Patterns of Candida biofilm on intrauterine devices

Kamal M. Zahran,1 Michael N. Agban,2 Shaaban H. Ahmed,2 Ehsan A. Hassan2 and Marwa A. Sabet3

Abstract:

Biofilms are colonies of microbial cells encased in a self-produced organic polymeric matrix and represent a common mode of microbial growth. Microbes growing as biofilm are highly resistant to commonly used antimicrobial drugs. We aimed to screen and characterize biofilm formation by different isolates of Candida on removed intrauterine devices (IUDs), to perform experimental biofilm formation with isolated strains, and to examine biofilm by the crystal violet and XTT reduction assays and scanning electron microscopy (SEM). A total of 56 IUDs were examined for biofilm formation using Sabouraud's dextrose chloramphenicol agar. Suspected colonies were identified by different methods. Antifungal susceptibility testing with fluconazole (FLU) and amphotericin B for the isolated strains and in vitro experimental biofilm formation was carried out. The biofilm was quantified by crystal violet, XTT reduction assay and SEM. Among the 56 IUDs investigated, 26 were Candida positive (46.4 %). Candida albicans was recovered from 15 isolates. The biofilm MIC of FLU was increased 64 to 1000 times compared to the MIC for planktonic cells. The XTT method results were dependent on the Candida species; biofilm formation was highest in Candida krusei and Candida glabrata strains, followed by C. albicans and Candida tropicalis. SEM of Candida biofilm revealed a heterogeneous thick biofilm with a mixture of micro-organisms. The main conclusion from this study was non-albicans Candida represents more than a half of the Candida biofilm. Better understanding of Candida biofilms may lead to the development of novel therapeutic approaches for the treatment of fungal infections, especially resistant ones among IUD users.

Published In:

Journal of Medical Microbiology, NULL, NULL