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IMPROVEMENT OF ENZYME IMMUNODETECTION IN THE LABORATORY DIAGNOSIS OF HEPATITIS E VIRUS

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Abstract

Hepatitis E is an RNA virus causing chronic diseases with detrimental effects, such as liver cancer and cirrhosis. Various biochemical tests exist for its diagnosis, but low sensitivity and cross-reactivity led the focus toward improved serological methods: immunoglobulin-based and enzyme immunodetection.

This study aims to determine the effectiveness of improved enzyme immunodetection methods in hepatitis E virus laboratory diagnosis compared with other diagnostic methods.

A systematic literature review was conducted over secondary source databases: Google Scholar, Web of Science, Springer, ScienceDirect, and PubMed. The study followed a Preferred Reporting of Items for Systematic Reviews and Meta-Analysis checklist for conducting the systematic review. Abstracted and full-text peer-reviewed articles were selected, published in English in 2015-2022.

The study employed keywords and set publication dates to search for the most relevant articles. However, these studies were assessed using the risk of bias tools: the Cochrane Risk of Bias for randomized controlled design and the Newcastle-Ottawa Scale for non-randomized controlled design. Critical Appraisal Skills Programme checklist was also used to assess the quality of the studies that cannot be assessed by the Cochrane risk of bias tool and Newcastle-Ottawa Scale. After the selection, the data were synthesized using a qualitative approach to present the results. About 10 articles were identified, including randomized, cohort, qualitative, and diagnostic studies. They found the specificity of an immunoassay to achieve a significantly high specificity (98.3%) and sensitivity (89.5%) for immunoglobulin G-based hepatitis E virus detection. However, they reported that immunoglobulin G and immunoglobulin M detection in the suspected hepatitis E virus patients and exposed groups gave potential results for detecting hepatitis E virus. The method was found as efficient as can be designed as non-invasive and with low risks and challenges.

The results showed that the improved enzyme immune-detective method can assist in providing a reliable, easily accessible, and error-free hepatitis E virus diagnostic method. Thus, future research must focus on exploiting these methods and strategies.

Keywords: *hepatitis E, enzyme immune detection, liver cancer, cirrhosis, biochemical tests, lab diagnosis, IgG, IgM.*

Introduction

Hepatitis E is a single-stranded RNA virus with ~7.2 kb in length has 3 open reading frames and is a non-enveloped virus in the fecal material and bile of the liver, while in the blood, it is covered by a lipid envelope [*Ahmad I et al., 2011*]. This means that the virus has a different structure when it is present in different bodily fluids. The family of Hepeviridae belongs to the genus of Orthohepevirus, which contains four species of Orthohepevirus A and eight genotypes [*LeDesma R et al., 2019*]. Orthohepevirus B is floating in chickens, Orthohepevirus C is found in rats, and Orthohepevirus D is found in bats.

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