

Study of Identification of Candida Albicans by Using Different Culture Medias and Its Association in Premalignant and Malignant Lesions

***Dr. M.K. Sharma**
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Abstract

Background & objective

The present study of this papers evaluate the association of Candida albicans with normal controls, potentially malignant and malignant patients, using different culture medias.

Materials & Methods

Inter comparison of Candida albicans association with normal control, potentially malignant and malignant patients. The present study comprised of total 75 patients, which included, 30 potentially malignant (15- leukoplakia and 15- oral submucous fibrosis), 30 oral squamous cell carcinoma and normal controls group comprised of 15 healthy volunteers who were not having any relevant medical, dental & habit history.

Introduction

Cancer afflicts all communities world-wide; approximately 10 million people are diagnosed with cancer and more than 6 million die of the disease every year. About 22.4 million persons were living cancer in the year 2000. This represents an increase of around 19% in incidence and 18% in mortality since 1990. In India, the National Cancer Registry Programme of the Indian Council of Medical Research (ICMR) provides data on incidence from five population based registries and one rural based population registry at Barshi, Maharashtra. It's estimated that there are approximately 2-2.5 million cases of cancers in India at any given point of time with around 7,00,000 new cases being detected each year. Nearly half of these cases die each year. The four most frequent cancers in male in India are mouth/oropharynx, esophagus, stomach and lower respiratory tract¹. Oral cancer is a major problem in India and account for 50-70% of all cancer diagnosed, as compared to 2-3% in UK and USA. Oral cavity cancer is currently the most frequent cause of cancer related deaths among India men¹. The strong association between cancers of the oral cavity and pharynx with tobacco use is well established and chewing tobacco have also been associated with an increased risk for oral cancer², where as the epidermoid carcinoma of the hard palate is common in the eastern coastal regions of the Andhra Pradesh state in India. It's associated with the habit of reverse smoking of cigar¹. Alcohol use has been identified as a major risk factor for cancers of the upper aero digestive tract. In India and Southeast Asia, the chronic use of betel quid in the mouth has been strongly associated with an

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increased risk for oral cancer. Recent evidence suggests that human papilloma virus (HPV) may be causative with some oral and oropharyngeal cancers. Dietary factors, such as a low intake of fruits and vegetables, may also be related to an increased cancer risk. Certain strains of *C. albicans* and of other yeasts play a causal role in the development of oral cancer, by means of endogenous nitrosamine production³.

The oral cavity harbors hundreds of different microbial species. This complex micro flora shows great quantitative and qualitative variation at different locations within the oral cavity. Changes in the micro flora on oral mucosa after cancerous alteration may lead to both local and systemic infections, which may complicate the morbidity of the patient suffering from oral malignant neoplasm. Mucosal infections can be caused by potentially pathogenic micro-organisms of extra oral origin or by a shift within the normal commensal micro flora. Anticancer therapy, irradiation, chemotherapy or surgery further impairs the defense mechanism of the oral mucosa with resultant proliferation of the mucosal biofilm with overgrowth especially of yeast and anaerobic bacteria⁴. *Candida albicans* is the most common fungal pathogen in humans. It exists as a commensal inhabitant of mucosal surfaces in most healthy individuals. However, alterations of host or environment can lead to overgrowth of fungus and infection to the host⁵. Its colonization in the oral cavity can be defined as the acquisition and maintenance of a stable population of *C. albicans* cells which do not give rise to clinical disease. In many states of impaired local and/or general health, *Candida albicans* may assume a pathogenic role giving rise to acute and chronic clinical manifestations such as thrush, atrophic glossitis, leukoplakic lesions, angular stomatitis and others⁷. The presence of candida in mouth together with epithelial changes may predispose to candidal infection which together with co-factors may also induce including epithelial physiology is likely to be distributed in Oral Submucous Fibrosis, it's hypothesized that the oral yeast carriage in patient with this condition may be different from those who are healthy⁸ therefore the co-existence of *Candida* species within humans either as commensals or pathogens has been a subject of interest, among physicians. Also the association of *Candida* with various precancer and cancer lesions has been reported as a causative agent.

In ancient Greece, phlegm and saliva were regarded by Hippocrates as one of the four humours fundamental to disease and health. Saliva indeed is a mirror of our blood as these bio fluids and their molecular components share many similarities¹⁰. It's an important and necessary body fluid. Blood constituents such as hormones, amino acids, electrolyte, immunoglobulin and creatinine, can enter saliva through the blood barriers of the capillary walls. As one of the fluids in the human body, variation in saliva constituents is influenced by various pathophysiological changes in the body. Significant development of biotechnology and improvement in our basic understanding of cancer, initiation and progression now enable us to identify tumor signatures, such as oncogenes and tumor-suppressor gene alterations, in bodily fluids that drain from the organs affected by the tumor. Saliva is not one of the popular bodily fluids. It lacks the drama of blood, the sincerity of sweat and the emotional appeal of tears. Despite the absence of charisma, however, a growing number of internists, pediatricians, pharmacologists, clinic and forensic pathologists, psychologists and dentists are finding that saliva provides an easily available, noninvasive diagnostic medium for a rapidly widening range of diseases and clinical situations. Historically this diagnostic value may have been recognized first by the ancient judicial community who employed salivary flow (or its absence) as the basis for a primitive lie detector test. However the current development of diagnostic biomarkers (via proteomic and genomic approaches) in conjunction with technological developments in salivary diagnostics will lead to the development of robust diagnostic tools for dentists to use in making clinical decisions and predicting treatment outcomes¹³. The possible use of saliva as a specimen for diagnosis is due to its exchange with substances that compose the plasmatic liquid. This occurs due to the presence of a

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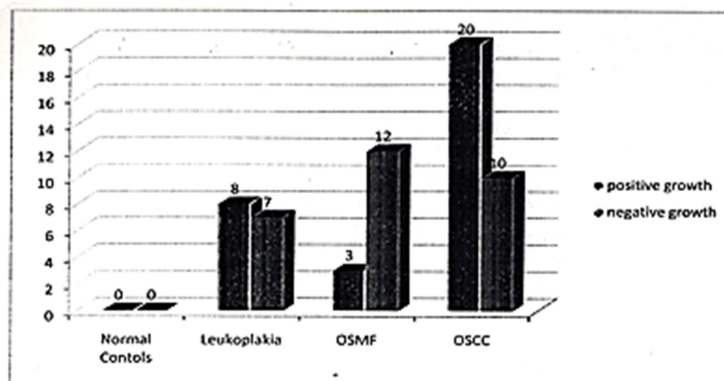
thin layer of epithelial cells separating the salivary ducts from the systemic circulation, making it possible for substance to be transferred to the saliva through active carriage, diffusion through the membrane, or through passive diffusion via a concentration gradient. The ability to use saliva to monitor an individual's health and disease state is a highly desirable objective for healthcare research and promotion. Due to the anatomical proximity of saliva to both premalignant and malignant oral neoplasms, saliva seemingly would be ideal for the screening of these lesions. As diagnostic medium, can give not only the same information as serum testing, but also additional or new information that cannot be obtained from serum. It has several advantages and from a logistical perspective, the collection of saliva is safe, non-invasive, and simple, it may be collected repeatedly without discomfort to the patient and could also be a cost-effective; hence the saliva was used to find the association of *Candida albicans* in normal controls, potentially malignant and malignant patients.

Results & Discussions

The present study evaluated the association of *Candida albicans* with normal controls, potentially malignant and malignant patients for which we used oral rinse method for saliva culture technique and tool biopsy from the suspected lesion.

Other authors suggested different sampling and identification methods for *Candida* spp. That would also certainly influence the results, Because of the uneven distribution of *C. albicans* throughout the oral cavity; swab samples can yield false-negative culture more often than oral rinse samples or imprint culture. Compared with the imprint method the rinse culture method has a markedly increased upper limit of detection in quantifying yeast carriage which is particularly useful when dealing with highly infested individuals.

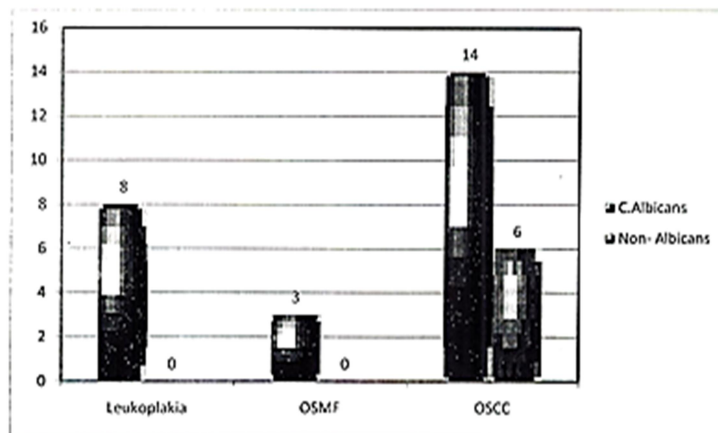
The association of *candida albicans* was significant with malignant cases in comparison to potentially malignant cases. In potentially malignant group the association of *candida albicans* with leukoplakia was more significant in comparison to oral sub mucous fibrosis lesions. The association of *candida albicans* with potentially malignant and malignant cases has been investigated by various authors under microbiological cytological and histopathological studies. Other authors has got slightly lower results (30%) Candidal positive culture in leukoplakia¹⁵⁶, other precancerous lesions 48.88% and almost similar in cancer 60%.



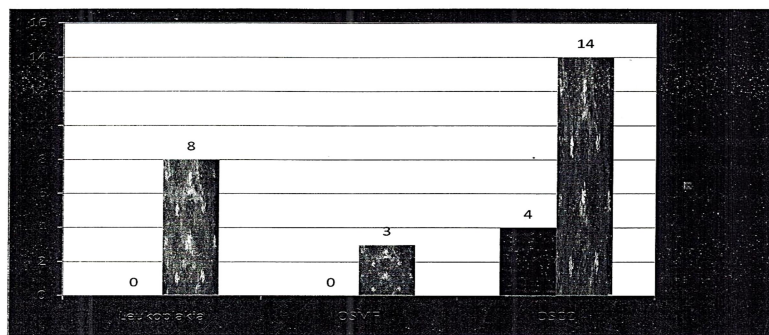
Graph 1: Fungal growth with Sabouraud's dextrose Agar media in normal control, potentially malignant (Leukoplakia and OSMF) and malignant cases (OSCC).

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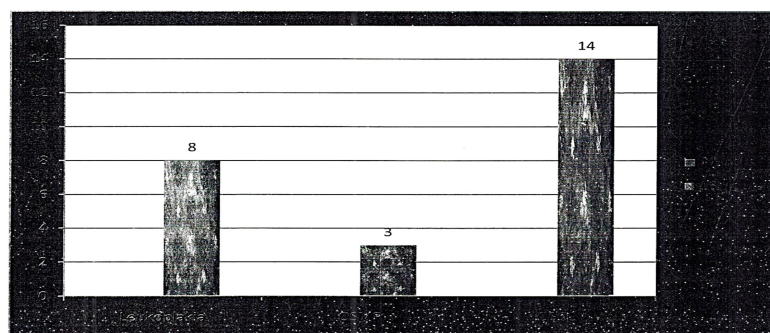
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Graph 2: Germ tube test with serum in potentially malignant (Leukoplakia and OSMF) and malignant cases (OSCC).



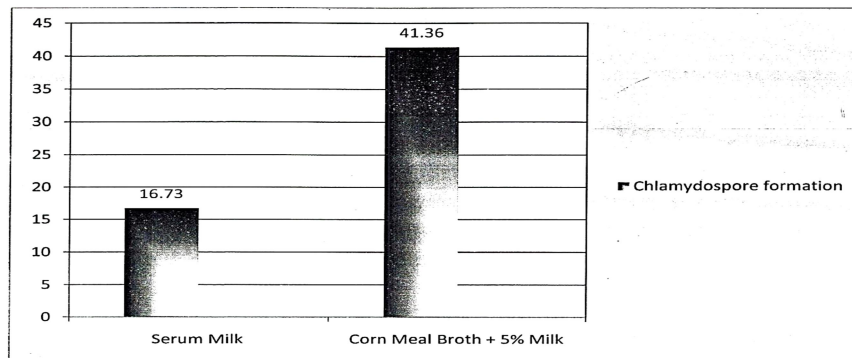
Graph 3: Chlamyospore formation with corn meal broth + 5% milk in potentially malignant and malignant cases.



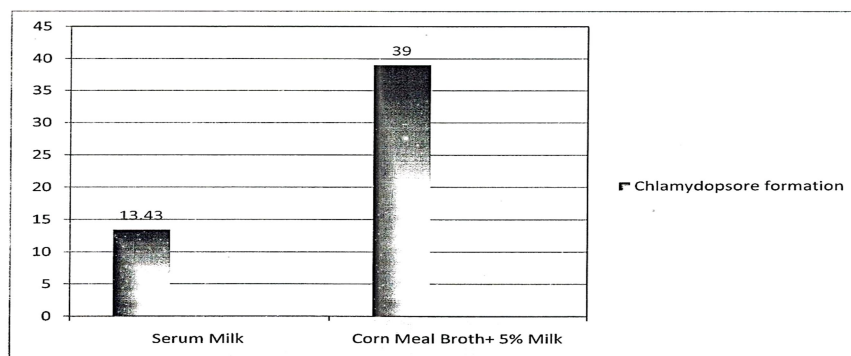
Graph 4: Chlamyospore formation with serum milk in potentially malignant and malignant cases.

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Graph 5: Mean of total chlamydospore formation in potentially malignant (Leukoplakia + OSMF) cases after 16 hours.



Graph 6: Mean of chlamydospore formation in malignant (OSCC) cases after 16 hours.

Conclusion

In conclusion, as it's well documented in support of an association of candida and its role in malignant transformation of leukoplakia, oral sub mucous fibrosis. This commensal appears to be the reservoir of infection, and when the optimal conditions supervene they may cause disease. as the oral mucosa is compromised in potentially malignant lesions, it can be argued that the presence of Candida species may involved in carcinogenesis by elaborating the nitrosamine compounds which either act directly on oral mucosa or interact with other chemical carcinogens to activates specific proto - oncogenes and thereby initiate oral neoplasia.

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