

REVIEW

Diagnosis and management of hepatic encephalopathy: A summary for patients

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INTRODUCTION

Hepatic encephalopathy (HE) is a common and serious symptom of advanced liver disease. The goal of this article is to explain HE and treatments for patients and their caregivers. It is not intended to give medical advice and cannot replace the role of a patient's medical team. This article is based on the 2014 guidelines by the American Association for the Study of Liver Diseases, the primary professional medical society for liver disease in the United States (the guidelines can be found online at: <https://www.aasld.org/sites/default/files/2019-06/hepaticencephalopathy82014.pdf>).¹

WHAT IS HE?

HE is changes in brain function in patients with severe liver disease. It results in a wide range of nerve and mood symptoms, which range from mild confusion to coma.

Some important things to know include the following:

1. HE can develop in patients with any cause of liver disease.
2. Most people with HE have very severe liver disease, or cirrhosis.
3. HE is the most frequent complication of cirrhosis that leads to hospitalization.
4. People with cirrhosis can have other reasons (besides HE) that can lead to similar symptoms.
5. HE symptoms can improve if the liver gets healthier (or with a liver transplant).

TABLE 1 West haven criteria for HE

Grade	Description
Grade I	<ul style="list-style-type: none"> • Mild confusion • Very mild lack of awareness, short attention span • Slurred speech • Problems with sleep • Mood changes (euphoria, anxiety, depression)
Grade II	<ul style="list-style-type: none"> • Moderate confusion, disorientation to time ("What time of day is it?") • Lethargy or apathy • Personality changes • Asterixis (hand flapping occurring with arm extension and wrist flexion) • Dyspraxia (trouble planning and coordinating muscles to complete a task)
Grade III	<ul style="list-style-type: none"> • Marked confusion, confusion about place ("Where am I?") • Extreme sleepiness, still responsive • Strange behavior
Grade IV	<ul style="list-style-type: none"> • Coma, does not respond to pain or shaking

Besides changes in thinking, other symptoms of HE include poor appetite, sleep, and mood, as well as trouble with self-care and work.² The West Haven Criteria, listed in [Table 1](#), are a scale used by health care providers to grade the seriousness of HE. Grade I on this scale is difficult for physicians to detect, but people who know the patient well might be able to see confusion or forgetfulness. Physicians look for difficulty thinking with simple questions and check for hand flapping, called asterixis, as in [Figure 1](#).

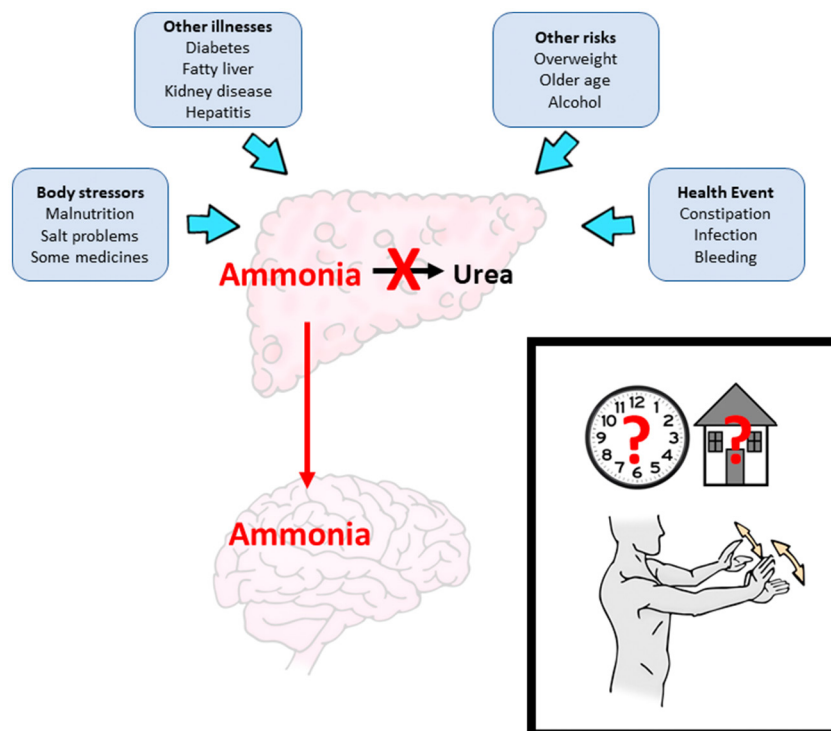


FIGURE 1 Why HE happens. A diseased liver is unable to change toxic ammonia into urea to leave the body in the urine. This is worsened by a patient's other illnesses and risks, and is also made worse by body stressors and sudden health events. Ammonia then builds up in the blood and gets to the brain, where it causes the findings of HE (boxed inset): confusion about time, date, and place, as well as asterix or hand flapping.^{1,3}

WHY DOES HE HAPPEN?

The cause of HE is an active area of research. HE can be triggered by one reason or a combination of multiple reasons. A damaged liver struggles with the breakdown products of the protein we eat. Ammonia is a key breakdown product of proteins, and the change of ammonia to urea, which can be removed more easily from the body, happens mostly by the urea cycle, which is found only in the liver. In a diseased liver, ammonia builds up in the blood, where it can then injure nerves in the brain.^{3,4} Extra stress on the liver, such as alcohol, obesity, hepatitis infection, diabetes, certain medications, and aging, can increase the risk for HE developing, as in [Figure 1](#).

Remember, other disease processes can present with symptoms similar to that of HE. That is why when patients present with symptoms of HE, they are examined and tested for other possible causes that can add to their confusion. This includes new medications and drugs (prescribed and over the counter), pain medications, a recent injury or trauma, bleeding, kidney problems, and infections in the blood, urine, or lungs.

WHAT IS THE TREATMENT FOR HE?

Treatment for HE starts with checking for possible triggers that can be treated. For example, if the patient has

a new infection in the lungs or urine, treating the infection with antibiotics will help the HE. Another example is when there are problems with electrolytes in the blood. This can be treated with adjusting certain medications. A third common example is bleeding. Sometimes patients with cirrhosis can present with obvious or silent bleeding that worsens HE. Finding and stopping the source of bleeding can improve HE.

The ultimate goal of HE treatment is to decrease the number of severe confusion episodes and to prevent patients from being admitted to the hospital. It is difficult to predict when HE will happen. However, patients and especially caregivers should watch for little and big changes in personality or thinking. If they notice these changes, they should let their medical care team know.

There are many parts to the management of HE. For example:

1. HE is treated by prevention, early diagnosis, and care of emergencies and causes.
2. Patients with HE must stop activities such as driving.
3. Patients with HE should document their wishes, such as in an advance directive, and choose a person to speak for them, such as a surrogate decision maker, in case they cannot speak for themselves.
4. HE treatment focuses on ridding the body of ammonia through laxatives such as lactulose.
5. Nutrition is very important in cirrhosis care.

TABLE 2 Medications and therapies used to treat HE

Therapy	How it works	Goal
Lactulose	Laxative (causes frequent bowel movements that make you “poop out” the ammonia from your body)	First line to treat HE Goal is to have 3–4 loose bowel movements per day May cause bloating
Rifaximin	Antibiotic not absorbed from the gut	Use with lactulose Take one tablet twice a day
Nutrition	High-calorie and -protein meals to maintain muscle	Goal is to build muscle, which helps process ammonia, because many patients with cirrhosis lose muscle

TABLE 3 Recommended calorie and protein intake for those with cirrhosis

Patient	Calories needed: 35–40 kcal/kg	Protein needed: 1.2–1.5 g of protein/kg/day
Average woman 130 pounds (59 kg)	2360 calories	88.5 g of protein
Average man 160 pounds (73 kg)	2920 calories	110 g of protein

6. HE can improve if the liver gets healthier (or with a liver transplant).

The medicines for HE work by slowing ammonia creation and uptake in the gut. Lactulose is a laxative that works this way by pulling out toxic ammonia from the body through the stool (Table 2). Lactulose can be combined with rifaximin, an antibiotic the gut cannot absorb that fights gut bacteria that produce ammonia. The goal of treatment is to reduce serious HE episodes and hospitalizations.

The key treatment, other than medicines such as lactulose, is nutrition, as listed in Table 2. Serious muscle loss (called sarcopenia) is common in cirrhosis. This can make HE worse because healthy muscle can help break down ammonia. It is important to get enough calories and protein to build muscle, which decreases the risk for HE. High-protein diets are recommended in patients with cirrhosis to help build muscle. The average needs

for calories and protein are listed in Table 3. For example, there is 6 g of protein in an egg and 80 g in a salmon fillet. These high numbers of calories and protein usually mean special nutrition drinks are needed. Small, frequent meals and snacks before bedtime is good because a lot of muscle building happens while you sleep at night.

Liver transplantation can cure HE but may take time. Continued confusion may be seen, especially shortly after surgery, often as a result of stress on the body from the surgery, new medications to prevent rejection of the new liver (called immunosuppressants), or other new and old illnesses that are diagnosed.

HE is very hard for patients with cirrhosis and their families. HE symptoms often change. It is important to work with your medical care team to adjust the amount of lactulose you are taking and to identify possible things that can sometimes make HE worse. Please be patient with your loved ones and yourself.

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CONFLICT OF INTEREST

Nothing to report.

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