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Pathogenic characteristics of candida albicans isolated from oral cavities denture wearers and cancer patients wearing oral prostheses

Mothibe, Junior Vivian

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ABSTRACT

Candida albicans is a normal commensal carried by humans in the oral cavity, gut and vagina. It can cause superficial oral candidiasis to systemic infection both in immunocompromised patients, denture wearers, cancer patients and otherwise healthy individuals. The ability to cause infection is due to its pathogenic characteristics or virulence factors. In the susceptible patients, the number and the virulence of this organism may act as a marker for the onset of disease process. This study investigated the virulence properties of *C. albicans* isolated from the oral cavities of healthy subjects and two vulnerable groups, denture wearers and cancer patients wearing oral prostheses.

Oral rinse samples were collected from 49 normal healthy subjects (control group), 35 patients wearing full denture and 19 cancer patients with oral prostheses (study groups). They were cultured on CHROMagar for the quantitative and qualitative analysis of *Candida.* Yeasts were identified using API 20C Aux system. Twenty strains of *C. albicans* isolated from the healthy subjects and denture wearers and 14 strains isolated from the cancer patients were selected and their virulence properties ie. germ tube formation, adherence, proteinase and phospholipase production were measured. The results of the study groups were compared using a Scheffe test for pairwise comparison and a chi square test.

The *Candida* carriage rate in the normal subjects, denture wearer and cancer patients with prostheses was 42.86%, 74.29% and 84.21% respectively. In all three groups *C. albicans* was the predominant species. Denture wearer (45.72%) and cancer patients with prostheses (47.37%) carried several *Candida species*. The most frequently isolated non-*C. albicans* species were *C. glabrata*, *C. tropicalis* and *C. krusei*. In addition, these two groups carried

significantly higher number ($p<0.01$) of *Candida* in their oral cavity than the controls. Overall germ tube formation, adherence to epithelial cells, and production of phospholipase and proteinase was significantly higher in *C. albicans* isolated from the two patient groups ($p<0.05$) than the controls. In addition, when the virulence properties of strains isolated from normal individuals were compared to isolates from denture wearers, the adherence abilities as well as phospholipase and proteinase production were significantly higher in the strains from denture wearers ($p=0.01$, $p<0.01$ and $p=0.03$ respectively). Many strains isolated from the denture wearers produced phospholipase and proteinase (85% and 80% respectively) compared to the strains from normal subjects (25% and 60% respectively). In addition, germ tube formation and adherence ability were significantly higher in the strains isolated from the cancer patients with prostheses ($p=0.05$ and $p<0.01$ respectively) compared to the controls.

In conclusion, the high number of *C. albicans* isolated from the two study groups and their increased adherence ability suggests a compromised innate immunity that might be responsible for the frequent development of candidiasis. During the commensal state the increased expression of virulence factors in the denture wearers suggest the readiness of these strains to cause infection in this group. Further research is required to investigate the other host and environmental factors that may influence the virulence of *C. albicans* in these groups.