

# Usefulness of RT-PCR test over the immunological test for hepatitis E virus detection in donated blood; cost analysis in an endemic developing country

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## Abstract

Hepatitis E virus (HEV) is an important hepatitis virus that can cause hepatitis. In a comparative study we found, to implement the RT-PCR test for screening purpose for hepatitis E virus contamination in donated blood in our setting has to greatly concern on the cost. Although the pool sample analysis might be applied to reduce the cost, the cost per diagnosis after pool sampling is still high notably.

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## Introduction

Hepatitis E virus (HEV) is an important hepatitis virus that can cause hepatitis (1). This infection is endemic in several tropical Asian countries including Thailand. The pork consumption is mentioned as a possible risk factor for getting HEV. In a recent report from Thailand, the significant higher seroprevalence for HEV among local Thai in areas with pork consumption is significantly higher than that of the local people in the Islamic area (2).

The new consideration on HEV is its possibility for transmission via blood transfusion. Kamp et al noted that the screening for hepatitis E in donated blood can significantly reduce the risk of expected HEV transmission (3). At present, the hepatitis E virus screening among donated blood is not routinely performed in all countries. In Thailand, the screening for HEV among donated blood is the new issue in transfusion medicine.

## Objectives

This study aims to compare the classical immunological test and RT-PCR test for determination of HEV in donated blood. The usefulness of the RT-PCR test over the classical immunological test is assessed. Also, the cost comparison between the two diagnostic approaches is done.

## Core tip

To implement the RT-PCR test for screening purpose for hepatitis E virus contamination in donated blood in our setting has to greatly concern on the cost. Although the pool sample analysis might be applied to reduce the cost, the cost per diagnosis after pool sampling is still considerable high notably.

## Materials and Methods

This work is a comparative study. The primary data from the previous diagnostic test study in our setting, Thailand, is used for further appraisal (4). The incremental analysis was done in order to derive the usefulness of the RT-PCR test over the classical immunological test. In addition, the comparative cost-effectiveness analysis was done. In the study, the cost is referred to the standard cost provided by the Thai Ministry of Public Health and the effectiveness is defined as the diagnostic property, the detection rate of each test. The final cost per diagnosis is calculated and compared. The research followed the Tenets of the Declaration of Helsinki.

## Results

According to the available data, from 30 115 test donated blood samples, the classical immunological test and RT-PCR test can detect the positive results in 0 case and 9 cases, giving detection rate equal to 0% and

0.03%, respectively. The incremental analysis showed that the usefulness of the RT-PCR test over the classical immunological test is 0.03% regarding detection property. Focusing on cost, the costs per detection by classical immunology test and RT-PCT are equal to 80 USD and 320 USD, respectively. Since the detection rate by classical immunological test is equal to 0%, hence, the cost per diagnosis is infinity and significantly higher than that of RT-PCR test (10666.67 USD per diagnosis).

### Discussion

Hepatitis E virus is an important hepatitis virus. The possibility of this virus transmission by blood transfusion becomes new emerging public health consideration. Whether it is appropriate or not to implement HEV screening in blood bank becomes the new discussed issue in Europe at present (5). Here, the authors specifically discuss the situation in Thailand, a tropical country in Southeast Asia, where HEV is prevalent. According to our study, it is no doubt that RT-PCR test is better in term of diagnostic property comparing to classical immunological test for detection of HEV virus in donated blood in our setting. In addition, the cost effectiveness analysis also confirms that HEV determination by RT-PCR test is more cost effective. Nevertheless, if we focus on the cost per diagnosis that cost per diagnosis of RT-PCR test is extremely high.

### Conclusion

To implement the RT-PCR test for screening purpose for HEV contamination in donated blood in our setting has

to greatly concern on the cost. Although the pool sample analysis might be applied to reduce the cost, the cost per diagnosis after pool sampling is still high notably.

### Authors' contribution

Both authors wrote the manuscript equally.

### Conflicts of interest

The authors declared no competing interests.

### Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

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