Postsurgical cortical myoclonus responsive to perampanel

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An infrequent and difficult to treat complication of the neurosurgical removal of a lesion in the frontal or parietal lobes is cortical myoclonus (CM).^{1,2} CM has also been linked to focal lesions in the same locations independently from their surgical removal.³⁻⁵ In the present case and in the majority of the reported cases, the paramedian premotor cortex was involved. However, all except one of the lesions that were previously reported were not adjacent to the primary motor cortex as in our patient (figure, A). Treatment of myoclonus can be difficult and polytherapy is often required for an acceptable result.⁶ We present a case of CM that started 5 days after surgery, was not responsive to benzodiazepine and levetiracetam, and resolved only after perampanel administration.

Case report

A 61-year-old woman with a 2-week history of headache was admitted to our hospital unconscious after a generalized epileptic seizure. After she regained consciousness, her neurologic examination was normal with the exception of a right hemiparesis. A contrast-enhanced CT demonstrated a left paramedian extra-axial frontal lesion whose maximal dimensions were anteroposterior 4 cm, mediolateral 4.2 cm, vertical 1.9 cm. A contrast-enhanced MRI confirmed the clinical suspicion of meningioma (figure, A and B). She was put on mannitol (0.35 g/kg body weight QID) and oral phenytoin (2 mg/kg TID) with partial improvement in her right hemiparesis. After the initial episode, she did not present new seizures. An EEG obtained the day after the initial seizure showed slowing over the left hemisphere without spikes. Surgery was performed 3 days after admission. The lesion was removed and the pathologic diagnosis was fibroblastic meningioma. Upon awakening, her hemiparesis slightly worsened, mainly at the level of her right hand and forearm. A postoperative contrast-enhanced CT obtained the day after surgery (figure, C) excluded major postoperative bleeding and confirmed the persistence of the large preoperative hypodensity on CT, indicative of edema surrounding the lesion (figure, B). Perioperatively, the patient was put on dexamethasone that was maintained postoperatively (8 mg BID). Five days after surgery, while she was trying to grasp the bed trapeze with her right hand, she suddenly developed myoclonic jerks that interfered with her voluntary movements. Myoclonic jerks (4–5 Hz) became continuous and were worsened by any attempt to initiate a voluntary movement with the involved part of the body (figure, D, and video 1, links.lww.com/CPJ/A18). Myoclonus resolved during sleeping and returned upon awakening. EEG coupled to EMG did not demonstrate epileptiform discharges during myoclonic jerks. We performed a back averaging analysis of the EEG that confirmed the cortical nature of the myoclonus (figure, E). After a new CT scan that excluded bleeding, we administered clonazepam without benefit. We then tried levetiracetam (20 mg/kg BID) for 3 days, again without benefit. During these days, the myoclonus persisted and worsened, since sometimes it affected the ipsilateral lower limb, especially when the patient attempted to move it. She was frustrated and exhausted by the myoclonus but she never lost consciousness or the ability to voluntarily move the contralateral hemibody. Levels of phenytoin and levetiracetam were checked and found within therapeutic ranges. We then decided to switch to perampanel and progressively

PRACTICAL IMPLICATIONS

Consider perampanel when other drugs have failed in controlling cortical myoclonus arising after neurosurgical removal of a frontal or parietal lesion.

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(A) T1-weighted MRI with contrast. Preoperative axial section shows the paramedian fibroblastic meningioma in the left frontal lobe. For comparison, we drew on the same image the outlines of the lesions that were previously reported as inducing cortical myoclonus either preoperatively (red outlines) or postoperatively (green outlines); numbers refer to the appropriate reference; the dashed outline indicates a lesion whose MRI is not shown in the original reference. All lesions involved the frontal lobe, but all except one had a more anterior location in the lobe compared to that of the meningioma in our patient. (B) T2-weighted MRI. Preoperative, sagittal section shows the large hyperintensity surrounding the fibroblastic meningioma. (C) Postoperative CT scan, axial section, shows the removal of the meningioma without hematoma. (D) EMG of biceps brachii recorded by a surface electrode during myoclonus. (E) Jerk-locked back averaged EEG traces with EMG recorded from the right biceps brachii as the trigger. Bold trace is the averaged EMG signal; abbreviations are according to the international 10–20 system.

withdraw levetiracetam, leaving the dosage of phenytoin constant. Perampanel is an antagonist of α -amino-3-hydroxy-5methyl-4-isoxazolepropionic acid receptors used as adjunctive antiepileptic drug mainly in patients with partial epilepsy. It has been previously reported that perampanel was able to stop myoclonic jerks in one postanoxic patient with Lance-Adams syndrome.⁷ We initially administered perampanel at a dose of 2 mg QD in the evening, and we simultaneously halved the amount of levetiracetam. In the absence of drowsiness and other side effects, we noticed an improvement in the amplitude of the myoclonus, and on the third day, we stopped the administration of levetiracetam and increased the dose of perampanel to 4 mg QD, obtaining a complete resolution of the myoclonic jerks. Myoclonus was completely suppressed although the patient continued to take phenytoin and dexamethasone, 2 drugs that have been associated with induction/worsening of myoclonic jerks.⁶ We left her on phenytoin and perampanel and she recovered from her right hemiparesis in 2 weeks after withdrawal of dexamethasone and mannitol (video 2, links.lww.com/CPJ/A19). The myoclonus has not recurred. Replication studies on larger samples are warranted before perampanel might be suggested as effective in the treatment of myoclonus induced either by the neurosurgical treatment of a focal cortical lesion or by

the lesion itself. Nevertheless, perampanel may be considered in similar cases of myoclonus when other drugs have failed.

Author contributions

S. Bianchini: helped with surgery, acquisition, analysis, and interpretation of the data, revision of the manuscript for intellectual content. G. Bellantoni: interpretation of the data, revision of the manuscript for intellectual content. A. Albergati: interpretation of the data, revision of the manuscript for intellectual content. L. Magrassi: design and conceptualization of the study, performed surgery, acquisition, analysis, and interpretation of the data, drafted and revised the manuscript for intellectual content.

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Disclosure

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