What is the more suitable for early detection of low abundant lamivudine-resistant mutants?

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Lamivudine is an effective antiviral agent for treatment of patients with chronic hepatitis B and advanced liver diseases. However, long-term lamivudine monotherapy leads to the emergence of lamivudine-resistant hepatitis B virus (HBV) mutants in some patients chronically infected with HBV. Sensitive methods for early detection of lamivudine-resistant mutants will help physicians make clinical decisions in treating patients with HBV infection.

To date, many assays have been used for detection of lamivudine-resistant mutants in patients with Hepatitis B. Differences in sensitivity, specificity, cost, and time required, exist in these methods. Real-time PCR is able to quantitatively detect a small portion of resistant mutants in HBV populations and ligase detection reaction (LDR) is a newly developed method for detection of low abundant mutants in the background of wild-type HBV. However, there are no studies which have compared the clinical performance of the two methods.

A research article to be published on January 7 in the World Journal of Gastroenterology (volume 14, issue 1) addresses this question. It compared LDR and real-time PCR for detection of low abundant YMDD mutations in mixed plasmids and serum samples from 52 lamivudine treated patients. Time required and reagent cost for both assays were evaluated. The research was conducted carefully by an experienced team of investigators.

The article suggested both methods are sensitive and inexpensive for detection of YMDD mutation; but LDR is more sensitive than real-time PCR. The results obtained with both methods were completely concordant in all serum samples. LDR was able to detect as low as 0.01% (100 copies/mL) of YIDD plasmid, while real-time PCR only detected 0.1% (1000 copies/mL) of YIDD plasmid in the background of YMDD plasmid. In addition, the cost of LDR is slightly lower than that of real-time PCR.

However, real-time PCR is much more rapid and requires less manual work than LDR. The total assay time for LDR and real-time PCR was 4.5 and 2.5 h, respectively. Another advantage of the real-time PCR method is it is able to calculate the ratio of mutants to total virus in samples. This will be useful in clinical studies on the dynamics of resistant mutants during lamivudine therapy.

Source: World Journal of Gastroenterology