Movement Disorders
CLINICAL PRACTICE

CASE REPORT

Segmental Dystonia in the Context of Dextromethorphan Abuse: A New Cause of Delayed Onset Drug-Induced Dystonia?

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The deliberate misuse of the cough suppressant, dextromethorphan, by those seeking its euphoric effects at high doses, is increasingly recognized.[1] To date, the only reported case of a movement disorder secondary to dextromethorphan is an acute dystonic reaction in a toddler following accidental overdose.[2] We report on a case of segmental (cranial and respiratory) dystonia in a patient with a long history of dextromethorphan abuse and postulate that this might represent a form of delayed-onset dystonia secondary to this medication.

Ethics committee approval was waived by our local institutional review board for this study. Written consent was obtained from the subject for reporting of the case and submission of the accompanying video.

Case Report

A 42-year-old man with a history of chronic alcohol dependence presented in June 2013 complaining of involuntary facial movements. He had a past history of recurrent closed injuries secondary to falling while intoxicated and had undergone craniotomies for drainage of extradural and subdural hematomas in July 2010 and January 2013.

When first observed in the movement disorders clinic, he reported that the movements had commenced with neck stiffness around 8 months earlier. Since that time, he had experienced gradually worsening involuntary facial movements, including frowning, blepharospasm, trismus, and grimacing. On examination, there were prominent dystonic contractions of the cranial muscles with intermittent "gasping" suggestive of respiratory dyskinesia (see Video 1). The patient reported no previous exposure to antiemetic or neuroleptic medications, and this was supported by careful review of the medical records. MRI brain scan was normal.

When questioned about illicit drug use, the patient admitted to being a habitual user of dextromethorphan cough syrup for the previous 7 years. He estimated that his usual daily intake was approximately one 200-mL bottle of dextromethorphan (equivalent to 600 mg daily). He reported using dextromethorphan to treat depression, as well as to suppress cravings for alcohol and tobacco.

The patient commenced botulinum toxin treatment, and there was a significant improvement in the severity of the dystonia over the next 12 months (see Video 2). Despite being strongly advised to discontinue dextromethorphan, at the time of writing, the patient continues to consume it on a near daily basis.

Dextromethorphan is the d-isomer of 3-methoxy-N-methylmorphinan, a synthetic analog of codeine, and it exerts its antitussive properties by binding to central opioid receptors.[3] Dextromethorphan is metabolized by the cytochrome P-450 pathway to dextrorphan, which binds to and inhibits N-methyl-D-aspartate (NMDA) receptors. NMDA receptor blockade is believed to be responsible for the dissociative effects (e.g., euphoria, dream-like experiences, and hallucinations) of dextromethorphan overdose.[3,4] These dissociative effects, which may occur in adults following bolus doses exceeding 200 mg,[4] are similar to those following ingestion of other NMDA antagonist drugs, such as ketamine[5] and phencyclidine.[6] The abuse of dextromethorphan-containing cough syrups by those seeking its psychoactive effects is increasingly recognized.[1]

To our knowledge, this is the first description of delayed-onset dystonia occurring in the context of long-term dextromethorphan abuse. However, acute dystonic reactions following dextromethorphan overdose in a toddler[2] and ketamine ingestion in an adult have both been reported.[7]

The movement disorder manifested by our patient is very suggestive of a tardive dystonia, which is usually precipitated by exposure to dopamine-blocking agents, such as neuroleptic medications. However, the patient gave no history of exposure to dopamine-blocking medications, and a careful review of his medical records supported this. We therefore propose that the patient's habitual overuse of dextromethorphan may have caused the dystonia, perhaps as a result of chronic NMDA receptor blockade in basal ganglia motor circuits. It is possible

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that the patient's chronic alcoholism may have made him more susceptible to a drug-induced dystonia, as is reported with neuroleptic-induced tardive dyskinesia.[8]

This report expands the range of movement disorders that can be associated with dextromethorphan toxicity to include delayed-onset segmental dystonia. In addition, it adds to the spectrum of movement disorders that can be associated with NMDA receptor blockade, which include the distinctive facial and limb movements that are pathognomonic of anti-NMDA receptor encephalitis.[9] In that disorder, the movements are typically stereotypic and rhythmic, rather than dystonic, in character, but they have a similar orofacial distribution to those of the present case.

Author Roles

(1) Research Project: A. Conception, B. Organization, C. Execution; (2) Statistical Analysis: A. Design, B. Execution, C. Review and Critique; (3) Manuscript Preparation: A. Writing of the First Draft, B. Review and Critique.

T.E.K.: 1A, 1B, 1C, 3A, 3B

P.D.T.: 1A, 3B

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Supporting Information

Videos accompanying this article are available in the supporting information here.

Video 1. The patient describes the symptoms of his movement disorder. During the video, dystonic contractions of the upper and lower facial muscles and platysma are seen, as well as involuntary jaw closure, subtle lingual dyskinesias, and intermittent gasps indicative of respiratory muscle dyskinesia.

Video 2. The patient describes his response to botulinum toxin treatment, 12 months after commencing 3-monthly treatments of the masseter, orbicularis oculi, anconeus, corrugator, frontalis, and platysma muscles. Significant improvement in the facial and jaw dystonia is evident. The respiratory dyskinesia is still apparent.

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