Hyperhidrosis Due to Thalamic Deep Brain Stimulation in a Patient with Essential Tremor

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ABSTRACT

OBJECTIVE: We present a unique case of hyperhidrosis as a side effect of Vim (ventrointermediate) deep brain stimulation.

BACKGROUND: Essential tremor (ET) is a the most common form of tremor encountered in movement disorder clinics. ET is characterized by postural and action tremor of the upper extremities, but head, voice, and lower extremity tremors may also be present. For medication-resistant patients, high frequency stimulation of the thalamus is a viable therapeutic alternative. Side effects of DBS include, but are not limited to, paresthesias, gait difficulty, dysarthria, and dystonia.

METHODS: The patient is a 76 year-old, right-handed male who developed intermittent right hand action tremor at the age of 71 when reaching for objects. In time, he developed a mild action tremor in the left hand. The tremor gradually progressed to interfere with activities of daily living. He responded poorly to medications and was referred to our facility for evaluation of DBS. Examination revealed a postural and kinetic tremor in the right greater than left hand. There was no tremor in the bilateral lower extremities, head, or voice. The patient underwent left Vim-DBS without complications.

RESULTS: For localization, stimulation parameters remained constant: 2.5V, frequency 185Hz, pulse width 120µsec, and case positive. Using contacts 0, 2, and 3, no sweating occurred. Within seconds of activating contact 1, the patient developed profuse sweating of the left face, thorax, and arm. Magnetic resonance imaging of the brain confirmed lead positioning in the thalamus with a slightly inferior displacement extending to the region of the STN. Neurology 2005;65(5):774-775.

METHODS/RESULTS

A 76 year-old right handed man presented with progressive action tremor of the right hand for five years.

He later developed a head tremor in the horizontal plane and action tremor in the left hand.

The bilateral hand tremor gradually interfered with activities of daily living. Examination showed postural and action tremor in right greater than left hand.

Because his tremor interfered with activities of daily living and failed to respond to propanolol, he underwent left Vim-DBS.

He had no intra- or immediate postoperative complications, but during programming sessions, the patient developed profuse, left-sided hyperhidrosis.

Various combinations of stimulating parameters were employed to alleviate the hyperhidrosis; when contacts 0, 2 and 3 were used, the sweating resolved.

Within seconds of activating contact 1, he developed profuse sweating of the left hemi-body visualized with a mixture of corn starch and providone iodine (Figure 1, top).

Optimal tremor control without hyperhidrosis was achieved with contact 5.

Neurostimulation parameters remained constant after the initial programming session: amplitude 2.5V, frequency 185 Hz, pulse width 120 µsec, case positive, and electrode 0 negative.

Magnetic resonance imaging of the brain showed electrode placement in the left anterior thalamus traversing the hypothalamus (Figure 1, bottom) with the tip of the electrode extending caudally into the upper mediatrin.

CONCLUSIONS: Although a rare complication, hypothalamic dysfunction can occur as a stimulation-related side effect of Vim-DBS. In our patient, DBS possibly resulted in unilateral thalamus and descend uncoressed through the medial portion of the lateral funiculus of the brainstem to synapse with preganglionic sympathetic neurons of the interomedial lateral column of the spinal cord. Based on animal anatomical studies, sympathetic neurons and outflow tracts have been found to involve the A5 noradrenergic cell group, paraventricular hypothalamus, caudal raphe region, rostral ventrolateral medulla, ventromedial medulla, and the ventral zona incerta. Structural lesions resulting in unilateral hyperhidrosis have been described following pituitary, tentorial, subcortical brainstem and hypothalamic infaracts, syringomyelia, multiple sclerosis, and neurological procedures (Table). In our patient, high frequency DBS possibly resulted in unilateral activation of the anterior hypothalamus or effferent sympathetic pathways to the brain stem resulting in ipsilateral hyperhidrosis.

REFERENCES