



Case report

Utility of bilateral Bispectral index (BIS) monitoring in a comatose patient with focal nonconvulsive status epilepticus

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ABSTRACT

We report the case of a patient with an extensive right cerebral hematoma complicated by focal nonconvulsive status epilepticus (NCSE) in whom the use of the new bilateral BIS-Vista™ monitor was helpful in managing profound sedation and antiepileptic treatment in the absence of continuous EEG monitoring (CEEG). The analysis of color density spectral array (CDSA) showed stereotyped changes indicative of recurrent focal nonconvulsive seizures (NCSz) and NCSE. We noted a close correlation between NCSz and BIS value changes. EEGs during working hours always confirmed the persistence of focal NCSE. After several days of sedation, CDSA disclosed a gradual resolution of NCSE that was also confirmed by electroencephalography. The patient died of cardiorespiratory complications a few days later.

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1. Case report

A 69-year-old woman was admitted to our intensive care unit (ICU) with the diagnosis of right fronto–parieto–temporal hematoma and subarachnoid hemorrhage secondary to the rupture of a middle cerebral artery aneurysm. She underwent endovascular embolization of the aneurysm and surgical evacuation of the hematoma. Subsequently, she was transferred to the ICU where intravenous sedation with propofol (2.0 mg/kg/h), midazolam (0.1 mg/kg/h) and prophylactic antiepileptic treatment with levetiracetam (2000 mg/24 h) were started. Three days later, a portable electroencephalogram (EEG) showed a burst-suppression pattern but seizures were absent. Over the next two days although sedation was stopped, she remained in coma (Glasgow Coma Score 3). EEG revealed recurrent and stereotyped right frontal nonconvulsive seizures (NCSz) spreading to the contralateral frontal lobe (Fig. 1a). These findings were consistent with a diagnosis of focal nonconvulsive status epilepticus (NCSE) in a comatose subject by the criteria of Young et al.,¹ and subsequently modified by Chong and Hirsch.² In addition to the spontaneous NCSz,

stimulus-induced, focal left hemispheric NCSz also occurred. In the view of these EEG findings, profound sedation with propofol and midazolam was again started. Since we do not have continuous EEG monitoring (CEEG) in our hospital and emergency EEG is only available during normal working hours, we proposed using the newest bilateral Bispectral index (BIS)-Vista™ monitor (Aspect Medical Systems Inc., Norwood, MA) version 3.00 to guide anesthetic sedation and to detect bouts of NCSz and NCSE. BIS-Vista sensors were bilaterally placed on the forehead according to manufacturer's guidelines. During the subsequent days, the patient remained sedated and analysis of color density spectral array (CDSA) showed stereotyped changes indicative of recurrent focal NCSz and NCSE (Fig. 1b). We noted a close correlation between NCSz and BIS value changes. The signal quality index (SQI-BIS) was acceptable (>50) as would be expected in relation to focal seizures without motor activity. EEGs carried out during working hours confirmed the persistence of focal NCSE. After several days of sedation, CDSA disclosed a gradual resolution of NCSE also confirmed by EEG (Fig. 1c). Sedation with propofol and midazolam was stopped, seizures did not recur, and the patient minimally improved, remaining in vegetative state. Unfortunately, she died of cardiorespiratory complications a few days later.

2. Discussion

We report the case of a patient with an extensive right cerebral hematoma complicated by focal NCSE in whom the use of the new

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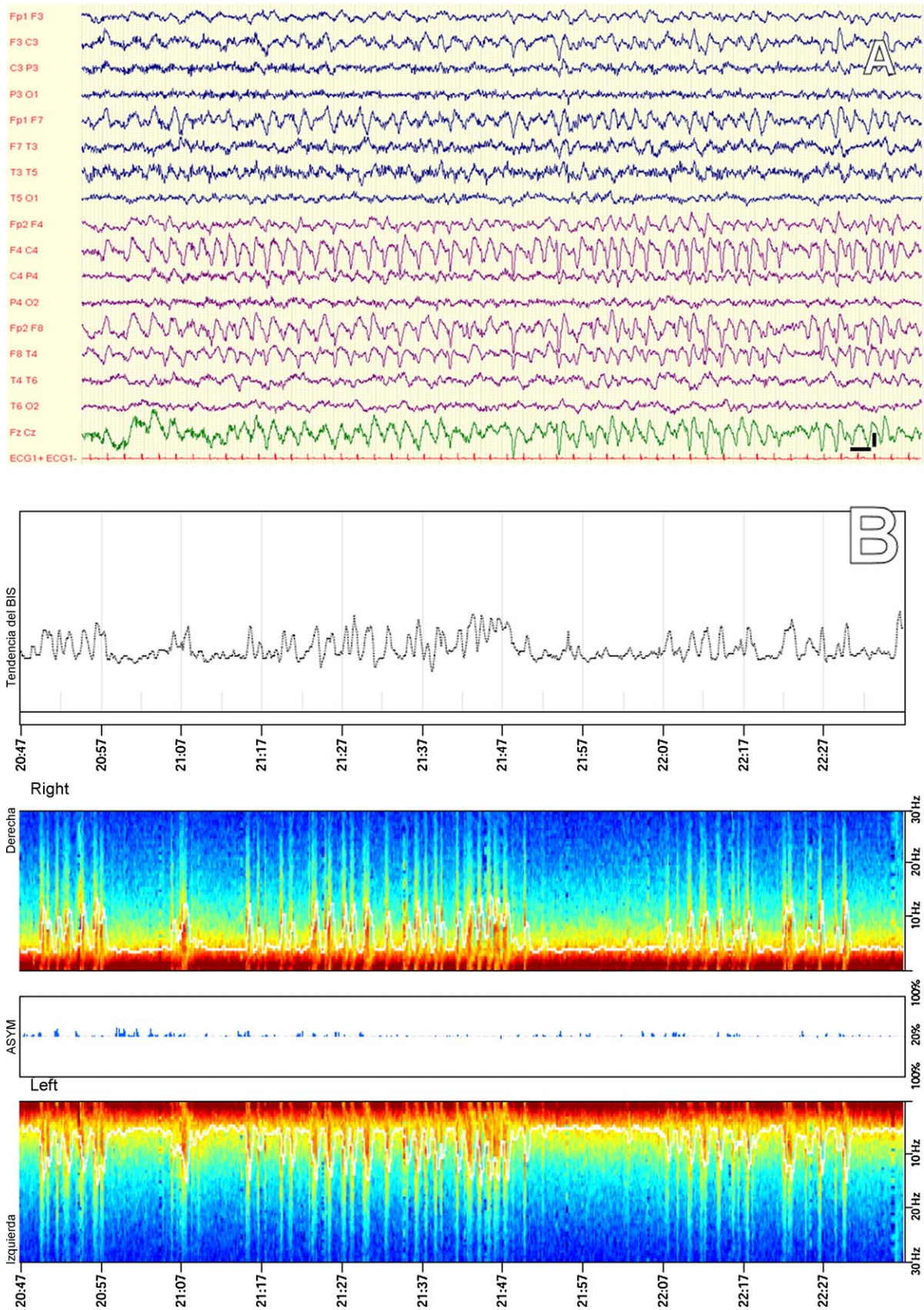


Fig. 1. (a) Digital EEG showing the existence of recurrent focal nonconvulsive seizures involving the right frontal lobe and spreading to the contralateral side. LF: 0.53 Hz; HF: 70 Hz; NF: 50 Hz; vertical bar: 100 μ V; horizontal bar: 1 s. (b) CSDA revealing the occurrence of recurrent seizures in keeping with the diagnosis of NCSE and (c) CSDA showing the resolution of the NCSE. Lower power: blue color; Higher power: red color. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of the article.)

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