Brief Clinical Note

A case of position dependent tremor

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Abstract: A 79-year-old woman presented 3 years' history of hand shaking while drinking a cup of tea. The tremor was seen bilaterally, more predominantly on the left, and it also appeared when reading a book or writing. It was also induced by flexing the elbow to about 90 degrees or more without any specific task. Although there was no family history, the tremor in the present case was clinically diagnosed as essential tremor, because there were no other movement abnormalities, and other causes of tremor were excluded by laboratory tests. The tremor was dependent on the position of the involved extremity regardless of the kind of tasks. Position-specific tremor is discussed in relation to postural tremor.

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Key words: position dependent tremor, position-specific tremor, task-specific tremor, postural tremor

Introduction

Tremor is involuntary movement characterized by repetition of the same movements at a certain pace. Recently Bhatia et al. published a consensus statement on the classification of tremors[1)]. Tremor is largely divided into two groups depending on whether isolated or combined. The tremor may be further classified according to the topographic distribution, frequency, or activation conditions under which it appears[2)]. Although the latter classification includes resting, postural and kinetic tremor, the effect of position on tremor has not been clearly understood.

Here we present a patient who showed position dependent tremor, and discuss about the differential diagnosis.

Case report

A 79-year-old woman was referred to our hospital because of gradually progressive shaking of the hands when drinking a cup of tea for the last three years. Her coexisting diseases include Hashimoto disease, diabetes mellitus and rheumatoid arthritis, for which she was treated with levothyroxine sodium hydrate, bucillamine, salazosulfapyridine, methotrexate, celecoxib, folate, rebamipide, lafutidine and minodronic acid hydrate. She was not aware of any tremor in her family.

On neurological examination, orientation and recent memory were intact. There was no apparent abnormality in the cranial nerves territory. Muscle strength was well preserved. There was no involuntary movement in the resting condition. There was no dystonia. Tendon reflexes were normal in all extremities. The plantar reflexes were flexor on both sides. Tactile and vibration senses were normal in all extremities.

The tremor appeared in both forearms not only when drinking a cup of tea, but also when flexing the elbow to about 90 degrees or more. More specifically, it appeared in both forearms when flexing the elbow to read a book or in the right forearm when drawing a line with the right forearm placed on the desk and also in the left forearm when holding the paper with the left hand on the desk. The tremor was also elicited when the hand was placed near the face in the nose-finger-nose test. The larger amplitude elbow tremor, except for fine irregular finger

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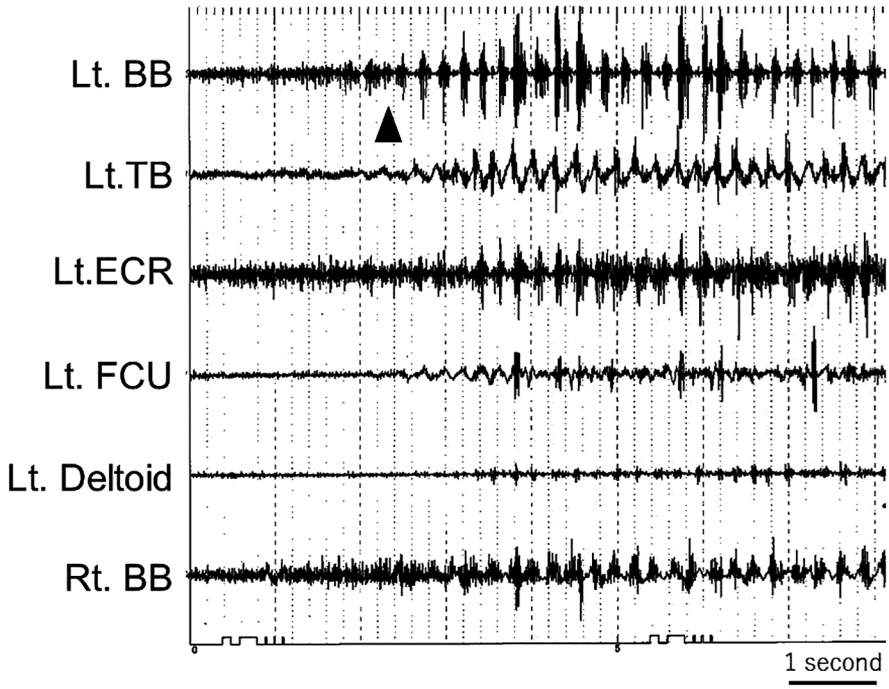

Fig. 1 Surface electromyogram of upper extremities.
Tremor appeared when elbows were kept flexed (arrowhead). Note reciprocal contraction of agonist and antagonist muscles in the left upper arm and simultaneous contraction of the left and right biceps brachii muscles. Lt.: left, Rt.: right, BB: biceps brachii, TB: triceps brachii, ECR: extensor carpi radialis, FCU: flexor carpi ulinaris.

tremor, was not seen while the arms were held straight forward (Video).

The tremor frequency calculated from the video data was about 4 Hz. The tremor frequency was not affected by loading the weight of 500 g and 1,000 g to the forearm. The tremor was not elicited by passive elbow flexion in the resting state. Clonazepam had little effect on the tremor. The effect of ethanol intake was unclear due to lack of drinking habits.

On laboratory examination, there was no abnormality in the complete blood count. Blood glucose was 124 mg/d*l* and HbA1C was 6.9%. Rheumatoid factor was 127 IU/m*l*. The thyroid function was normal. Head MRI showed a meningioma (15 mm × 15 mm × 15 mm) on the left cerebral falx. Electrophysiologically, motor and sensory nerve conduction study showed normal amplitude of evoked potentials and conduction velocity in all extremities. There was no abnormality in the somatosensory evoked potentials. The tremor recorded by surface electromyogram showed reciprocal contraction of the biceps and triceps brachii muscles (Fig. 1).

Discussion

According to the recent classification of tremor[3], isolated tremor is classified into resting tremor, postural tremor without worsening with kinetic movement, postural tremor with worsening with kinetic movement, resting and postural tremor with pause, resting and postural tremor without pause, resting, postural and kinetic tremor, position-specific tremor, task-specific tremor, and functional tremor. Among these, position-specific tremor is defined as a tremor brought on during specific positioning of the involved body part.

Tremor in the present case was different from resting tremor because it did not appear in the resting state even when the elbow was passively flexed. Postural tremor is defined as a tremor seen while the corresponding extremity is assuming a certain posture or while the corresponding muscles are kept in isometric contraction. The present case showed tremor of the forearm in the specific position in which the elbow was flexed to about 90 degrees or more. Therefore, the tremor in the present case was considered to be a kind of postural tremor. Typical postural tremor is seen while the upper limbs are kept in front of the chest with the elbows flexed[4)5)]. The phenomenon is observed not only in essential tremor but also in postural tremor caused by a variety of other neurological disorders[6)].

Position-specific tremor is considered to be a kind of postural tremor. The cases previously reported as position-specific tremor showed tremor in one arm in a certain position of purposeful action such as putting on makeup or pitching a baseball[7)].

Task-specific tremor is seen during execution of a specific task such as writing or playing a musical instrument[8)9)]. Tremor

in the present case was dependent on the specific posture; elbow flexion during writing or reading a book. However, the tremor also appeared with elbow flexion without any specific task. Therefore, although tremor in the present case was posture-dependent, it was different from the task-specific tremor.

Neurologically the present case showed no movement abnormalities other than the tremor, and other causes of tremor were excluded by laboratory tests. Therefore, although there was no family history suggestive of hereditary condition, essential tremor is the most likely clinical diagnosis.

The pathophysiology of position dependent tremor has not been precisely clarified. The tremor was suggested to be of central nervous system origin rather than the peripheral origin because the frequency of the tremor was not influenced by weighting. However, since the tremor was elicited by flexing the elbow to about 90 degrees or more, peripheral information indicating the degree of muscle extension might be also related to the occurrence of the tremor.

Video legend

Gross tremor seen in the left upper extremity while the patient is trying to drink a cup of water, to read, to wright or to brush teeth. Tremor also appears when the patient is requested to just flex the left elbow to about 90 degrees.

Consent statement: The patient gave written informed consent.

※The authors declare there is no conflict of interest relevant to this article.

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