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).(*JHepatol2017*) 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>10^7,ALT<40]; ***Ch.Hep.HBe+*** [VL10^4–10^7,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 2,4x10^7(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 ***Ch.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.