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Original Article

Molecular Detection of Common Bacterial Pathogens Causing Meningitis

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Abstract:

Background: The clinical diagnosis of meningitis is crucial, particularly in children. The early diagnosis and empiric antibiotic treatments have led to a reduction in morbidity and mortality rates. PCR and the enzymatic digestion of 16SrDNA fragment which is produced by universal primers led up fast and sensitive determination. The purpose of this study was to investigate a rapid method for detection of common bacterial pathogens causing meningitis.

Methods: According to the gene encoding 16SrDNA found in all bacteria, a pair of primers was designed. Then the universal PCR was performed for bacterial agents of meningitis (*Streptococcus pneumoniae, Neisseria meningitidis, Haemophilus influenzae,* etc.) by employing broad- range DNA extraction method. The obtained universal PCR products were digested with restriction enzymes (*Hae*III, *Alu*I and *Mnl*I) to identify bacterial species.

Results: By the enzymatic digestion of the universal products of each standard strain of the above bacteria, specific patterns were achieved. These specific patterns may be used for comparison in CSF examination. The analytical sensitivity of the assay was approximately $1.5\acute{}10^2$ CFU/ml of CSF even in samples with high amount of proteins.

Conclusion: The universal PCR coupled with enzymatic digestion can be used to detect and identify bacterial pathogens in clinical specimens rapidly and accurately. Molecular diagnostic of bacterial meningitis, though expensive and labor-intensive, but is valuable and critical in patient management.

Keywords:

Bacterial diagnosis ، *Universal PCR* ، *Meningitis*

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