

Teaching NeuroImages

Holmes Tremor Secondary to a Stabbing Lesion in the Midbrain

Rubens Gisbert Cury^{1*}, Egberto Reis Barbosa¹, Christian Freitas¹, Luis Filipe de Souza Godoy³ & Wellingson Silva Paiva²

¹Movement Disorders Center, Department of Neurology, School of Medicine, University of São Paulo, São Paulo, Brazil, ²Division of Neurosurgery, School of Medicine, University of São Paulo, São Paulo, Brazil, ³Diagnostic Neuroradiology Division, Institute of Radiology, School of Medicine, University of Sao Paulo, Sao Paulo, Brazil

Abstract

Background: The development of Holmes tremor (HT) after a direct lesion of the midbrain has rarely been reported in the literature, although several etiologies have been linked with HT, such as stroke, brainstem tumors, multiple sclerosis, head trauma, or infections.

Phenomenology Shown: A 31-year-old male, having been stabbed in the right eye, presented with a rest and action tremor in the left upper limb associated with left hemiparesis with corresponding post-contrast volumetric magnetic resonance imaging T1 with sagittal oblique reformation showing the knife trajectory reaching the right midbrain.

Educational Value: Despite the rarity of the etiology of HT in the present case, clinicians working with persons with brain injuries should be aware of this type of situation.

Keywords: Midbrain, trauma, tremor

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*To whom correspondence should be addressed. E-mail: rubens_cury@usp.br

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Holmes tremor (HT) is a low-frequency (<4.5 Hz) and large-amplitude tremor that is usually present at rest and accentuated by action.¹ The underlying pathophysiological mechanism that leads to HT involves different lesions affecting the brainstem that damage the ascending cerebellothalamic and dentate-rubro-olivary pathways, and nigrostriatal fiber tracts.² HT is generally the result of lesion(s) such as stroke, trauma, and/or demyelinating diseases.¹ Here, we describe the case of a patient who developed HT after a direct lesion of the midbrain, an etiology rarely reported in the literature.

A 31-year-old male was taken to the emergency department after being stabbed in the right eye. He was conscious but presented with left hemiparesis. The initial brain computed tomography was normal. A few days later, at discharge, the left hemiparesis had partially improved and he was able to walk, albeit with slight difficulty. Two months later he developed a tremor in his left arm at rest, which was exacerbated with posture and additionally worsened with action.

Brain magnetic resonance imaging (MRI) revealed a right midbrain injury and the trajectory of the knife reaching the midbrain (Figure 1). He was treated with propranolol without an effective response. After the introduction of biperiden 6 mg/day the tremor improved, remaining stable for the next 3 months of follow-up.

Despite the rarity of this case, clinicians working with persons with brain injuries should be aware of this type of situation. The singularity of the report is also because this stabbing injury crossed the orbit, reaching directly to the midbrain, without affecting other important nearby structures.

A delayed onset between the lesion and the occurrence of tremor has been reported in the literature, as observed in the present case, and could be related to receptor sensitivity changes or axonal sprouting, which may lead to a rearrangement of the central pathways in the brain or to an aberrant neuronal reorganization, resulting in plasticity.^{2,3}

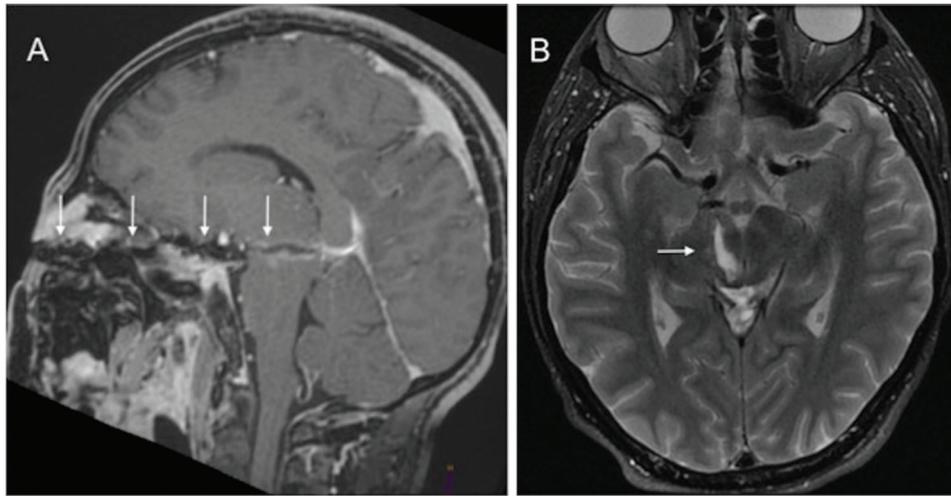


Figure 1. Brain Magnetic Resonance Imaging. (A) Post-contrast volumetric T1 with sagittal oblique reformation showing the knife trajectory reaching the midbrain. (B) Axial T2 image showing the right midbrain lesion.

Once established, post-traumatic HT rarely remits. Treatment is difficult and few cases respond well to primidone and propranolol. Interestingly, the present patient responded well to Biperiden, which is not the first-line therapy but occasionally anticholinergics may help.³ Finally, because of refractory symptoms and tremor severity in some cases, stereotaxic surgery may be contemplated. To date, there is no evidence whether the response of HT to treatment varies depending on the etiology or location and reporting such differences would contribute to the care of patients with this condition.

References

1. Alqwaifyly M. Treatment responsive Holmes tremor: case report and literature review. *Int J Health Sci* 2016;10:558–562.
2. Raina GB, Cersosimo MG, Folgar SS, Giugni JC, Calandra C, Paviolo JP, et al. Holmes tremor: clinical description, lesion localization, and treatment in a series of 29 cases. *Neurology* 2016;86:931–938. doi: 10.1212/WNL.00000000000002440
3. Samie MR, Selhorst JB, Koller WC. Post-traumatic midbrain tremors. *Neurology* 1990;40:62–66. doi: 10.1212/WNL.40.1.62