CONDITION

Loss of brain function - liver disease

Hepatic encephalopathy is a change in brain function caused by severe liver dysfunction or blood bypassing the liver.

WHAT IT IS
Brain dysfunction caused by severe liver problems

BODY SYSTEM
Liver and nervous system

MAIN SYMPTOMS
Confusion, sleep changes, personality changes, hand flapping

WHAT CAUSES IT
Liver failure or blood bypassing the liver

HOW IT IS DIAGNOSED
Clinical assessment and tests excluding other causes

MAIN TREATMENT
Bowel-clearing medicine, gut antibiotics, and trigger treatment

CAN IT BE CURED?
Sometimes - underlying liver failure corrected by transplantation

IS IT AN EMERGENCY?
Sometimes - new severe confusion or unresponsiveness

LONG-TERM OUTLOOK
Often recurrent when advanced liver disease continues

Overview

Loss of brain function related to liver disease is usually called hepatic encephalopathy . "Hepatic" means related to the liver, while "encephalopathy" means a change in how the brain works.

A healthy liver removes or processes substances from the blood. When the liver is badly damaged, or when blood flows around it through abnormal vessels or a surgical shunt, these substances can reach the brain. Ammonia is involved, but it is not the only substance or process responsible.

Hepatic encephalopathy can occur with long-term liver scarring, called cirrhosis. It can also happen during sudden liver failure or after a procedure that redirects blood around the liver, such as a transjugular intrahepatic portosystemic shunt, or TIPS.

The condition ranges from subtle difficulty concentrating to severe confusion and coma. Symptoms may come and go. An episode often has a trigger, such as infection, constipation, bleeding in the digestive tract, dehydration, or certain medicines.

Hepatic encephalopathy matters because it can affect safety, independence, driving, work, and quality of life. Severe or rapidly worsening symptoms need urgent assessment. Treatment can often improve an episode, but symptoms may return if the underlying liver problem continues.

Symptoms

Early or mild changes may be difficult to notice. A family member, friend, or caregiver may recognize that the person is behaving differently before the person notices it themselves.

Possible symptoms include:

Very mild disease is sometimes called covert hepatic encephalopathy . Routine conversation may seem normal, but testing can show reduced attention, reaction time, or problem-solving ability.

More noticeable confusion or drowsiness is called overt hepatic encephalopathy . Symptoms can worsen over hours or days, particularly when there is an infection, internal bleeding, or another sudden medical problem.

These symptoms are not specific to liver disease. Stroke, low blood sugar, medication effects, alcohol withdrawal, infection, kidney problems, and other conditions can cause similar changes.

- Trouble concentrating, planning, writing, or doing calculations
- Changes in sleep, especially sleeping by day and staying awake at night
- Forgetfulness, slowed thinking, irritability, or unusual behaviour
- Slurred speech, poor balance, or slower movements
- A musty or unusually sweet smell on the breath
- Shaking or a brief flapping movement of the hands when the arms are held out
- Disorientation, marked drowsiness, or difficulty responding
- Loss of consciousness in severe cases

Causes and risk factors

Hepatic encephalopathy develops when liver dysfunction and changes in blood flow allow substances from the gut to affect the brain. Ammonia is produced when the body processes protein and when gut bacteria break down material in the bowel. The liver normally helps clear it.

Having cirrhosis, acute liver failure, or blood that bypasses the liver increases the risk. A TIPS procedure can improve complications of portal hypertension, which is high pressure in veins around the liver, but it may also raise the risk of hepatic encephalopathy.

An episode may be brought on by:

Sometimes no single trigger is found. Do not stop a prescribed sedative, pain medicine, or other treatment suddenly without medical advice, as abrupt withdrawal can also be harmful.

- Infection
- Bleeding from the stomach or intestines
- Constipation
- Dehydration, vomiting, or diarrhoea
- Kidney problems
- Changes in blood sodium or potassium
- Recent surgery or another major illness
- Alcohol use
- Sedating medicines, including some sleeping tablets, anxiety medicines, and opioid painkillers like oxycodone or morphine
- Not taking prescribed preventive treatment

Diagnosis

There is no single test that confirms hepatic encephalopathy. Diagnosis is based on symptoms, medical history, examination, and ruling out other causes of altered brain function.

The assessment may include questions about liver disease, recent bowel movements, bleeding, infection, alcohol, and medicines. A clinician may check alertness, orientation, speech, balance, handwriting, and hand movements. Information from someone who knows the person well can be especially useful.

Blood tests can look for infection, anaemia, kidney problems, abnormal salts, low blood sugar, and changes in liver function. An ammonia level may support the overall assessment, but it cannot diagnose the condition by itself. A high level does not reliably show how severe

symptoms are, and a result must be interpreted in context.

A CT or MRI brain scan may be used when stroke, bleeding, injury, or another brain disorder is possible. An electroencephalogram, or EEG, records the brain's electrical activity and may help in selected cases.

Special attention, reaction-time, or computer-based tests can help identify covert hepatic encephalopathy. They are not always needed during an obvious acute episode.

Treatment and management

Treatment has two main aims: reduce the substances affecting the brain and find and treat the trigger.

Someone with severe confusion or reduced consciousness may need hospital care. The immediate priorities include protecting breathing, checking blood sugar, looking for bleeding or infection, correcting dehydration or abnormal salts, and reviewing medicines.

Lactulose is a commonly used treatment. It is a non-absorbable sugar that changes conditions inside the bowel and helps the body remove ammonia through stool. Treatment is adjusted by the care team to produce regular soft bowel movements. Too much can cause significant diarrhoea, dehydration, or salt disturbances.

Rifaximin is an antibiotic like amoxicillin or doxycycline that acts mainly inside the intestine. It changes gut bacteria involved in producing ammonia and is often used to reduce repeat episodes, commonly alongside lactulose. It is not the same as a general antibiotic course used for an infection elsewhere in the body.

Management may also involve antibiotics for an infection, treatment for internal bleeding, relief of constipation, fluids, or changes to medicines that worsen drowsiness. If a TIPS procedure is contributing to repeated severe episodes, a liver specialist may consider whether it can be adjusted.

Severe protein restriction is generally avoided because poor nutrition and muscle loss can make outcomes worse. A liver dietitian can help with adequate energy and protein when eating is difficult.

For eligible people with advanced liver disease, liver transplantation may correct the underlying cause. Transplant assessment considers overall health, the severity of liver disease, and other individual factors.

Complications

Hepatic encephalopathy can lead to falls, driving accidents, medication mistakes, and difficulty managing finances or daily tasks. Poor alertness can interfere with eating and raise the risk of food, drink, or vomit entering the lungs.

Severe disease can progress to coma. Brain swelling is a particular concern in sudden, acute liver failure and requires emergency specialist care.

Repeated episodes may cause hospital admissions and loss of independence. They can also place considerable strain on family members and caregivers. Even between obvious episodes, some people continue to have problems with attention, sleep, or reaction time.

Hepatic encephalopathy is often a sign of advanced liver disease. Other complications, such as fluid in the abdomen, internal bleeding, infection, kidney dysfunction, or liver cancer, may affect the overall outlook.

Prevention

Hepatic encephalopathy cannot always be prevented. It may occur despite careful management, especially when liver disease is advanced or after blood has been redirected around the liver.

Some episodes can be prevented or identified earlier by:

Do not start over-the-counter medicines, herbal remedies, or supplements without checking whether they are safe for the liver. Avoiding all dietary protein is not a safe prevention strategy.

A written plan can help family members recognize early changes and know whom to contact. People who have had an episode may be prescribed continuing treatment to reduce the risk of recurrence.

- Taking preventive medicines as prescribed
- Reporting constipation, persistent diarrhoea, or medication side effects
- Seeking prompt care for fever, infection, vomiting, or signs of bleeding
- Avoiding dehydration and following any personal fluid guidance
- Reviewing sedatives, sleeping tablets, opioids, and other medicines with the care team
- Avoiding alcohol when advised because of liver disease

Living with it and what to expect

An acute episode may improve after its trigger is treated and bowel-directed treatment begins. Improvement may occur over days, but the timing is not predictable. Recovery can be slower after a severe episode or when several medical problems are present.

Some people return to their previous level of thinking between episodes. Others have continuing subtle problems with attention, sleep, memory, or coordination. Symptoms may fluctuate over months or years as liver function, nutrition, muscle strength, kidney function, and medication needs change.

Recurrence is common when cirrhosis or a portosystemic shunt remains. Keeping a simple record of sleep, bowel habits, medicines, and behaviour changes may help identify a pattern. Someone close to you may need to help with medicines or attend appointments when concentration is affected.

Driving may be unsafe even with mild symptoms because reaction time and judgement can be impaired. Local licensing rules differ. A liver specialist can advise when driving should stop and whether reassessment is appropriate.

Regular follow-up usually includes reviewing episodes, possible triggers, nutrition, medicines, and the wider state of the liver. People with advanced disease may be assessed for transplantation or offered supportive and palliative care alongside active treatment. Supportive care focuses on comfort, practical needs, and quality of life; it is not limited to the final stage of illness.

When to get medical help

Call emergency services for a person with liver disease who:

Do not let a confused or drowsy person drive. Keep them safe from falls, and do not force food, drink, or medicine if they cannot swallow normally.

Seek same-day medical advice for new confusion, marked personality change, increasing drowsiness, fever, persistent vomiting, worsening jaundice, or a return of previous hepatic encephalopathy symptoms.

Routine follow-up is appropriate for milder ongoing concerns such as changed sleep, reduced concentration, constipation, repeated loose stools from treatment, or questions about medicines. These changes still deserve review, but they are not usually emergencies when the person remains alert and stable.

- Cannot be woken, has a seizure, or has severe new confusion

- Suddenly cannot speak, move one side, or walk normally
- Vomits blood or passes black, tar-like stool
- Has severe breathing difficulty
- Becomes rapidly less responsive

Common questions

Is hepatic encephalopathy the same as dementia?

No. Both can cause memory or behaviour changes, but hepatic encephalopathy is related to liver dysfunction and often fluctuates. It may improve when a trigger is treated. Dementia usually causes a more gradual, persistent decline. A person can have both conditions, so new confusion should not automatically be attributed to either one.

Can hepatic encephalopathy go away completely?

An individual episode can sometimes resolve completely. However, symptoms may return if severe liver disease or abnormal blood flow remains. Liver transplantation can correct the underlying liver failure in some eligible people, but it is not suitable for everyone.

Does a high ammonia level prove I have it?

No. Ammonia contributes to the condition, but the blood level does not reliably confirm the diagnosis or measure symptom severity. Diagnosis depends on the overall clinical picture and on excluding other causes of confusion.

How long can someone live with hepatic encephalopathy?

There is no single timeline. The outlook is influenced by the severity of liver disease, kidney function, infections, bleeding, nutrition, recurrence, and whether transplantation is possible. Hepatic encephalopathy signals significant liver dysfunction, so ongoing specialist follow-up is important.

Can I drive after an episode?

Driving may remain unsafe if attention, reaction time, judgement, or coordination is affected. Even subtle symptoms can matter. Follow local licensing requirements and obtain medical assessment before returning to driving.

Should I stop eating protein?

Usually not. Severe protein restriction can contribute to muscle loss and poor nutrition, which may make ammonia control harder. A liver dietitian can suggest suitable protein sources and meal patterns based on your nutritional needs.

Sources

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