Evaluating the accuracy and increasing the reliable diagnosis rate of blood tests for liver fibrosis in chronic hepatitis C

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Calès, Paul [1], de Ledinghen, Victor [2], Halfon, Philippe [3], Bacq, Yannick [4], Leroy, Vincent [5], Boursier, Jérôme [6], Foucher, Juliette [7], Bourlière, Marc [8], de Muret, Anne [9], Sturm, Nathalie [10], Hunault, Gilles [11], Oberti, Frédéric [12]

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blood test [13], Diagnostic accuracy [14], liver biopsy [15], liver fibrosis [16], Metavir staging [17], non-invasive diagnosis [18], reliable diagnosis [19], Sensitivity [20], Specificity [21], Viral hepatitis C [22]
Background: The reliable diagnosis rate of diagnostic tests is provided by their intervals with acceptable accuracy (e.g. ≥90%) where a liver biopsy can be avoided. Aims: To evaluate the overall accuracy and improve the reliable diagnosis rates of blood tests for significant liver fibrosis. Methods: Five blood tests were compared with Metavir fibrosis (F) staging in 1056 patients with chronic hepatitis C. Results: Area under the receiver operating characteristics (F0-1 vs. F2-4) were: FibroMeter: 0.853, Fibrotest: 0.811, Fib-4: 0.799, aspartate aminotransferase to platelet ratio index (APRI): 0.786 and Hepascore: 0.784 (P<10−3 between tests). The reliable diagnosis rates based on two traditional intervals defined by thresholds ≥90% of negative predictive values (NPV) and positive predictive values (PPV), diagnosing F0/1 and F2/3/4, respectively, were: FibroMeter: 43.5%, APRI: 19.6%, Fibrotest: 17.1%, Hepascore: 3.9%, Fib-4: 1.7% (P<10−3). By dividing the indeterminate interval by the diagnostic cut-off, two new intervals could be diagnosed reliably: F1/2 and F1/2/3. Accordingly, the reliable diagnosis rate was increased, e.g. FibroMeter: 75.5% (accuracy: 89.5%) with three intervals (F0/1, F1/2, F2/3/4). It was possible to further increase this rate by using the more exportable 90% sensitivity/specificity thresholds, e.g. FibroMeter: 90.2% (accuracy: 86.4%). By using the four intervals, the reliable diagnosis rate was 100% (accuracy: 89.5% with predictive value (PV) and 87.5% with sensitivity/specificity). Conclusion: Reliable diagnosis is a diagnostic index devoted to clinical practice. Its rate can be increased by creating new intervals between diagnostic cut-off and 90% PVs or sensitivity/specificity thresholds. This increased the overall accuracy from 78.1 to 89.5% and reduced the need for a liver biopsy from 56.5 to 0% with the most accurate test.

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