

Cirrhotic patients experience increased daytime sleepiness from higher ammonia levels

March 1 2012

Italian and Swiss researchers confirm that induced hyperammonaemia significantly increases daytime sleepiness in patients with cirrhosis. The findings available in the March issue of *Hepatology*, a journal published by Wiley-Blackwell on behalf of the American Association for the Study of Liver Diseases, show that higher blood levels of ammonia reduced the ability of cirrhotic patients to produce restorative sleep.

Chronic liver disease can lead to cirrhosis—a condition where scar tissue replaces healthy tissue, resulting in decreased blood flow through the liver and reduced liver function. Viral hepatitis, heavy alcohol use and obesity are among the causes of cirrhosis according to the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK).

In patients with chronic liver failure neuropsychiatric abnormalities may arise—termed hepatic encephalopathy (HE)—which experts believe to be due to neurotoxic substances that originate in the gut and are not cleared by the liver, such as [ammonia](#). HE is common following a gastrointestinal bleed, which can be simulated by the oral administration of a mixture of protein mimicking that contained in blood ('amino acid challenge'; AAC).

To investigate the effects of excess ammonia and HE on sleep-wake patterns in patients with cirrhosis, Dr. Sara Montagnese and colleagues from the Dipartimento di Medicina in Padova, Italy and the Institute of

Pharmacology and Toxicology in Zurich, Switzerland, induced hyperammonaemia in participants by an AAC. Ten [cirrhotic patients](#) and ten healthy controls underwent eight days of [sleep](#) quality monitoring, neuropsychiatric/wake and sleep EEG assessment prior to and following the AAC, and hourly ammonia and sleepiness assessments for eight hours post-AAC.

"Our study found that induced hyperammonaemia led to a significant increase in [daytime sleepiness](#) in both patients and healthy volunteers," said Dr. Montagnese. The authors also report changes to the EEG architecture of a sleep episode (nap) in patients with cirrhosis, which they believe points to a reduced ability to produce restorative sleep.

Dr. Montagnese concludes, "Our findings have important clinical implications in that subjective sleepiness may be used as a surrogate marker for HE." The authors also suggest that strategies aimed at reducing daytime sleepiness may result in improved sleep at night.

More information: "Induced Hyperammonaemia may Compromise the Ability to Generate Restful Sleep in Patients with Cirrhosis." A Bersagliere, ID Raduazzo, M Nardi, S Schiff, A Gatta, P Amodio, P Achermann and S Montagnese. *Hepatology*; January 19, 2012 ([DOI: 10.1002/hep.24741](#)); Print Issue Date: March 2012

Provided by Wiley

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