

Professor Defebvre is a scientific advisor for ApoPharma, Laboratoire Aguettant, Orkyn and Novartis.

Professor Jourdain has nothing to disclose.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.neurol.2017.06.014](https://doi.org/10.1016/j.neurol.2017.06.014).

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Pseudotumoral cerebellitis with acute hydrocephalus as a manifestation of EBV infection



Abbreviations:

CSF; cerebrospinal fluid

CT; computed tomography

EBV; Epstein–Barr virus

ICP; increased cranial pressure

MRI; magnetic resonance imaging

PCR; polymerase chain reaction

VZV; varicella-zoster virus

1. Case report

A 7-year-old boy presented with a 5-day history of afebrile vomiting, during which time he also developed acute behavioral disorders and temporal headaches. The child had presented with a viral rash a fortnight before the onset of symptoms.

Physical examination revealed neck stiffness associated with new-onset bradycardia. The patient was conscious, but wailing. Neurological examination was otherwise unremarkable.

Computed tomography (CT) of the brain showed dilatation of the ventricular system associated with asymmetrical density between the two cerebellar hemispheres (Fig. 1). Fundoscopy was normal. Cerebrospinal fluid (CSF) analysis revealed 47 elements/mm³. T2-weighted brain magnetic resonance imaging (MRI) confirmed the presence of a hyperintense



Fig. 1 – Brain CT reveals asymmetrical density of the two cerebellar hemispheres.

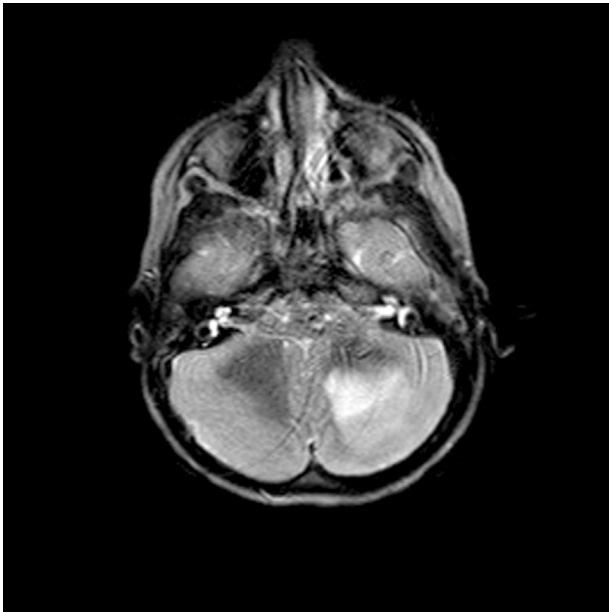


Fig. 2 – Brain MRI shows a hyperintense swelling in the left cerebellar hemisphere with a mass effect on adjacent structures leading to hydrocephalus.

swelling of the left cerebellar hemisphere with a mass effect on adjacent structures and, consequently, hydrocephalus (Fig. 2). Serological analysis revealed positivity for anti-Epstein–Barr virus (EBV) IgM; otherwise, autoimmune serologies were negative.

Patient management consisted of insertion of an external ventricular shunt and a course of oral prednisone. Clinical evolution was favorable and the shunt was removed. On follow-ups 1 month and 1 year later, there was persistence of asthenia and slight psychomotor slowness.

This report describes a case of cerebellar meningoencephalitis due to EBV that affected predominantly a single hemisphere, inducing edema in the affected region leading to hydrocephalus and increased cranial pressure (ICP). Neurological manifestations of EBV infections include meningoencephalomyelitis, cerebellitis and Guillain–Barré syndrome, and account for around 0.5% of cases [1] that mainly affect young patients.

Cerebellitis is a parainfectious disease characterized by cerebellar swelling and presenting with signs of mild cerebellar dysfunction. While the outcome is favorable in most patients, the disease can, in a minority of cases, induce neurological sequelae or death [2,3]. On rare occasions, it can manifest as unilateral cerebellar swelling with obstructive hydrocephalus and signs of ICP, but without the life-threatening cerebellar-syndrome presentation known as “hemocerebellitis”TM, which can easily be mistaken for a tumoral process [4].

The literature contains reports of 39 cases of acute hemocerebellitis [2,3] in addition to our present case, and all of them involve patients aged 3–18 years. These reported cases also suggest a predominance of affected females, with a gender ratio of 2:3. In addition, 56% of cases had presented

with an infectious event weeks before developing manifestations of hemocerebellitis. Symptoms at disease onset were: cerebellar signs (67.5%); headache (60%); vomiting (45%); fever; cranial nerve involvement (20%); neck stiffness (17.5%); pyramidal syndrome (15%); fluctuations of consciousness (10%); and seizures (7.5%). However, no cerebellar signs were evident in 32.5% of cases.

An etiological infectious agent was identified in eight cases (20%), and included EBV (two cases), *Salmonella*, rotavirus, *Coxiella burnetii*, varicella-zoster virus (VZV; two cases) and influenza virus.

Management of cerebellitis differs according to the severity of the initial presentation. The therapeutic value of steroids is questioned, as the clinical course is often benign and sequelae-free [5]. Antiviral therapy appears to be a safe therapeutic option for all patients presenting with encephalitis symptoms, as the benefits outweigh the risks in potentially life-threatening conditions. Emergency management is mandatory in cases of consciousness deterioration suggestive of brain-stem involvement. Temporary draining of hydrocephalus through external ventricular drainage is often sufficient, as the post-infectious inflammatory reaction often resolves rapidly, but posterior fossa decompression is indicated when drainage does not improve the clinical condition [6].

In conclusion, infectious cerebellitis can manifest as a pseudotumoral process with acute hydrocephalus. The present case adds to the currently available literature by being only the second case attributable to EBV infection, thereby highlighting the variability of the pathogenic spectrum of this viral agent, and raising the issue of the importance of antiviral therapy for all acute neurological disorders.

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Disclosure of interest

The authors declare that they have no competing interest.

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Guillain–Barré syndrome due to hepatitis E



1. Case report

A 60-year-old man presented with progressive weakness and sensory symptoms. Ten days earlier, he had experienced diarrhea, nausea, severe asthenia and a fever lasting for 4 days, and liver cytolysis and systemic inflammation. Four days later, he experienced symmetrical paresthesia of the feet that rapidly extended to the whole of his lower limbs and hands. Progressive weakness developed in the proximal lower limbs. He had no fever. Neurological examination showed predominantly proximal weakness (upper limbs: distal, grade 5/5 and proximal, grade 3/5; lower limbs: distal, grade 4/5 and

proximal, grade 2/5). Diminished temperature and pain sensation together with hypopallesthesia were noted in the lower limbs, as well as areflexia and ataxia. He had no breathing or swallowing difficulties, and no clinical manifestations suggestive of hepatitis.

Magnetic resonance imaging of the entire spine was normal. A nerve conduction study showed increased F-wave latency in the lower limbs. A repeat study done 2 weeks later demonstrated segmental demyelinating neuropathy with prolonged distal latency, and trunk and root conduction blocks in the lower limbs, indicating a diagnosis of Guillain–Barré syndrome (GBS). Standard blood tests showed severe liver cytolysis (Table 1). Cerebrospinal fluid (CSF) was characterized by albuminocytological dissociation with moderately elevated protein (0.53 g/L; normal: ≤ 0.45 g/L), and only 27 leukocytes (85% lymphocytes) were without oligoclonal bands. The first CSF sample was not tested for hepatitis E virus (HEV) RNA. However, serum was positive for IgM antibodies to HEV and for HEV genotype 3c RNA. Abdominal ultrasonography showed hepatomegaly with steatosis.

The chronological link between acute HEV infection and GBS suggested a causal relationship. Intravenous immunoglobulin (0.4 g/kg/day) was given for 5 days. Liver cytolysis and clinical, electrophysiological and laboratory abnormalities improved spontaneously. The patient also regained muscle strength. A second CSF study 2 weeks after symptom onset showed protein elevation (0.67 g/L), no leukocytes and the presence of HEV RNA (59.9 IU/mL). On follow-up evaluation 4 months later, the patient had normal sensory and motor function, and all limb tendon reflexes were present. Nerve conduction study results were also improved. Liver function tests were normal, and HEV RNA was undetectable. One year later, there was no evidence of relapse.

HEV infection is an emerging cause of acute hepatitis in industrialized countries. Neurological complications have been reported in association with HEV infection, including GBS [1–4]. A recent study from The Netherlands showed serum IgM anti-HEV antibodies in 5% of 201 cases of GBS compared with only 0.5% of 201 healthy controls [5]. Thus, HEV infection is an emerging trigger for GBS in Europe. In immunocompetent patients with acute HEV infection and GBS, intravenous immunoglobulin therapy has been consistently followed by favorable outcomes [1–4]. In contrast, the treatment is not always effective in immunocompromised patients or in those with chronic HEV infections [3]. Further studies are needed to determine the best therapeutic strategy for HEV-associated GBS.

In conclusion, patients with GBS and liver cytolysis should be routinely tested for HEV infection, as such a diagnosis can lead to more appropriate follow-up as it carries a risk of chronic hepatitis that may require treatment.

Consent

Written informed consent was obtained from the patient for publication of this case report. A copy of the signed consent form is available for review by the Editor.

Abbreviations: CSF, cerebrospinal fluid; GBS, Guillain–Barré syndrome; HEV, hepatitis E virus