Sir,
A 56-year-old man with a history of systemic hypertension, chronic kidney disease, and hypothyroidism presented with vomiting, vertigo, and right-sided weakness. On examination, he was conscious and oriented. He had dysarthria, a 3 ½ syndrome (absent upgaze, bilateral horizontal gaze, and monocular downgaze paresis in the right eye), and skew deviation with left eye hypotropia. The gaze palsies could not be overcome by oculocephalic maneuvers. Both pupils were pinpoint and reactive. He also had left lower motor neuron (LMN) facial palsy and sensory loss over the right side of the face. He had mild quadriparesis (grade 4/5 power bilaterally) and bilateral extensor plantar responses. CT brain showed a left ponto-mesencephalic intracerebral hemorrhage. He was treated with antihypertensives and mannitol. Four months later, he was brought for follow-up due to financial constraints. He also had left lower motor neuron (LMN) facial palsy and sensory loss over the right side of the face. He had mild quadriparesis (grade 4/5 power bilaterally) and bilateral extensor plantar responses. CT brain showed a left ponto-mesencephalic intracerebral hemorrhage. He was treated with antihypertensives and mannitol. Four months later, he was brought for follow-up due to financial constraints. He also had left lower motor neuron (LMN) facial palsy and sensory loss over the right side of the face. He had mild quadriparesis (grade 4/5 power bilaterally) and bilateral extensor plantar responses. CT brain showed a left ponto-mesencephalic intracerebral hemorrhage. He was treated with antihypertensives and mannitol.

Myorrhythmia is a repetitive, rhythmic, slow (1–3 Hz) movement that predominantly affects the cranial and limb muscles at rest. It is seen with brainstem lesions, with additional contributions from lesions involving the cerebellar dentate nuclei and substantia nigra. Classical oculo-masticatory myorrhythmia (OMM) is associated with Whipple’s disease and presents with ocular nystagmus (convergent-divergent or vertical) and rhythmic contractions of the facial and masticatory muscles. OMM is also frequently associated with progressive supranuclear vertical ophthalmoplegia. Pendular vergence oscillations (PVOs) occur without other components of the near-vision triad (miosis and accommodation). Thus, they are likely to occur due to the involvement of a separate vergence pathway in the brainstem.
These continuous PVOs are distinguishable from Parinaud’s syndrome (which is associated with episodic nystagmus that is provoked by voluntary saccadic eye movements such as attempted upgaze). Convergence or convergence-retraction nystagmus usually indicates a dorsal mesodiencephalic lesion. Similarly, divergence nystagmus with lesions involving the midline cerebellum and dorsal pons can resemble PVOs. However, these have a jerky component (rather than pendular) and are present only during visual fixation.

Although PVOs are pendular in nature, they are distinguished from pendular nystagmus by their oscillations in the z-axis (anteroposterior) rather than the x- (horizontal) or y- (vertical) axis.

OMM resembles other involuntary movements such as myoclonus (cortical/subcortical/spinal origin). If OMM involves the skeletal muscles in addition, it is termed OFSM.

Oculo-palatal myoclonus/tremor (OPM or OPT) is a phenomenologically similar movement disorder, that arises with lesions of the dentato-rubo-thalamic tract (Guillain–Mollaret triangle [GMT]). Lesions here cause a secondary pseudo-hypertrophy of the inferior olivary nucleus hypertrophy (IONH). The IONH is the pacemaker in this circuit. Unilateral palatal tremor with unequal vertical nystagmus and conjugate torsional oscillation is seen in the lateral type of OPM. The midline variant of OPM is associated with bilateral symmetrical palatal tremor and vertical nystagmus.

Like OPM, OMM and OFSM are also disorders of brainstem oscillators (pacemakers) and form a spectrum of movement disorders generated from the brainstem [Table 1]. Hence, OMM and OFSM overlap with other involuntary movements that arise from brainstem structures, such as rubral tremors, rest tremors (seen with Parkinson’s disease), dystonic tremors, and facial myokymia. OMM/OFSM usually occurs at rest, but may be observed during sustained posture and action. They disappear during sleep, although persistence during sleep has been reported in a case of anti-IgLON encephalitis. OMM/OFSM has a slower frequency [1–3 Hz] than Parkinsonian tremor [4–6 Hz]. Although both OMM and rubral (Holmes) tremor [HT] have the same frequency, HT is a coarse tremor with a larger amplitude, and a kinetic as well as an intentional component tremor. In contrast to OMM or OFSM, HT does not involve cranial muscles. However, due to the rarity of OMM/OFSM, the exact brainstem regions and oscillators responsible for this rhythmic movement disorder have not been accurately delineated.

Although OMM was previously considered a classical manifestation of Whipple’s disease, the most common etiologies of OMM and OFSM, nowadays are ischemic and hemorrhagic strokes (involving the brainstem, thalamus, or basal ganglia). Other conditions include N-methyl-D-aspartate receptor (NMDAR) encephalitis, Hashimoto’s encephalopathy, multiple sclerosis, etc. [Table 2]. OFSM responds poorly to medical treatment. Our patient also did not respond to tetrabenazine, clonazepam, or sodium valproate. He also displayed unusual features such as a prolonged OFSM storm and preservation of vertical eye movements.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have

![Figure 1: Top panels show eye position at rest and only monocular downward movement on attempted downgaze. The bottom panels show axial CT images with a predominantly left-sided ponto-mesencephalic hemorrhage with some extension across the midline at the pontine level.](image)

Table 1: Involuntary movements of brainstem origin

| Condition                                      |
|------------------------------------------------|
| Rest tremor                                    |
| Rubral tremor                                  |
| Oculo-palatal myoclonus (OPM)/tremor [OPT]     |
| Palatal myoclonus                              |
| Oculo-masticatory myorrhythmia (OMM)           |
| Oculo-facio-skeletal myorrhythmia (OFSM)       |
| Isolated facial myorrhythmia                   |
| Ocular flutter                                 |
| Opsoclonus                                     |
| Vertical/torsional nystagmus                   |
| Facial myokymia                                |
| Pharyngeal/laryngeal myorrhythmia              |
| Limb myorrhythm                                |
| Reticular myoclonus                            |

Table 2: Conditions associated with myorrhythmia

| Condition                                      |
|------------------------------------------------|
| Ischemic and hemorrhagic strokes (involving the brainstem, thalamus, or basal ganglia) |
| Whipple’s disease                              |
| Listerial rhombencephalitis                    |
| Japanese encephalitis                          |
| Japanese encephalitis                          |
| Hashimoto’s encephalopathy                     |
| Multiple sclerosis                             |
| Celiac disease                                 |
| NMDAR encephalitis                             |
| Autoimmune encephalitis                        |
| Paraneoplastic conditions                      |
| Traumatic brain injury                         |
| Alpha interferon 2a therapy                    |
| Phenytoin intoxication                         |

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given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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