Tremor onset with acute frontal infarct and disappearance with the second stroke

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ABSTRACT

Ischemic stroke associated movement disorders can be seen as the first sign of a stroke or as a delayed onset development. Tremor after a stroke is a rare finding among movement disorders. In addition to reports of tremor caused by cerebral infarction of varied locations, data on the disappearance of existing tremor following infarction is also available. Patients with hand tremor associated with cerebral infarct are not encountered frequently. In this report, we present a case with acute tremor in the contralateral hand following frontal cortical infarction and disappearance of the tremor after the second infarction comprising large areas in the same hemisphere.

Case Report. A 78-year-old male was admitted to the emergency department with a complaint of sudden onset of tremor in his left hand fingers. His medical and family histories were unremarkable. Vital signs were within normal limits. Neurological examination revealed resting and postural, continuous, rhythmic, involuntary movements like tremor, prominent in left first and second fingers of the hand. The frequency of the tremor was the same at rest and during action. He did not have rigidity at the time of the tremor. He did not have a tremor in his leg. As the complaint's started acutely, cerebral and diffusion MRI were carried out, and the results showed an acute infarction in the right fronttal region (Figure 1). Examinations for the etiology of the stroke (carotid-vertebral artery color Doppler, electrocardiography, and echocardiography) were not remarkable. The EEG revealed normal findings. Electromyographic assessment of the left
first metacarpal region with surface electrodes showed resting and postural involuntary rhythmic activity at a frequency of 6-7 Hz, 20-50 ms duration and 0.3 to 1 millivolt amplitude (Figure 2). He was started on 100 mg acetylsalicylic acid. Due to the acute nature of the stroke, no treatment for the tremor was given and we planned to examine the patient after 2 weeks. However, he did not attend for examination.

His second presentation to our clinic was one year after the first event. He had developed left hemiparesis syndrome 7 months after the first event. According to the information given by the patient and his relatives, the tremor in the left hand had disappeared following the second stroke. On neurological examination, left spastic hemiparesis (upper extremity 0/5, lower extremity 4/5) was determined. The tremor was not detected. Cerebral MRI showed chronic ischemia of right fronto-parietal and parietal-occipital regions (Figure 3).

**Discussion.** Many brain regions play a role in the development of tremor. These regions that control voluntary and involuntary commands are the main parts of the critical circuits. Each of the loops has specific anatomical connections, and they interact with numerous sensory feedback signals. These circuits are the loop between the motor cortex and basal ganglia, the circuit between the cerebellum and brain stem especially Guillain-Mollaret triangle, the circuit among the cerebellum, the thalamic nucleus and the motor cortex (cerebello-thalamocortical pathways and cortico-ponto-cerebellar pathways), the peripheral circuits from muscle spindles to the alpha-motor neurons (spinal loop), and from the peripheral recipients to the motor cortex (transcortical loop). Clinically, tremor may be divided into resting, postural, kinetic, and task-specific forms. Action tremor results from voluntary muscle contractions and includes postural, kinetic, and isometric tremor forms. Major tremor causes include Parkinson’s disease and Parkinson-Plus syndromes, stroke, drug-induced tremor, psychogenic tremor, essential tremor, multiple sclerosis, cerebellar diseases, dystonic tremor, and writing tremor. In a study by Alarcón et al., the frequency of movement disorders after stroke was reported as 3.7%, with 14% tremor. Ischemic stroke associated movement disorders can be seen as the first sign of a stroke or as a delayed onset development. Tremor after a stroke is a rare finding among movement disorders. Holme’s tremor, which accompanies different types of tremor occurring after a stroke, has been reported as the most common tremor type. Tremor associated with involvement of many regions of the brain has been reported. Tremor disappearance has also been reported as a result of lesions of these regions. In the literature, 3 cases have been reported with developed delayed onset (ranging from 3-21 months) hand tremors caused by...
stroke. Also, in 2 patients, tremor reportedly occurred immediately at the onset of the stroke and lasted only a few days.3 In another patient, right arm, and leg tremor developed 3 months after the left centrum semiovale and caudate lacunar infarction.9 In addition, patients whose tremor resolved following a frontal infarct have been reported.4,5

In our case, the tremor was localized to the hand and seen at rest and posturally, and developed immediately at the onset of the frontal infarct. Seven months later, as a consequence of the development of new infarct areas comprising the frontal, parietal, and occipital regions, the upper extremity became plegic, and the tremor disappeared. However, the disappearance of the tremor may be associated with the complete power loss.

In this report, we wanted to draw attention to tremor developing after a stroke, and disappearing after a second stroke in the same patient. The initial presentation with only a mild hand tremor is another interesting aspect of this case. As a result, we can suggest that stroke should be suspected in a patient with only a mild hand tremor, if the onset is acute and the tremor may disappear after a new subsequent stroke.

References

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