

Sensitivity and Specificity of Tests of Liver Injury

Editor - In the recent “Outpatient Practice Management Tips: Tests of Liver Injury”, Musana et al.¹ make a broad statement that “All tests of liver injury are neither highly sensitive nor specific.” This statement, by itself, is probably not accurate, nor helpful in the practical sense.

The following quotes from *Harrison’s Principles of Internal Medicine* textbook illustrate the problems with your statement regarding liver disease and tests of liver function:

- “Diagnosis of liver disease is greatly aided by the availability of reliable and sensitive tests of liver injury and function.”²
- “To increase both the sensitivity and the specificity of laboratory tests in the detection of liver disease, it is best to use them as a battery.”³

Thus, I would rather the statement read “No single test of liver injury is neither highly sensitive nor specific.” *Harrison’s Principles of Internal Medicine* is clear in the basic wisdom of diagnosing liver injury that these tests are highly sensitive when used in a battery and goes on to add: “When more than one of these tests provide abnormal findings, or the findings are persistently abnormal on serial determinations, the probability of liver disease is high. When all test results are normal, the probability of missing occult liver disease is low.”³

1. Musana KA, Yale SH, Abdulkarim AS. Outpatient practice management tips: tests of liver injury. *Clinical Medicine & Research* 2004;2:129-131.
2. Ghany M, Hoofnagle JH. Approach to the patient with liver disease. In: Kasper DL, Fauci AS, Longo DL, Braunwald E, Hauser SL, Jameson JL, eds. *Harrison’s principles of internal medicine*. 16th ed. New York, NY: McGraw-Hill Medical Publishing Division; 2005. 1808-1813.
3. Pratt DS, Kaplan MM. Evaluation of liver function. In: Kasper DL, Fauci AS, Longo DL, Braunwald E, Hauser SL, Jameson JL, eds. *Harrison’s principles of internal medicine*. 16th ed. New York, NY: McGraw-Hill Medical Publishing Division; 2005. 1813-1816.

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Authors’ Reply

Editor - We appreciate Dr. Cameron’s comments to our Outpatient Practice Management Tips: Tests of Liver Injury.¹ It is true that no single test of liver injury is either highly sensitive or specific. Taken as a panel, considering the preclinical suspicion of disease, the specificity and sensitivity can be increased. In our article we stated that it is imperative that the evaluation first confirm the result of an abnormal test by either repeating the tests and/or ordering a more specific one.

The sensitivities and specificities of different tests of liver injury have been demonstrated in multiple studies. The sensitivity and specificity of the serum aminotransferases, particularly serum alanine aminotransferase (ALT) for discriminating those with and without liver disease, depends upon the cutoff values chosen to define an abnormal test. For example, in a study by Kundrotas and Clement² of 19,877 asymptomatic US Airforce basic trainees, 99 were found to have abnormal ALT elevation, and among these, only 12 had associated liver disease.² In a retrospective review of 6,835 serum ALT values, Prati and colleagues³ found that the upper limit of normal may be too high and recommended lowering this value. Thus, patients who may have had “normal” functioning livers would under the revised limits, be classified as abnormal. Furthermore, most patients identified as abnormal by the recommended revised lower cutoff values had only mild liver disease or no identifiable cause of the abnormal laboratory values. In our view, the overall benefit of this proposed revision is unclear, since it would translate into more patients having suspected liver disease and a large increase in the absolute number of patients who would require further evaluation with an uncertain clinical benefit. At present, it is unknown whether finding disease at this stage would have any appreciable effect on outcomes.

A single test to assess liver injury is insufficient. A well-chosen panel of liver tests is more specific in identifying patients with underlying liver disease.

1. Musana KA, Yale SH, Abdulkarim AS. Outpatient practice management tips: tests of liver injury. *Clinical Medicine & Research* 2004;2:129-131.
2. Kundrotas LW; Clement DJ. Serum alanine aminotransferase (ALT) elevation in asymptomatic US Air Force basic trainee blood donors. *Dig Dis Sci* 1993;38:2145-2150.
3. Prati D; Taioli E; Zanella A. et al. Updated definitions of healthy ranges for serum alanine aminotransferase levels. *Ann Intern Med* 2002;137:1-10

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