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Risk of non-alcoholic fatty liver disease in patients with type-1 diabetes

In this modern world non-alcoholic fatty liver disease (NAFLD) is one of the most common forms of chronic liver disease. It is defined as the presence of fatty liver disease in the absence of excess alcohol or other causes of fatty liver such as hepatitis or certain medications. NAFLD can progress to advanced fibrosis, cirrhosis, end-stage liver disease and liver cancer. It can also increase the risk of cardiovascular diseases, chronic kidney disease and death. A multitude of factors such as obesity, poor dietary habits, lack of exercise, diabetes can all contribute to the development of NAFLD. Almost 50-70% of type-2 diabetics and about 50% of type-1 diabetics are found to have NAFLD on a liver ultrasound. These patients are at high risk of developing advanced stages of NAFLD and progressing to end-stage liver disease. The rate of NAFLD progression in diabetics is significantly higher than patients without diabetes. Type-1 diabetics with NAFLD have been associated with 5-fold increased risk of distal neuropathy, and 8-times higher risk of having cardiovascular issues.

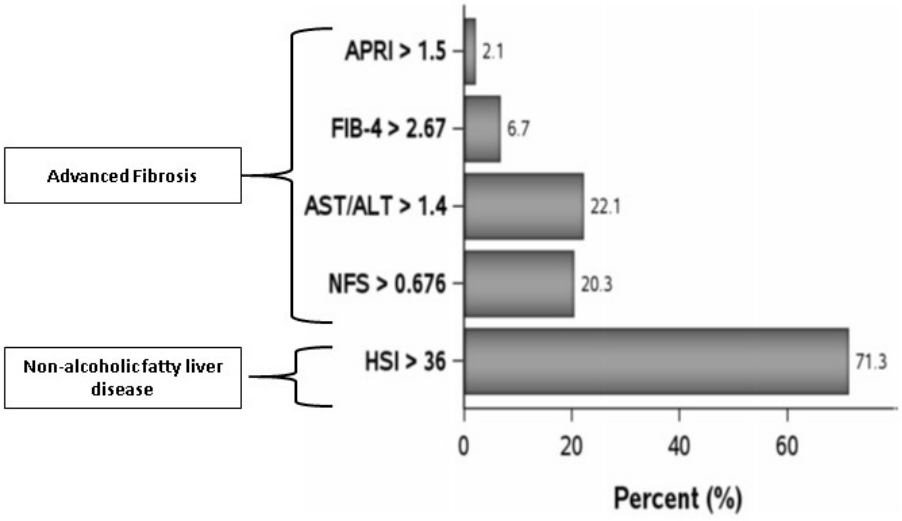

Fig. 1. Presence of advanced fibrosis and NAFLD based on noninvasive scores.

We conducted a study to assess the prevalence of NAFLD in patients who had type-1 diabetes. We also evaluated if advanced fibrosis was present, which is a stage that can progress to cirrhosis and end-stage liver disease. We used well-established simple fatty liver and fibrosis scores, easily calculated by using demographic and laboratory data without the need of a liver ultrasound or biopsy. Hepatic steatosis index (HSI) is the score used to diagnose NAFLD and four different scores with different cut-off values (APRI>1.5, FIB-4>2.67, AST/ALT >1.4 and NFS >0.676) were used to detect advanced fibrosis.

Of the 4,899 patients included in the analysis, 86.9% were Caucasian and 67% were above normal weight limit. The mean hemoglobin A1C level was 8.1 ± 1.9, indicating poor glycemic control. Liver enzymes (AST and ALT) were within normal limits. Nearly 33% of our study population had hypertension, 34.7% had high

lipid levels, and 12.1% had chronic kidney disease. Based on non-invasive scores, our study suggested that more than 70% of type-1 diabetics had fatty liver and advanced fibrosis, showing a presence in 2-22% of these patients (Fig. 1). Besides the complications associated with type-1 diabetes these patients are at high risk of complications associated with NAFLD. One of the major reasons for the underdiagnoses of NAFLD by primary care physicians and diabetic specialists is the reliance on normal liver enzymes. In our study, liver enzymes (AST and ALT) were within normal limits, despite this finding 71% of patients having suspected NAFLD. Noninvasive methods are inexpensive, easy to use and may help to screen for fatty liver. They also allow the assessment of NAFLD's degree of progression and appropriately selecting patients for liver ultrasound or liver biopsy. The clinicians who manage NAFLD should not only focus on liver disease but be able to recognize the increased risk of cardiovascular and kidney complications. Management includes referral to a dietician, weight loss and education regarding exercise and lifestyle modifications. These management strategies are the foundation of therapy for both diabetes and NAFLD, while significantly affecting progression of NAFLD to non-alcoholic steatohepatitis, cirrhosis and liver cancer. In conclusion, NAFLD affects a large population of patients with type-1 diabetes but is often overlooked. Patients with diabetes and NAFLD generally have a more aggressive disease course and at a higher risk of cirrhosis, end-stage liver disease, cancer, cardiovascular, kidney and neuropathy-related complications. Non-invasive scores are readily available and inexpensive tools to screen for NAFLD and advanced fibrosis. This provides opportunity to clinicians for early diagnosis, aggressive risk factor modification and treatment of NAFLD-related complications.

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Publication

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