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Electron microscopic assay of bacterial biofilm formed on indwelling urethral catheters

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Biofilm formation in indwelling urinary catheters is a leading cause of urinary tract infection (UTI) that is associated with increased bacterial resistance to antimicrobial therapy and treatment failure. Our aim was to find out the incidence of biofilm formation in urinary catheterized patients and to detect a reliable diagnostic technique for the detection of the formed biofilm. The study was done on 20 hospitalized patients from Cairo University Hospitals with indwelling catheters for ≥3 days that were scanned by electron microscopy (SEM) for the presence of biofilm. Microorganisms isolated from catheter and urine samples were identified and tested for biofilm formation using the tissue culture plate (TCP). The microbial species isolated from cultured urine were *E. coli, Acinetobacter, Candida albicans* and non-*C. albicans.* Biofilm formation increased with duration of catheter in situ, but no significant correlation was found (p=0.095). There was reduction in microbial diversity with antimicrobial use but the correlation was insignificant (p=0.317). SEM images of 14/20 (70%) showed biofilms on the luminal surface. The sensitivity, specificity, total accuracy, PPV and NPV of urine culture and catheter culture against SEM were 64.30%, 100%, 75%, 100%, 54%, 85.70%, 100%, 90%, 100%, 75% respectively. Combined routine microbiological examination of urine and intraluminal catheter surface is required for early identification of organisms causing catheter associated urinary tract infections (CAUTI) and biofilms on urinary catheters. SEM proved to be a reliable method for the detection of biofilm on urinary catheters than urine culture and TCP assay.

Biography

Nada Nabil Nawar has completed her PhD from Kasr Al Aini School of Medicine, Cairo University, Egypt. She is currently working as a Professor of Clinical Pathology in Cairo University, Egypt. She has more than 18 papers in reputed journals.

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