiology of oral mucosal cancer: catalytic potential of infecting Candida aibicans and other yeasts in production of N-nitrosobenzylmethylamine. Carcinogenesis, 8(10), 1543-1548.
7. Sitheeque, M. A. M., & Samaranayake, L. P. (2003). Chronic hyperplastic candidosis/candidiasis (candidal leukoplakia). Critical Reviews in Oral Biology & Medicine, 14(4), 253-267.
8. Kumar, R. S., Ganvir, S. M., & Hazarey, V. K. (2009). Candida and calcofluor white: Study in precancer and cancer. Journal of oral and maxillofacial pathology: JOMFP, 13(1), 2.