Assessment of Liver Steatosis in a Patient with Chronic Liver Disease

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INTRODUCTION

Liver steatosis is a relatively wide-spread liver condition, which is considered in most cases to be a non-cancerous, reversible and asymptomatic formation [1,2]. On the other hand, there is convincing evidence that steatosis is one of the stages in the whole pathological process, which, regardless of its etiology, may lead to generation of fibrosis, which in its turn underlies the chronic liver disease (CLD) [3]. Steatosis can be the manifestation of secondary causes of fat accumulation in hepatocytes. Under some circumstances there develops an non-alcoholic fat liver disease (NAFLD), and it can evolve into steatohepatitis and fibrosis, the stage of which would correlate with risks of liver cirrhosis and hepatocellular carcinoma, which makes fibrosis an important prognostic criteria [4-6]. It is also known that the NAFLD prevalence is high in the risk groups. For instance, NAFLD prevalence in patients with obesity is more than 80-90%, in patients with diabetes II around 70%, in patients with dyslipidemia around 50% [7,8].

Thus, in conditions of high NAFLD prevalence, timely discovery of steatosis and its quantitative measurement becomes a current task of hepatology. That is why the appearance of a method which can help to define not only presence, but the grade of steatosis causes a huge interest inside scientific community. A modern method of measuring grade of steatosis is a Controlled Attenuation Parameter (CAP). CAP is a newly developed non-invasive method based on VCTE™ (vibration-controlled attenuation parameter) technology, inserted into FibroScan (Echosens, Paris, France). CAP helps to measure the grade of ultrasonic attenuation in the adipose tissue of the liver, which helps to define steatosis grade [9-12].

We have gained our own experience of non-invasive methods practice in defining the steatosis grade in patients with CLD during the pilot research. There is a case below describing the comparative study of steatosis grade held by various methods (CAP with elastography, FibroMax, based on steatosis and fibrosis biomarkers in comparison with liver biopsy).

CASE PRESENTATION

Institute of Gastroenterology with complaints of general weakness, discomfort and heavy feeling in right subcostal region, breathlessness after moderate physical activity. Anamnesis morbi: worsening of health was recorded since November 2014. He reported that to local GP medical clinic. After examination there was found a three-times higher level of ALT and AST; Hematosis: thrombocytopenia 98х10³/l. According to the Ultrasound: hepatosplenomegaly. More Patient L, 57 years old male, got into the Clinic of Department of Hepatology of Moscow Scientific Research than 30 years the patient has been overweight (BMI fluctuated around 28-31 kg/m²). In 2004 there was discovered type 2 diabetes mellitus. Since 2011 the patient has been insulin dependent (due to impossibility to maintain glucose level).

Patient has a medical history of Ischemic Heart Disease, Atherosclerosis, cardioclerosis, Hypertension. Obesity. Abdomen greatly increased in volume by over-developed subcutaneous fat, palpation painless in all regions. Questionnaires CAGE and AUDIT-C 0 and 2 points respectively.

Chemistry: ALT - up to 3,6, AST - up to 2,9, Cholesterol - 6.1 mmol/l, HDL - 0.6 mmol/l, LDL - 3.6 mmol/l, Triglycerides-3.05 mmol/l, Glucose - 6.6 mmol/l, Prothrombin - 55%, INR - 1.52.

Hematology: Platelets - 112 000.

Abdominal ultrasonography shows - splenomegaly (S - 98 cm²), Portal Vein - 12 mm, Splenic Vien – 7 mm.

Esophagastroduodenoscopy - atrophic gastritis was diagnosed.
According to the regular investigations no evidence of viral, alcoholic autoimmune etiology of CLD has been found. Storage diseases (Hemochromatosis, Wilson’s disease) has been excluded as well.

The CAP determination using FibroScan® M probe identified liver steatosis - S3 (299 dB/m), stage of fibrosis F4 (18.8 kPa) (according to METAVIR score). According to FibroTest (FibroMax): F4 (0.81), A3 (0.84), S3 (0.85), N1 (0.50), H0 (0.03).

According to the liver biopsy findings (Biopsies 1.9 cm in length with 8 portal tracts of tissue sample), there is failure of lobular-trabecular structure as a result of dissimilar thickness and extent of fibrous sept which join up portal tracts. There are significant lymphoid infiltration and vascularisation of central veins and portal tracts. Macrovesicular steatosis of hepatocytes and minor protein dystrophy. There is significant hyperplasia of cells reticuloendothelial system.

CONCLUSION

Active micronodular liver cirrhosis. Index of steatosis - S2. METAVIR A2F4 (Figure 1).

The final clinical diagnosis

Liver cirrhosis in the outcome of NASH, moderate activity, Child-Pugh A (6 points), MELD 8. A2 F4 METAVIR. S2 (Brunt) (according to liver biopsy). F4 S3 (according to CAP with FibroScan). F4 A3 S3 N1 H0 (according to FibroMax). Splenomegaly.

Conclusion: Non-invasive methods of fibrosis, as well as methods of non-invasive quantitative assessment of fibrosis and steatosis show relatively high precision in comparison with liver biopsy. CAP should be recommended as a simple and fast non-invasive method of assessment of grade of steatosis in patients with CLD, diabetes, CVD, obesity etc. However, it is mentioned that factors possibly influencing CAP measurements are yet to be discovered due to narrow sampling. On top of that, CAP has an important advantage – the ability to define both steatosis and fibrosis with the help of one method. Our CAP usage experience posed to clinicians and scientists a range of questions:

- Will ultra-structural features of macro- and microvesicular liver steatosis influence the accuracy of its measurements?
- How active does alcohol, food or some specific medicine intake affect the result of CAP measurements?
- Does is matter in terms of assessing steatosis grade by CAP whether to use of M- or XL-probe, and how much do data correspond depending on initial patient’s characteristics?
- How much the steatosis grade shown by CAP depend on liver disease’s etiology?

Also needs to be mentioned that we need to continue the comparative study of quantitative assessment of liver steatosis between CAP and liver biopsy for evaluating CAP’s diagnostic accuracy and for defining precise quantitative compliance parameters in this method.

REFERENCES


2. Yeh MM, Raju M. Pathology of nonalcoholic steatohepatitis.


