Case report

Epilepsy and hemiparesis as an initial presentation of decompensated liver cirrhosis: A case report

ABSTRACT

Hepatic encephalopathy (HE) is a serious complication of cirrhosis that presents with a variety of neuropsychiatric disorders, including disorientation, asterixis and coma. Such neurological disorders are because of hyperammonemia. However, hepatic encephalopathy with neurological symptoms resembling epilepsy and hemiparesis is uncommon. We present a case of decompensated liver cirrhosis manifesting initially by epilepsy and hemiparesis.

Case report: A 59-year-old male smoker known to be diabetic, which was well controlled, presented to our hospital with a chief complaint of epileptic attacks over the past 24 hours in addition to dizziness, sudden-onset left-sided weakness and disturbed level of consciousness with a Glasgow Coma Scale rating of 13. Brain CT scan and MRI revealed supratentorial white matter changes with no signs of stroke or bleeding. Electroencephalogram (EEG) showed diffuse slow wave rhythm. Initially, the patient was treated with antiepileptic drugs with no improvement. Laboratory examination suggested liver cirrhosis. Plasma ammonia levels upon admission were 2 times the normal value. Abdominal imaging showed chronic hepatopathy, porto-systemic varices and splenomegaly. As a result, the diagnosis of HE was made. The symptoms were improved by adding lactulose and Rifaximin to antiepileptic treatment.

Conclusion: Though uncommon, hepatic encephalopathy, as a complication of liver cirrhosis, should be considered in patients presenting with epilepsy and hemiparesis. Antiepileptic drugs combined with lactulose are essential for treatment.

Keywords: HE, hyperammonemia, epilepsy, hemiparesis, lactulose.

1. INTRODUCTION

Liver cirrhosis is a chronic liver disease that causes degeneration and necrosis of hepatocytes as well as replacement of the liver parenchyma by fibrotic tissues and regenerative nodules [1].

Cirrhosis might remain asymptomatic for a long time and becomes patent once complications develop, including variceal bleeding, ascites, spontaneous bacterial peritonitis, and hepatic encephalopathy [2]. Hepatic encephalopathy (HE) results from elevated levels of toxic metabolites, such as ammonia and compromises 30%-45% of complications developing from cirrhosis [3]. It is often easily detected in patients with overt neuropsychiatric symptoms associated with well-known presentations such as sleep pattern changes, asterixis, hyperactive deep tendon reflexes, disorientation, and coma [2]. Hepatic disease is rarely considered in patients presenting with focal neurological deficits associated with epilepsy [4]. We present a case of decompensated liver cirrhosis manifesting initially by epilepsy and hemiparesis.

2. CASE PRESENTATION

A 59-year-old male smoker patient with a medical history of non-insulin-dependent diabetes and no alcohol consumption or drug intake, presented to the emergency room with a chief complaint of sudden-onset epileptic attacks over the past 24 hours in addition to dizziness, sudden-onset left-sided weakness and decreased level of consciousness with a Glasgow Coma Scale rating of 13. History of HE, epilepsy, stroke, brain trauma or hepatitis B/C virus infection was denied. Vitals on admission were: blood pressure of 139/97, pulse of 93 beats/minute, and SpO2 of 99% on room air. On clinical exam, the patient was somnolent and slow in answering questions. He was confused but oriented to person and place, not to time. Neurological examination was remarkable for left-sided weakness with 3/5 strength in the right upper and lower extremities. Abdominal examination was unremarkable.

Brain CT scan and MRI revealed supratentorial white matter changes with no signs of stroke or hemorrhage (figure 1). An Electroencephalogram (EEG) showed diffuse slow wave rhythm consistent with HE (figure 2). His labs were significant for a GGT of 86, total bilirubin of 1.9, Albumin of 33, platelets 134x103, prolonged prothrombin time, blood ammonia 2 times the normal value and Hb A1C 7. All of his other labs were normal. The patient was treated with several antiepileptic drugs precisely,Carbamezepam, Levetiracetam and Topiramate with no improvement. Because of elevated blood ammonia and high bilirubin, an abdominal CT scan was performed, showing an overall coarse and heterogeneous texture of the liver in addition to hypertrophy of segment I and hypotrophy of segment IV, in favor of liver cirrhosis. There were also signs of portal hypertension, precisely an enlarged portal vein (24 mm in diameter), an enlarged superior mesenteric vein (17 mm), an enlarged splenic vein (13 mm) and an enlarged spleen. Portosystemic collateral veins were seen in peri-gastric, peri-esophageal and peri-pancreatic areas. Moreover, a gastrorenal shunt was observed (figure 3).
The patient was started on lactulose and Rifaximin. His neurological symptoms resolved without residual neurological deficits or epilepsy 36 hours after the last treatment. The patient was discharged on antiepileptic treatment, lactulose and Rifaximin.

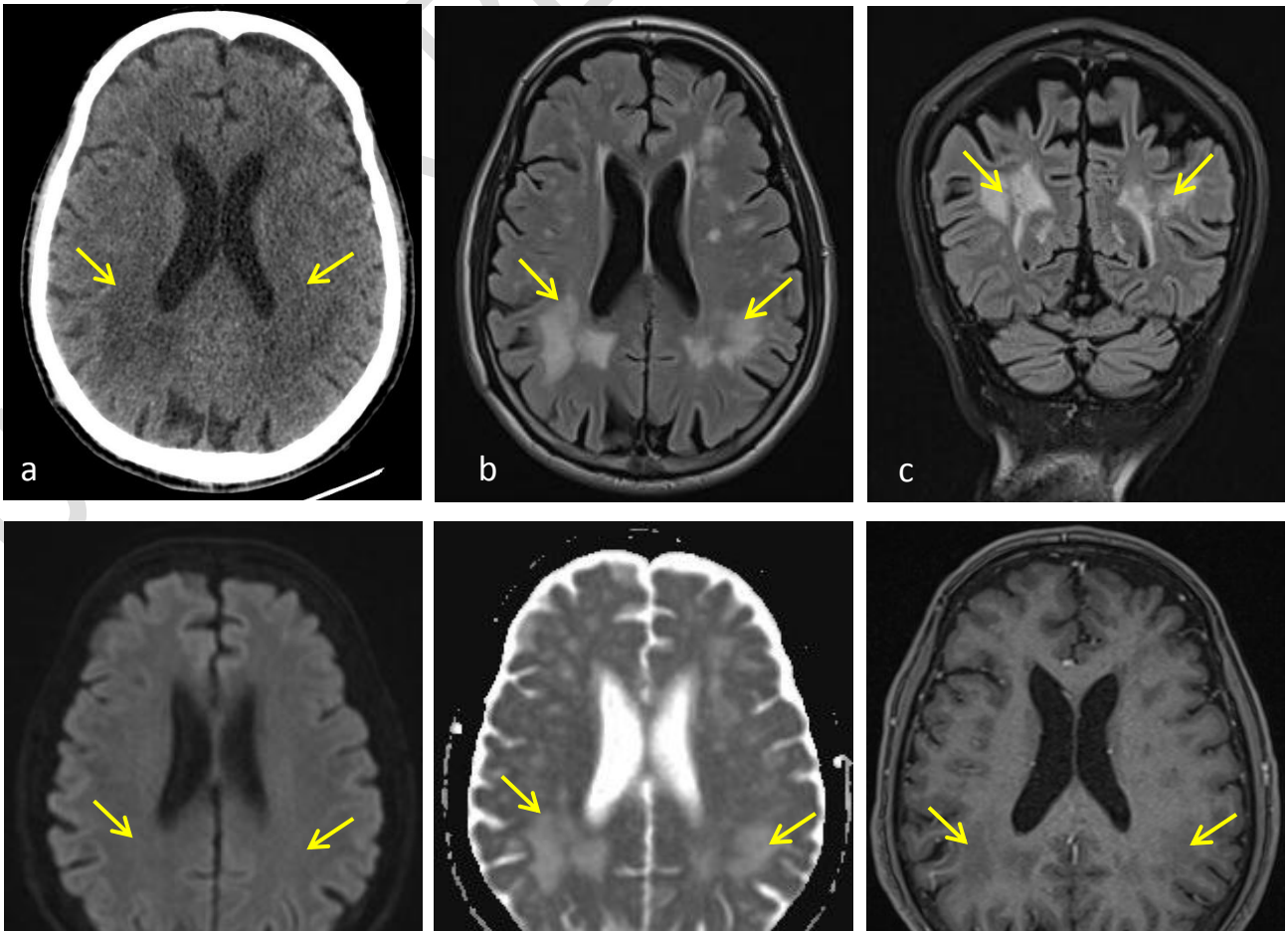

Figure 1: Brain CT (a) demonstrating frontal and parietal white matter hypodense areas (arrows), presenting as hyperintensities on axial and coronal T2-FLAIR (b & c), with no diffusion restriction on DWI and ADC map (d & e), and no enhancement after gadolinium administration (f).

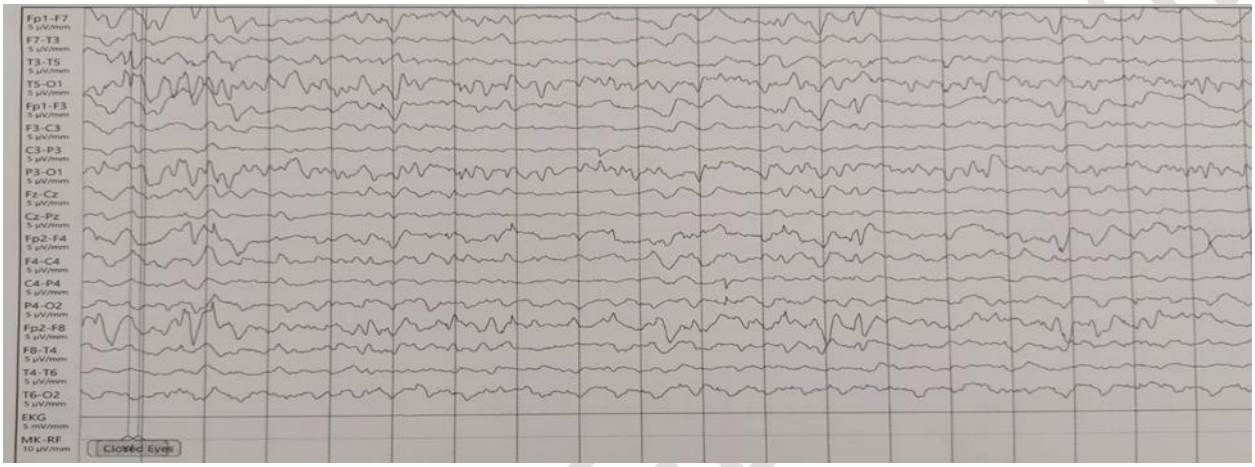

Figure 2: EEG showing diffuse slow waves rhythm.

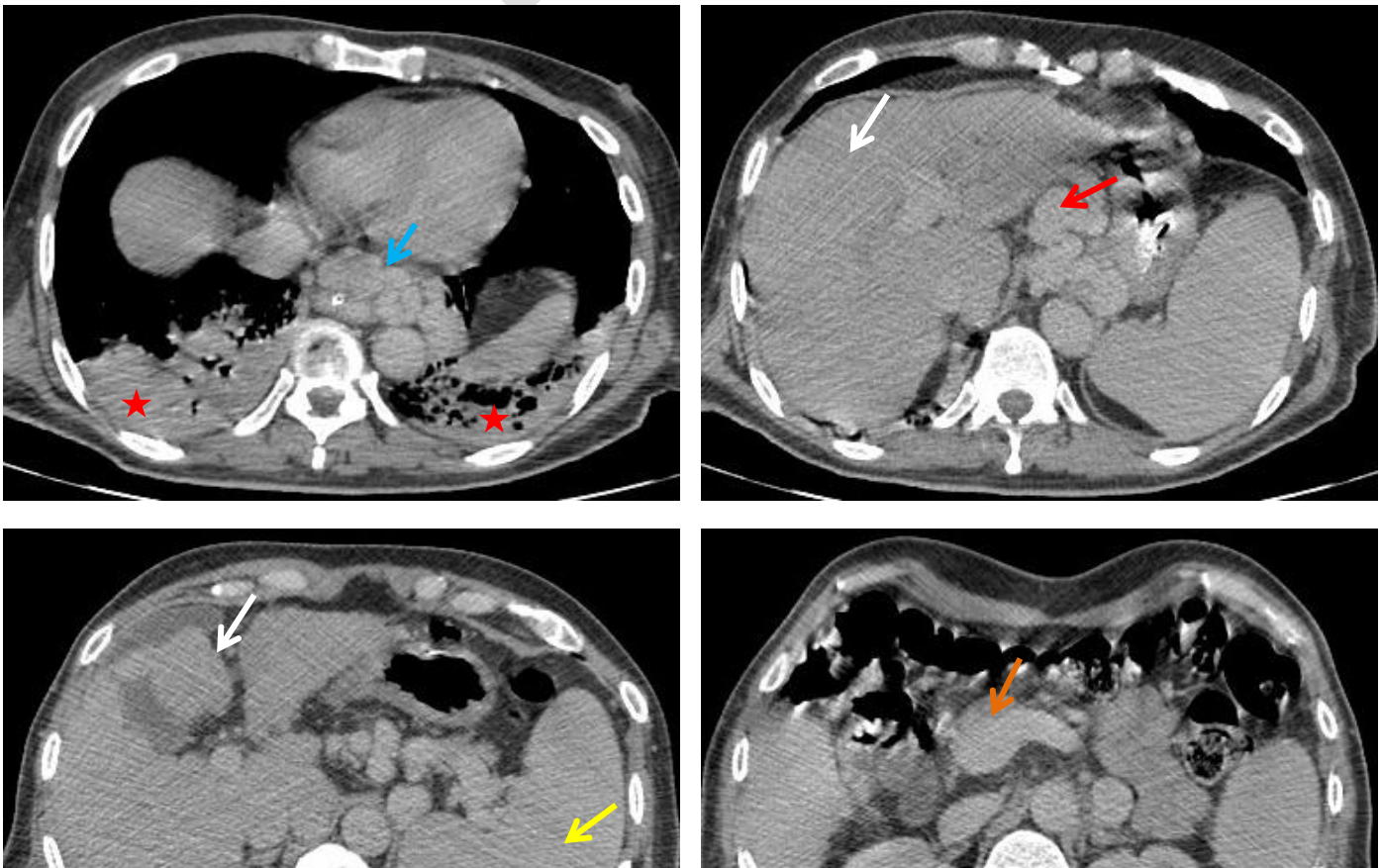

Figure 3: Abdominal CT showing signs of chronic hepatopathy (white arrows), paraesophageal varices (blue arrow), gastrorenal shunt (red arrow), enlarged superior mesenteric vein (orange arrow) and splenomegaly (yellow arrow). Note bilateral lung consolidation in favour of aspiration pneumonia (red stars).

3. DISCUSSION

Hepatic encephalopathy (HE) is a reversible consequence of advanced liver disease and/or portosystemic shunting characterised by impaired neurologic function including altered mental status, asterixis, and possible coma [7]. It is also associated with cognitive and neuromuscular impairment[2]. However, focal neurologic deficits and epilepsy are unusual presentations of HE.

Focal neurologic deficits and unilateral weakness are typically associated with acute cerebrovascular accidents. Prior reports have described a presentation of hemiparesis with a normal initial and repeated CT with contrast [5]. In these studies, the initial T2-weighted MRI of the brain showed a high-intensity lesion of 5-6 cm in the right frontal lobe and multiple lesions in both parietal and occipital lobes as a result of hypoperfusion [5]. It was later hypothesized that the neurotoxicity and neurotransmitter derangements of hepatic encephalopathy may have created focal neurologic signs due to diminished perfusion and impaired neurotransmitter function within the subclinical stable lesions [5]. Another study with prospectively collected data showed 6 out of 46 (13%) hospitalized patients with hepatic encephalopathy initially presented with hemiplegia or hemiparesis [6]. None of these patients showed significant initial or follow-up CT or MRI findings and symptoms were fully reversed upon regression of the hepatic encephalopathy [6].

Epilepsy is also a rare but life-threatening manifestation of HE [8]. The frequency of seizures in HE remains uncertain. One study found that up to one-third of their patients with HE developed seizures; however, this was largely in more advanced disease stages. Other authors suggest seizures are an uncommon event [9]. Ficker et al. reviewed EEG tracings in patients with HE and found that when epileptiform abnormalities were present, they were associated with a poorer prognosis [9].

The pathophysiology of HE is multifactorial and complex, including changes in ammonia (NH3) levels, inflammatory cytokines, and amino acids [10]. The most widely understood mechanism involves the hepatic metabolism of NH3. The two primary metabolic pathways by which ammonia is handled is through the urea cycle and glutamine synthase (which produces glutamine from glutamate) [10]. In patients with cirrhosis, there is hepatocellular dysfunction and portosystemic shunting, resulting in increased levels of ammonia through the systemic circulation. Astrocytes in the brain convert NH3 and glutamate to glutamine. Hyperammonemia results in increased glutamine production and accumulation in astrocytes creating an osmotic gradient that promotes astrocytic swelling [10]. Elevated glutamine levels also result in the generation of reactive oxygen species through a process of hydrolysis in mitochondria, which contributes to neuronal dysfunction in hepatic encephalopathy. A milieu of inflammatory cytokines augments the neurotoxic effects of ammonia by enhancing the diffusion of ammonia across the blood-brain barrier in addition to exerting their neurotoxic effects [10].

EEG recordings have been useful in identifying the underlying aetiology of altered mental status in patients with liver cirrhosis. A few reports detail the use of EEG recordings to discern hepatic encephalopathy from conditions such as non-convulsive status epilepticus (NCSE), which can be hidden within a diagnosis of HE yet requires a different course of medical management [11]. Slow wave rhythm was a marked EEG change in patients with HE[12].

Our case demonstrates a patient presenting with epileptic attacks and focal lesions which was not explained by a brain CT scan, MRI and EEG. Accordingly, the patient was treated with antiepileptic drugs with no improvement. Due to the presence of abnormal liver tests, elevated blood ammonia and radiological signs of liver cirrhosis with a large gastro-renal shunt, the diagnosis of hepatic encephalopathy due to liver cirrhosis was made. The patient showed great improvement

after the addition of Rifaximin and lactulose. Therefore, HE should not be overlooked in patients with unexplained focal neurological signs and epilepsy resistant to treatment.

4. CONCLUSION

Focal neurological lesions and epilepsy are uncommon and potentially serious complications in patients with hepatic encephalopathy. Brain imaging and EEG recordings may be useful in ruling out other etiologies of altered mental status in patients presenting with convulsions and unilateral weakness. Patients experiencing epilepsy secondary to HE may not respond to traditional anti-convulsant therapy, and therefore, the underlying liver problems must be addressed.

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ABBREVIATIONS

HE: Hepatic encephalopathy

CT: Computed Tomography

EEG: Electroencephalogram

FLAIR: Fluid attenuated inversion recovery

DWI: diffusion-weighted image

ADC: appaerant diffusion coefficient

MRI: magnetic resonance imaging