Synovial Procalcitonin versus Bacterial 16S rRNA Gene-Based RT-PCR in comparison with Conventional Culture for Diagnosing Septic Arthritis

*Rana AHA¹, Azian H¹, Tengku Muzaffar TMS¹, Ahmad Fadzli S², Salwani I³

¹Universiti Sains Malaysia (USM), School of Medical Science, Kelantan, Malaysia
²International Islamic University Malaysia- IIUM, Hospital Tengku Ampuan Afzan, Kuantan, Malaysia
³Universiti Sultan Zainal Abidin (UniSZA), Faculty of Medicine, Kuala Terengganu, Malaysia

Abstract

Septic arthritis (SA) a medical emergency necessitating rapid diagnosis to prevent irreversible joint destruction and disability. To differentiate septic from non-SA, no single laboratory test in clinical practice is conclusive. Objectives were to determine the types of causative organism, utility of synovial procalcitonin (PCT), C-Reactive Protein (CRP) and bacterial 16S rRNA gene-based RT-PCR and their comparison with conventional culture results in patients with clinically-suspected SA. A totals of 38 patients were recruited in this is cross sectional study for performing synovial PCT and CRP assay, bacterial gDNA quantification via RT-PCR assay, bacterial gDNA quantification via RT-PCT. Records of culture results, WBC count, ESR, blood CRP and antibiotic administration were obtained. Gross appearance and viscosity determination are significantly associated with bacterial load. This study documents Acinetobacter radioresistens and Klebsiella pneumoniae bacteria as causative pathogens of SA in Malaysia. CRP and ESR showed a significant role in diagnosing SA. Reasons of finding of no concordance between conventional culture methods and 16S rDNA RT-PCR as well as synovial PCT were comprehensively reviewed. Gross appearance and viscosity showed significant relationship with bacterial load. RT-PCR is useful in patients treated with antimicrobial therapy with negative culture results and have speed and accuracy compared to conventional culture. Awareness of Klebsiella pneumoniae and Acinetobacter radioresistens as causative bacteria should be prompted among clinicians. Developing guideline for including 16S rRNA gene RT-PCR and introduction of Digital PCR and next-generation sequencing to detect and identify bacterial species in diagnosing SA are recommended.

Keywords: Septic Arthritis, Procalcitonin, 16S rRNA gene, RT-PCR

*Authors for Correspondence