EFFECT OF CANDIDA TROPICALIS IN PLANKTONIC AND BIOFILM FORM ON URINARY EPITHELIAL CELLS

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Introduction

Urinary tract infections (UTI) are usually the most common type of hospital acquired infection in developed countries. Although medical devices are indispensable in the management of critically ill patients, about 20% of fungal UTI are associated to the use of urinary catheters.

Candida species are the most frequently isolated fungi, corresponding to approximately 80% of fungal associated nosocomial infections and are the second most common species responsible for patients' mortality. Candida tropicalis has been reported to be one of the Candida species which is most likely to cause bloodstream and urinary tract infections in hospitals being responsible for a high rate of patients' mortality.

Adhesion to host surfaces (epithelial cells and medical devices), as well as biofilm formation, are considered the first step to initiate Candida infection. Hence, the colonization of indwelling devices like urinary catheters by C. tropicalis poses a critical problem. Therefore, more knowledge has to be acquired in order to understand and prevent the formation of these biofilm infections.

Objective

The aim of this study was to investigate the influence of C. tropicalis growth form (planktonic or biofilm) on TCC-SUP cells (human urinary bladder).

Materials and methods

Clinical isolate biofilm cells adhered in higher extent than their planktonic cells.

Reference strain grown planktonically adhered significantly more (p<0.05) to epithelial cells than C. tropicalis from candiduria.

Fig. 1: (I) C. tropicalis extent of adhesion to TCC-SUP cells after 2 hours of incubation measured by crystal violet staining, expressed as absorbance/cm² (Abs/cm²). BCT750 - C. tropicalis ATCC 750 biofilm; BCT69 - C. tropicalis clinical isolate biofilm; CT750 - C. tropicalis ATCC 750 planktonic; CT69 - C. tropicalis clinical isolate planktonic. (II) Scanning electron microscopy of yeasts adhered to TCC-SUP. (A) C. tropicalis from candiduria and (B) C. tropicalis ATCC 750.

C. tropicalis in biofilm form caused higher epithelial cells death than their planktonic counterparts. Epithelial cells showed less metabolic activity when in contact with biofilms.

Conclusions

Thus, it is possible to conclude that C. tropicalis were able to cause more epithelial cell death when in biofilm form. This highlights the importance of biofilm formation, associated to the use of urinary catheters, on C. tropicalis virulence.