ABSTRACT

COMPARISON OF MICROBIOLOGIC EXAMINATION WITH
TEST TUBE METHOD AND CONGO RED AGAR
TO DETECT BIOFILM PRODUCTION
ON CLINICAL ISOLATES

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Biofilm is a community of microorganisms attached on solid surface, disregarding the surface was living or non-living material. Biofilm on medical devices can cause significant diseases and deaths and give a large effect on disease transmission among patients and health providers and potentially increase the cost of patient treatment. By knowing the presence of biofilm on a patient, one can differentiate the treatment management for that particular patient from the patients without biofilm on their medical device. Specific on patients with infection, biofilm detection can be a solution, i.e., by detecting biofilm on medical device on the patient body.

Purpose: To obtain diagnostic method to detect biofilm formation on isolates from the medical devices by simple method that is easy to do and can be applied in resource-limited microbiology laboratory, which is by analyzing comparison of Test Tube Method (visual), Test Tube method (nephelometer) and Congo Red Agar method with Microtiter Plate Assay as the gold standard of biofilm production detection on isolates from medical devices.

Method: 36 specimens obtained from IV Line, CVC, urinary catheter and ETT were grown on Muller Hinton agar and continued with 3 methods, i.e., Test Tube method, Congo Red Agar method and Microtiter Plate Assay method.

Result: Test Tube method (visual) has 100% sensitivity and 19.4% specificity (McNemar p = 0.000 (p < 0.05) and Kappa value = 0,164; and p = 0.073 (p 0.05) which were lower than Congo Red Agar method which has 100% sensitivity and 52.3% specificity (McNemar p = 0.002 (p < 0.05) and Kappa value = 0,478; and p = 0.001 (p < 0.05)). But Test Tube (nephelometer) has better sensitivity and specificity compared to Test Tube method (visual) and Congo Red Agar method, i.e., 100 % and 66.66%, respectively (McNemar p = 0.016 (p < 0.05) and Kappa value = 0,625 and p = 0,000 (p < 0.05)) with Microtiter Plate Assay as the gold standard of biofilm production detection on isolates from medical devices.

Conclusion: Test Tube (nephelometer), Test Tube (visual) and Congo Red Agar in order to have the same sensitivity of 100% but has higher specificity compared to Test Tube method (visual) and Congo Red Agar method in detecting biofilm production on isolates from medical devices that had been plugged into patients body. The biofilm formation inside devices depends on factors, i.e., host, device and the microorganism itself.

Keywords: biofilms, device, method, sensitivity specificity