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Case report

Hepatic encephalopathy with epilepsia partialis continua: A case report

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1. Introduction

Confusion is a common presentation to acute medical services; often in the setting of metabolic disturbance, such as alcoholic liver disease. Seizure activity should always be considered as a potentially reversible cause, and must be differentiated from encephalopathy. This case also demonstrates that both focal and generalised seizure activity can result from a metabolic cause without a focal lesion.

2. Case report

A 45-year-old right handed female, with known alcoholic liver disease, presented to the emergency department with post-ictal confusion, after 10 witnessed tonic–clonic seizures within an hour. On arrival she was disorientated, and moving all four limbs in an agitated manner. No further tonic–clonic seizures were observed, and no spontaneous movements were noted during her emergency department stay. Past history included a stable right ventriculo-peritoneal shunt following removal of a benign brainstem tumour 20 years previously. Admission bloods were consistent with decompensated liver disease (ALT 41, ALP 346, Bilirubin 112, Platelets 114, Albumin 29, Prothombin time 20 s, INR 1.7) with normal urea, electrolytes and blood glucose. Arterial blood gas analysis revealed a lactic acidosis, which resolved over a period of 12 h. Lumbar puncture, undertaken after fresh frozen plasma, was unremarkable, showing no evidence of infection or inflammatory change. No further generalised seizures were witnessed during her admission.

During the second week of admission she developed continuous, irregular right-sided facial and upper limb twitching, associated with right arm weakness and an expressive dysphasia. She had no alcohol during her stay, and there were no reports of pre-admission acute alcohol consumption to suggest alcohol withdrawal seizures. There were no acute lesions on CT head, and the scan appearances were unchanged from previous scans over the last 3 years. Neurosurgical review confirmed that the previous surgery and the (MRI incompatible) right-sided shunt did not provide an explanation for the patient's deterioration. Electroencephalography (EEG) on day 8 (Fig. 1), demonstrated 1 Hz periodic epileptic spike and wave discharges spreading through the left hemisphere from the left fronto-central region, reported as focal status, with mild slowing of the posterior dominant rhythm of 7 Hz in the right hemisphere; reported as compatible with a mild encephalopathy. Her serum ammonia level was mildly elevated at 85 ng/dl.

A diagnosis of continuous focal epilepsy (epilepsia partialis continua, EPC) was made and levetiracetam was commenced (250 mg bd) and subsequently titrated to 1 g bd. The facial and upper limb twitching resolved within 24 h. The right arm weakness and expressive dysphasia resolved. Her liver function also improved, but did not normalise, in keeping with chronic liver disease. At discharge bloods included: ALT 93, ALP 149, Bilirubin 23, platelets 149, albumin 34, PT 15 s, INR 1.3. A second EEG (Fig. 2) on day 12 showed cessation of the epileptiform discharges, leaving irregular slow waves in the left hemisphere. The posterior dominant rhythm in the right hemisphere had increased to a normal 8 Hz (compatible with resolved hepatic encephalopathy).

3. Discussion

Confusion is commonly associated with both acute and chronic alcohol use. Hepatic encephalopathy is a serious complication of alcoholic liver disease, with a number of potential causes, and a poor prognosis.[1] Differentiating seizure activity from metabolic encephalopathy in alcoholic patients with altered mentation is challenging from both clinical and neurophysiological perspectives.

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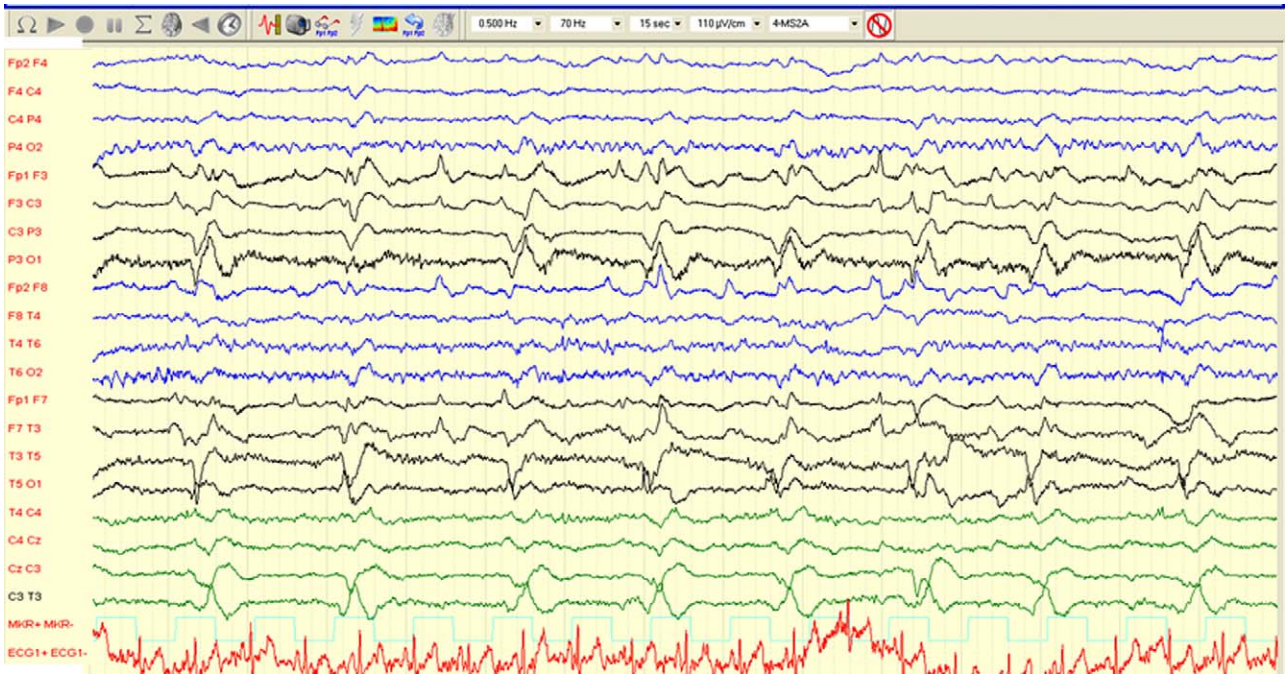

Fig. 1. Initial EEG (day 8) – bipolar longitudinal montage: 1 Hz periodic fronto-central 'spike and wave' epileptiform discharges which project posteriorly through the left hemisphere. The right hemisphere, by contrast, shows a 7 Hz posterior dominant rhythm which is consistent with a mild background encephalopathy.

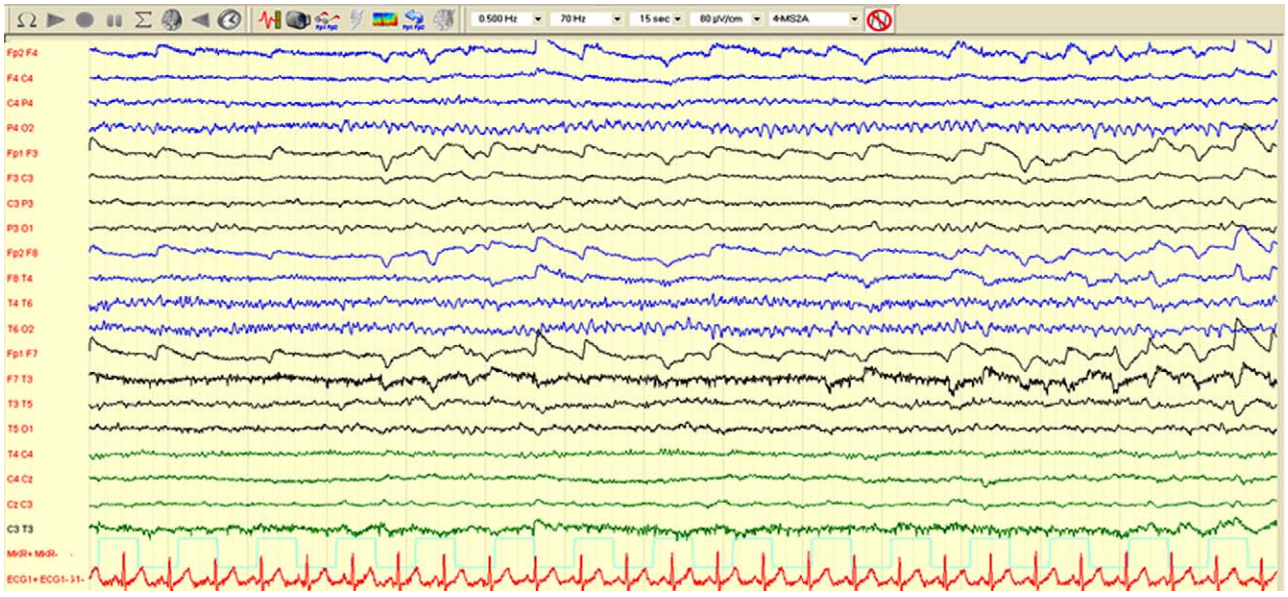

Fig. 2. Second EEG (day 12) – bipolar longitudinal montage: the left sided epileptiform discharges have now disappeared but the background remains very slow. The right hemisphere, by contrast, now shows an 8 Hz posterior dominant rhythm.

This patient demonstrates the need to establish the specific aetiology of confusion, and while these may have alternated between seizures and hepatic encephalopathy prior to and during the admission in our patient, it was the confirmation of EPC on the EEG that resulted in effective treatment. Reports of epileptic seizures in patients with hepatic encephalopathy or severe liver disease are rare.[2,3] A case series over ten years found only 18 cases (15%) of patient with hepatic encephalopathy had epileptiform activity, 2/3 of those had clinical seizures (focal in 4 patients and generalized in 8). As in our patient, neuroimaging failed to provide a focal aetiology for the generation of epileptiform discharges in most patients, including those with focal EEG abnormalities.

EPC is a focal motor status epilepticus without clinical or electrical spread; lasting from 1 h up to weeks or even years.[4,5] Previous reports suggest EPC most commonly affects the arm alone (50%), but may also involve the leg (28%); or, as with our patient, the face and arm (11%).[4]

An early study suggested that EPC may result from sub-cortical pathology,[6] but most evidence points to cortical dysfunction being primarily responsible for the clinical manifestations of EPC.[4] As a result there is a drive to identify electrophysiological evidence of focal epileptiform activity when making the diagnosis. The gold standard is concomitant EMG and EEG, where back averaging reveals a localised EEG spike that is temporally related to a muscle jerk; or, when nerve stimulation produces a temporally related stimulus evoked potential on EEG.[4] Although such a temporal relationship was not demonstrated on the electrophysiological study of this patient, the focal nature of the epileptiform activity

and the anatomical correlation with the clinical signs (left fronto-central dysfunction leading to right sided facial and upper limb jerks with speech disturbance), is indicative of a focal epileptic process such as EPC. Many patients with EPC are too unwell to undergo back-averaging, and we rely on standard EEG confirmation of the clinical diagnosis.

It is possible that in our patient the two types of seizure activity had separate pathologies. However, both generalised status epilepticus,[3] and EPC,[2] have been described with hepatic encephalopathy; and there is a previous report of patients with both.[2] Although focal structural causes are the most common reported reason for EPC, generalised metabolic disturbances must also be considered as a cause. In addition to liver disease, non ketotic hyperosmolar hyperglycaemia with hyponatraemia,[7,8] diabetic ketoacidosis[9] and hypocalcaemia[10] have all been reported to cause EPC.

In general the prognosis of seizure activity in the setting of hepatic encephalopathy is poor.[2] In contrast, our patient responded rapidly to oral anti-epileptic drugs. EPC can be difficult to treat,[4,11] and there are no randomised controlled treatment trials. Intravenous levetiracetam has been reported to lead to resolution of EPC in a severely treatment resistant case.[12]

This case demonstrates that localised seizure activity, such as EPC, can be due to a generalised metabolic disturbance and is not always due to focal brain pathology. Our patient showed both generalised and focal status epilepticus (manifesting as EPC) in the setting of hepatic failure. Although encephalopathy is generally neuro-depressant, it is important to consider seizure activity in patients with metabolic disturbances as a potentially reversible factor, and arrange for neurophysiological investigation in a timely manner.

Contributors

TP and HAL conceived this report. TP wrote the paper and all authors commented on drafts, had access to all data, and reviewed the paper. HAL managed the patient and initiated the report. SF and TT commented on the neurophysiology. TP is guarantor.

Provenance and peer review

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Conflict of interest statement

None declared.

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