Can Testing the Impact of Minimal Hepatic Encephalopathy on Driving Skills be Prolific to Translate Research to Real Life Clinical Medicine?

Minimal hepatic encephalopathy (HE) is considered a continuum of spectrum of HE. As the liver disease progresses, the abnormalities in central nervous function with impairment in attention, psychomotor speed, visuo-spatial perception and delayed information processing start disquieting the patient without any obvious clinical signs of HE. This cognitive impairment is so subtle to be picked up by the routine neurological clinical examination and requires specialized tests for diagnosis, hence unless specifically looked for will be missed in the outpatient clinic. There is sufficient evidence to suggest that minimal HE has a major impact on the health related quality of life and important outcomes like development of overt HE and survival.¹⁻⁵ There is also growing evidence to show that the driving skills get impaired in patients with minimal HE and they are more prone to accidents. This was first demonstrated by Schomerus et al.⁶ who studied 40 patients with cirrhosis of liver, and considered 60% of them to be unfit to drive based on their psychometric tests performance. However, the conclusions from the study were less persuasive in view of unspecified methodology used for driving fitness. Similar results reported by Watanabe et al.⁷ strengthened this observation, however a pilot study that evaluated driving using a real road test in cirrhosis patients with minimal HE found no impairment of driving performance.⁸

Later by using a standardized 90-minute on the road driving test Wein et al.⁹ inferred that fitness to drive a car was impaired in cirrhotic patients with minimal HE and also instructor intervention was more frequently required during the test to avoid accidents in patients with minimal HE (36%) than in patients without minimal HE (6%) and healthy controls (8%). The flawed fitness to drive was attributed to imperfect car handling, adaption, loss of cautiousness and maneuvering ability in patients with minimal HE. Similar observations were made by Bajaj et al.¹⁰ who reported a higher self-reported occurrence of violations and accidents in patients with cirrhosis and minimal HE compared to healthy volunteers. The impairment of attention and speed of mental processing adversely affect an individual's ability to react to unexpected traffic conditions, such as an illegal incursion by another vehicle at an intersection leading to more traffic accidents.¹⁰

In this study, the authors concluded that navigation is a complex activity required for safe driving and is dependent

on functioning working memory, attention and speed of mental processing, which is impaired in cirrhosis and minimal HE posing navigation difficulties.¹¹

However the study by Kirchies et al.¹² showed that the presence of minimal HE does not necessarily predict inability to drive a car and that computerized tests and especially the paper and pencil tests cannot reliably predict driving performance for which real or simulated driving tests are required. Based on these specialized tests 52% of the patients with minimal HE have to be classified as unfit to drive. A recent study by Lauridsen et al.¹³ again demonstrated that the higher proportion of subjects with minimal HE were categorized as unsafe drivers at baseline (16%) than subjects without minimal HE (7%), and at 1-year follow-up (18% vs 0%) by the driving simulation tests.

Standardization of screening tools for diagnosis of minimal HE remains a very important issue. Tests available for the diagnosis of minimal HE may not be appropriate in the diagnosis of driving skills of the patients as can be interpreted by the discordant results of the various studies done to assess the driving skills. The study by Thuluvath et al.¹⁴ in this issue of Journal of Clinical and Experimental Hepatology also highlights that unless carefully looked for, the driving unskillfulness might be missed. This study concluded that despite having significantly abnormal values on psychometric testing compared to controls, patients with cirrhosis performed similarly to controls on the driving simulator. Only the pedestrian portion of the driving simulator test was affected more so in patients with abnormal NCT-A scores (100%) as compared to those with normal NCT-A (64%) scores. However the biggest drawback of the study was that patients were on treatment with lactulose, which is the recommended treatment for the reversal of minimal HE. It has already been seen in studies that reversal of minimal HE with treatment by lactulose or rifaximin is associated with improvement in driving skills though we need further studies using specialized driving skill testing. The results of the cost effective analysis by Bajaj et al also reiterate the fact that diagnosis and treatment of minimal HE could be cost saving, when the potential reduction in motor vehicle accidents is considered.^{15,16}

Although we might conclude based on the various studies that minimal HE patients may have reduced driving ability, the predictive value of the presence of minimal HE on actual driving ability appears to be limited since the tests designed to assess driving skills may not go in hand in hand with tests designed to diagnose minimal HE. At present minimal HE does not compel us to advocate the stopping rule for driving in patients with cirrhosis unless

<http://dx.doi.org/10.1016/j.jceh.2016.03.007>

simple tests are available beyond the research modules and can be applied in the real world of clinical medicine. The only recommendation that can be inferred from the current literature is that minimal HE patients might be declared temporarily unfit if they fail a simulated driving test until improvement in the simulated driving test is exhibited on treatment. The future studies should lay emphasis on the factual existence of minimal HE and its treatment effect on motor vehicle accidents and death rates so that strong recommendations can be given for barring the cirrhotic patient with abnormal cognitive profile from driving.

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Sunil Taneja, Radha K. Dhiman

Department of Hepatology, Postgraduate Institute of Medical Education and Research, Chandigarh, 160012, India
E-mail: drsunitaneja@hotmail.com (S. Taneja)

Address for correspondence: Sunil Taneja, Department of Hepatology, Postgraduate Institute of Medical Education and Research, Chandigarh 160012, India.