

Disappearance of Essential Tremor After Frontal Cortical Infarct

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Video



Abstract: We present a patient with essential tremor who spontaneously improved after a sensorimotor stroke related to a small cortical infarct near by the left precentral region of the brain. This finding supports the presence of cortical or transcortical motor loops that are likely involved in essential tremor and suggests a possible link with the cerebellar–thalamic–cortical pathway. © 2006 Movement Disorder Society

Key words: essential tremor; cortical stroke; cerebellar–thalamic–cortical pathway

Although the precise localization of the primary pathology associated with essential tremor (ET) is poorly understood, neurophysiological studies suggest the presence of a central oscillator with the involvement of the cerebellar–thalamic–cortical pathway.¹ Vascular and surgical lesions of the cerebellum, the pons, and the thalamus have been reported to result in unilateral resolution of tremor in ET cases.^{2–4} Although the terminal portion of the abnormal cerebellar–thalamic–cortical loops linked to ET is thought to be in the sensorimotor cortex,⁵ their association with a specific lesion has not been described previously. We present a patient with essential tremor who had bilateral improvement after a small infarct in the left frontal precentral region.

Case

The patient presented at the age of 63 with a 5-year history of tremor of both hands. It was more pronounced on the left side. It was exacerbated by anxiety and relieved by alcohol. Her father and elder sister also had a history of tremor. On examination at that time, a postural tremor of the outstretched hands and “no-no” head tremor were observed (see Video, Segment 1). There were no clinical features suggesting Parkinsonism.

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She was diagnosed as having essential tremor and was treated with propranolol with a modest response.

Eight years later, the patient complained of abrupt onset of right arm weakness and sensory change. Neurologic examination showed the presence of hypesthesia and marked weakness of right arm (MRC score: 2 of 5) and an action tremor of the opposite hand. A brain magnetic resonance imaging study, obtained 2 days after hospital admission, showed a small infarct in the left frontal precentral region (Fig. 1).

Two weeks later at the time of discharge from the hospital, she regained almost complete strength in her right arm, but had mild weakness and sensory deficits in the right hand. The tremor was limited to the head and left upper limb (see Video, Segment 2).

When clinically evaluated 5 weeks later, the patient was noted to have a very subtle distal weakness of the right hand. There was no detectable tremor in her right hand, and there was significant improvement in her left hand and head tremor (see Video, Segment 3).

Discussion

Although the anatomical structure responsible for the ET remains unclear, several reports have described anatomical substrates related to ET. Studies using electrophysiological and functional neuroimaging observations suggest an association between abnormal activations in the central nervous system, for example, the cerebellum, the thalamus, and the medulla, and ET.^{1,6,7} In addition, it is well known that a tremor can be abolished by a stereotaxic lesion of the contralateral nucleus ventralis intermedius of the thalamus or by a vascular lesion involving the thalamus, cerebellum, pons, corona radiata, or frontal lobe.^{2–4,8–10}

Our patient presented with an essential tremor, which improved bilaterally after a sensorimotor stroke related to a small cortical infarct neighboring the left central sulcus. This finding supports the likely presence of cortical loops in ET and possibly links ET with cerebellar–thalamic–cortical pathways. It is also possible that sensorimotor cortical or the corticospinal tract could have been damaged.

In parkinsonian resting tremor, there is clear evidence for the involvement of the sensorimotor cortex in the tremor-generating network.¹¹ For essential tremor, the situation is less clear, although the contralateral sensorimotor cortex may be involved in the tremor generation in patients with unilaterally activated ET in terms of coherence analysis of simultaneous electroencephalography (EEG) and electromyography (EMG) recordings.⁵

The unilateral cortical lesion does not sufficiently explain the phenomenon of bilateral improvement of ET in this patient. Given the results of bilateral EEG and EMG coherence in bilaterally activated essential tremor, interhemispheric coupling by means of the corpus callosum may play an important role in switching from exclusively contralateral condition to bilateral one.¹² In addition, several reports describe an altered neuronal substrate present bilaterally in the cerebellum that is connected to the red nucleus and thalamus.^{13–15} The activation of reverberating cerebellar–thalamic–cortical circuits are involved in the generation of thalamic oscillation at the tremor frequency in ET.^{16,17} Therefore, we speculate that the discrete lesion in our patient may have interrupted or reset the specific tremor generating network in the unilateral sensorimotor cortex and that consequent alternations of independent oscillator on the opposite side might have manifested as ipsilateral improvement in ET.

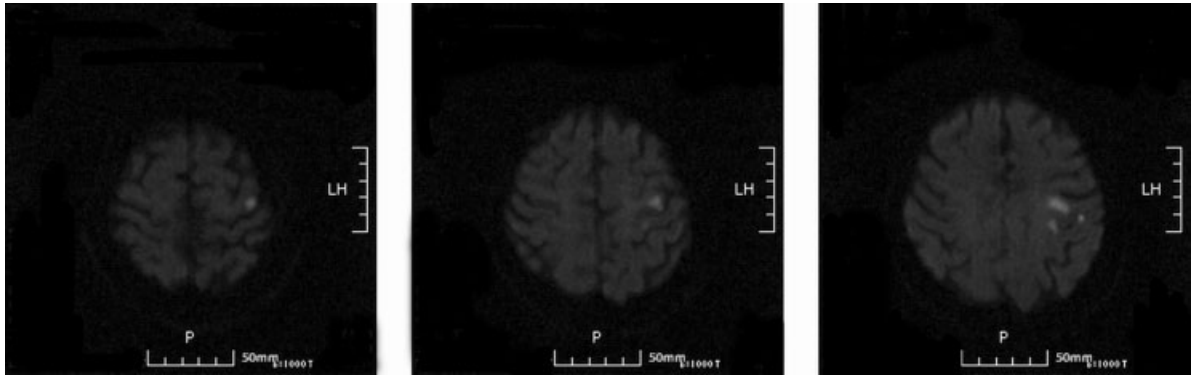


FIG. 1. Diffusion-weighted magnetic resonance imaging of the patient. The infarction is seen adjacent to the left frontal precentral region.

Legends to the Video

Segment 1. The patient at age 63. A postural tremor of the outstretched hands and “no-no” head tremor were observed.

Segment 2. The same patient at age 71. Two weeks after the left frontal cortical infarct, the patient regained almost complete strength in her right arm but had mild weakness and sensory deficits in the right hand. There was no detectable tremor in her right arm, but the tremor of the head and left side remained unchanged.

Segment 3. When seen 5 weeks after the initial stroke, she had a very subtle distal weakness of the right hand. There was no detectable tremor in her right hand and significant improvement in her left hand and head tremor.

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Antiamphiphysin-Positive Stiff-Person Syndrome Associated With Small Cell Lung Cancer

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Video



Abstract: The paraneoplastic amphiphysin⁺ stiff-person syndrome (SPS) has so far only been described in women with

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