

Predictive Value of Non-Invasive Methods LIVERFAST™, Acoustic Radiation Force Impulse (ARFI), FIB-4 and APRI to Identify the Natural Phases of Chronic Hepatitis B (CHB) Infection from the National University Hospital (NUH) CHB Study Cohort of Singapore

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Background and aim.

In order to determine the outcomes and progression to significant liver fibrosis (SLF) as per ARFI, we set up a prospective NUH HBV cohort with chronic HBV infection (*Ch.Inf*) expected to have no/minimal liver disease vs moderate/severe in chronic hepatitis (*Ch.Hep*) patients (pts). (*JHepatol*2017) LIVERFAST™ (LF, Fibronostics, US), is a patented technology to assess liver fibrosis(LF-F) and activity(LF-A).

Aim.

To estimate the negative predictive value (NPV) and the discriminating value between *Ch.Inf* and *Ch.Hep* with non-invasive tests LF-F, LF-A, ARFI, FIB-4 and APRI, in CHB pts from the NUH Singapore HBV cohort.

Methodology.

Prospective naïve CHB pts aged >21yrs, with ARFI<1.54m/s, were included. HBV phases were defined on HBeAg presence, HBVDNA(VL, IU/mL) and ALT(IU/L): *Ch.Inf.HBe+*[VL>10⁷,ALT<40]; *Ch.Hep.HBe+*[VL10⁴–10⁷,ALT>40]; *Ch.Inf.HBe-*[VL<2,000,ALT<40]; *Ch.Hep.HBe-*[VL>2,000,ALT>40]; *indeterminate* (not all criteria) and *resolved HBV* [HBsAg(-), VL<10,ALT<40,anti-HBc+].

Results.

724pts were included, [26 excluded (6 missing data; 7 ARFI>1.54m/s; 13 LF not applicable)] with the main characteristics [mean(se)] age 50(0.4)yrs, 51.7%males, 89.9% HBeAg-, ALT 31(1)IU/l, VL 2.4x10⁷(4643) IU/ml, qHBsAg 5428(758), ARFI 1.06(0,01). Prevalence of CHB profiles were: 60(8.3%) *Ch.Hep.HBe-*; 195(26.9%) *Ch.Inf.HBe-*; 33(4.6%) *Ch.Hep.HBe+*; 24(3.3%) *Ch.Inf.HBe+*; 32(4.4%) *HBsAg nonReact* and 380(52.5%) *indeterminate* (50.3%HBe-). Spearman correlations of LF-Fib/LF-Act with ARFI, FIB-4 and APRI were 0.18/0.21, 0.47/0.11 and 0.23/0.69, respectively (all p<0.01). In HBeAg(-)pts, *Ch.InfHBe-* phase was discriminated from *Ch.HepHBe-* as per liver disease estimators LF-Fib (0.23vs0.28,p<0.05), LF-Act (0.07vs0.23,p<0.001) and APRI (0.28vs0.44,p<0.001), respectively. In HBeAg(+) pts, *Ch.Inf HBe+* phase was discriminated from *Ch.HepHBe+* as per LF-Fib (0.10vs0.19,p<0.001), LF-Act (0.09vs0.31,p<0.001), and APRI (0.32vs0.46,p<0.001). ARFI and FIB-4 did not discriminate *Ch.Inf* from *Ch.Hep* in both HBeAg+/-

($p=NS$). NPV for LF-Fib/LF-Act/APRI were for HBe(-) 77%/82%/27% and HBe(+) 89%/62%/12%, respectively. *Resolved HBV* had significantly lower activity than *Chr.HepHBe-* as per LF-Act (0.11vs 0.23, $p<0.001$). Among 6 pts (0.8%) that scored F4 stage as per LF-Fib and F0 as per ARFI, 3 had false positive LF-Fib.

Conclusion.

LF-fib and LF-Act are reliable tools for defining HBV phase-related low vs high risk of liver disease with better NPV than APRI or FIB-4. Management of HBV pts with low ARFI scores could be improved by LF tests.

Figure 1. Boxplots of ARFI and LIVERFAST™ -Fibrosis and Activity scores according to HBV profiles.

