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THE ROLE OF SURFACE ADHESINS IN *CLOSTRIDIUM DIFFICILE* VIRULENCE AND BIOFILM FORMATION: COMPARISON BETWEEN A NON-EPIDEMIC AND AN EPIDEMIC STRAIN

Soza Tharwat Baban
Hospital-Cardiac Center, Iraq

C. difficile, the causative agent of severe inflammation of the bowel (pseudomembranous colitis), has become the most significant nosocomial antibiotic-associated diarrhoea (CDAD) reported worldwide. Recurring infections and increasing antibiotic resistance have complicated treatment of *C. difficile* infection (CDI). While there is a growing concern of increased incidence and severity of CDI reported in Europe and North America, it is important to determine the prevalence of CDI, its toxinotypes and antimicrobial resistance pattern in the Middle East. In this study, we review important epidemiologic aspects of CDIs in hospitalized patients in this region. Whilst the two major virulence factors, toxins A and B, are widely recognized as essential for *C. difficile* virulence, and spores are important for transmission and persistence of infection, other virulence-associated factors such as intestinal colonization and formation of biofilm in the gut undoubtedly contribute to virulence and persistence, but the mechanisms involved in this process have not been well characterised. This study showed that clinical *C. difficile* strains, in particular a UK-outbreak, PCR-ribotype 027 (B1/NAP1) strain forms complex, structured biofilms *in vitro*. We then investigated the role of selected virulence-associate clostridial proteins in biofilm development, and find that surface factors such as the flagellum and cwp84, a major cysteine protease that is required for the maturation of the S-layer, are all important for biofilm development. Moreover, this study demonstrated that these biofilms formed by this bacterium can resist high concentrations of vancomycin, an antibiotic that is currently used in treatment of *C. difficile* infections. Finally, this study also observed differences between the ability of epidemic hypervirulent and non-epidemic strain in adherence and intestinal colonization. We showed that the flagellar proteins of hypervirulent strain function as surface adhesins in mediating attachment to human intestinal cells, the first step in intestinal colonization.

sozy.baban@gmail.com