Using the Prevalence of an Elevated Serum Alanine Aminotransferase Level for Identifying Communities With a High Prevalence of Hepatitis C Virus Infection

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Background: Antibody to hepatitis C virus (anti-HCV) is a widely accepted method for the diagnosis of HCV infection. However, it is too expensive to use in large-scale health surveys.

Objective: To investigate the use of the serum alanine aminotransferase (ALT) level to predict the prevalence of HCV infection.

Patients and Methods: A sample of 6095 residents aged 35 years old or older in a small township of southern Taiwan, Republic of China, were examined in a community health survey. These persons were walk-ins to the government-sponsored stations after an intensive health promotion for this survey. Blood samples were obtained and analyzed for serum ALT levels. The presence of hepatitis B surface antigen and anti-HCV were determined by enzyme immunoassay methods.

Results: The overall prevalences of hepatitis B surface antigens(+), anti-HCV(+), and elevated ALT levels were 11.8%, 15.0%, and 7.5%, respectively. Among the 13 villages in this community, the prevalence of hepatitis B surface antigen(+) ranged from 6.8% to 17.3%, anti-HCV(+) ranged from 7.2% to 37.6%, and an elevated ALT level ranged from 5.8% to 16.5%. A strong positive correlation was found between the prevalence of an elevated ALT level and anti-HCV(+) \((r=0.91, \text{Spearman rank correlation; } P<.001)\). However, nearly 0 correlation \((r=-0.05, P=.87)\) was obtained between the prevalence of an elevated serum ALT level and hepatitis B surface antigen(+).

Conclusion: The prevalence of an elevated serum ALT level in a community is a strong indicator of its prevalence of anti-HCV(+), even in areas where there is a similar prevalence of hepatitis B virus infection. This result is useful for economically identifying hyperendemic communities with HCV infection.

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HEPATITIS C VIRUS (HCV) infection is an important public health problem.\(^1\)\(^2\) This communicable disease is difficult to treat and frequently causes advanced liver diseases and related extrahepatic disorders\(^1\)\(^3\) and, thus, its effect on a community with high prevalence is potentially devastating. An effective way of minimizing the effect is to prevent the disease’s further spread. Identifying the communities at high risk of HCV infection and the associated risk factors is an important first step.

Antibody to HCV (anti-HCV) test is the accepted method for the diagnosis of HCV infection. It is routinely used in the screening for HCV infection among blood donors. However, the anti-HCV test has not been widely used in routine health examination and community screening for 2 reasons: its high cost and the difficulty with performing the test in many communities where there is a lack of both necessary technicians and instruments. Cost and feasibility are primary considerations in such health surveillance and surveys. To identify the communities at high risk of HCV infection, there is a need for a much simpler, cost-effective tool.

The serum alanine aminotransferase (ALT) level test had been shown to be a viable and cost-effective screening test for HCV infection that could reduce the incidence of posttransfusion infection.\(^4\)^5 However, with the invention of anti-HCV test, the serum ALT level test has been gradually phased out in blood don-
nor screening because of its lower sensitivity, which can subject blood recipients to the unnecessary risk of HCV infection. Its effectiveness in large-scale screening of HCV infection also has been questioned because of its unsatisfactory sensitivity. Although the serum level test may not be ideal for the individual diagnosis of HCV infection, we will show that using the prevalence of an elevated serum ALT level ($40 \text{ U/L}$) for identifying communities with high prevalence of HCV infection is valuable.

**RESULTS**

The prevalence of HBsAg(+) was 11.8% (n=719), anti-HCV(+) was 15.0% (n=917), and elevated serum ALT level was 7.5% (n=459) for the township. The village-specific prevalence of HBsAg(+) ranged from 6.8% to 17.3%, anti-HCV(+) ranged from 7.2% to 37.6%, and elevated serum ALT level ranged from 5.8% to 16.5%. The Figure shows the relation between the prevalence of an elevated serum ALT level and anti-HCV(+) among the 13 villages, and the relation between the prevalence of an elevated serum ALT level and HBsAg(+). Spearman rank correlation was calculated as 0.91 ($P<.001$), and $-0.05$ ($P=.87$), respectively.

**COMMENT**

We found a strongly positive correlation between the prevalence of an elevated serum ALT level and anti-HCV(+) based on a sample of adults aged 35 years or older. This finding suggests that we can use the prevalence of an elevated serum ALT level for identifying the communities with high prevalence of HCV infection in this adult group. Considering that the per unit cost of the anti-HCV test is 5 to 25 times that of the serum ALT level test, the overall cost for conducting such a regional or national survey of HCV infection can be significantly reduced using the serum ALT level test. Moreover, the serum ALT level test is a routinely used liver function test in clinical practice and periodic health examination. Therefore, performing the serum ALT level test in the field is much more feasible than performing the anti-HCV test. Our data have important implications in terms of cost and feasibility for monitoring a communicable disease in communities, particularly in hyperendemic areas.

In contrast to HCV infection, we found no correlation between the prevalence of an elevated serum ALT level and HBsAg(+). Taiwan is a part of the world with high rates of HBV infection, so if HBV does not interfere with the use of the serum ALT level for the detection of HCV infection in Taiwan, it should not be a problem any-
where. In summary, the prevalence of an elevated serum ALT level is a valuable index for identifying the communities at the high risk of HCV infection. The increased population with an elevated serum ALT level is more likely to be attributed to HCV infection.

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REFERENCES


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