

are needed to explore the usefulness of ECT in the treatment of this disorder.

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Treatment of Tourette's Syndrome With Delta-9-Tetrahydrocannabinol

TO THE EDITOR: Tourette's syndrome is a complex neuropsychiatric disorder of unknown etiology. Earlier reports suggested beneficial effects in Tourette's syndrome when smoking marijuana (*Cannabis sativa*) (1, 2, 3). We report a successful treatment of Tourette's syndrome with delta-9-tetrahydrocannabinol (Δ^9 -THC), the major psychoactive ingredient of marijuana.

Mr. A, a 25-year-old man, was diagnosed with attention deficit hyperactivity disorder at age 6. Motor and vocal tics started at age 10. During adolescence, he developed obsessive-compulsive behavior, anxiety, lack of impulse control, and self-injurious behavior. The diagnosis of Tourette's syndrome according to DSM-IV criteria was made at age 22. At age 19, he started smoking marijuana. When using 2–3 g/day, he noted a marked improvement of both vocal and motor tics and associated behavioral disorders. Therefore, he stopped less effective medical treatment with pimozide.

In an uncontrolled open clinical trial, we investigated whether Δ^9 -THC is effective in the therapy of Tourette's syndrome. Written informed consent was obtained from the patient after complete description of the study. The local ethics committee approved the study.

Mr. A was treated once with 10 mg of Δ^9 -THC. (He was unmedicated and had stopped smoking marijuana 3 days before.) Using the section on tic symptoms of the Tourette's Syndrome Global Scale, we found that Mr. A's total tic severity score was 41 before treatment and was reduced to 7 just 2 hours after treatment. Both motor and vocal tics improved and coprolalia disappeared. The improvement began 30 minutes after treatment and lasted for about 7 hours; no adverse effects occurred. To measure cognitive functions, we performed neuropsychological tests, which showed improved signal detection and sustained attention and reaction time after treatment. Mr. A himself noted an improvement of motor and vocal tics of about 70%. Furthermore, he felt an amelioration in attention, impulse control, obsessive-compulsive behavior, and premonitory feeling.

This is the first report of a successful treatment of Tourette's syndrome with Δ^9 -THC. Furthermore, for the first time, patients' subjective experiences when smoking marijuana were confirmed by using a valid and reliable rating scale and by excluding the fact of using an illegal drug. In ad-

dition, our findings give evidence that beneficial effects of marijuana may be due to the most psychoactive ingredient— Δ^9 -THC. So far, it is unclear whether beneficial effects are caused by unspecific mechanisms like reduction of anxiety, sedation, or placebo effects. We hypothesize, however, that there may be an interaction between Δ^9 -THC and specific cannabinoid receptors located in basal ganglia (4). We are planning to confirm these preliminary results in a double-blind, placebo-controlled, crossover study.

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Neurosurgery for Obsessive-Compulsive Disorder: Problems With Comorbidity

TO THE EDITOR: Ideal criteria for neurosurgery of refractory obsessive-compulsive disorder (OCD) include the absence of comorbid conditions. In practice, the rarity of patients with no comorbid conditions poses the problem of how strictly to apply this criterion. To address this question, we present the case of a patient whose OCD had an excellent response to surgery, which was largely negated by the worsening of other symptoms.

Ms. A, a 32-year-old single woman with long-standing OCD, had symptoms including cleaning compulsions, buying things on the "right day," and the drive to eliminate "bad" or imperfect aspects of herself and her environment. Ten years of treatment, including behavior therapy and serotonin reuptake inhibitors with augmentation, resulted in no improvement. She depended on her family for financial support and could not complete her college degree. Her clinical picture was complicated by bulimia, kleptomania, and borderline personality disorder. There was a previous history of major depressive disorder, but she was not having an episode before the surgery.

Ms. A underwent bilateral anterior capsulotomy and had almost complete elimination of her OCD symptoms. Over the next several months, however, her kleptomaniac and bulimic behaviors increased, despite some evidence suggesting these "OCD spectrum disorders" might respond to treatments for OCD (1). She also had a recurrence of severe major depression, which had thus far been unresponsive to four antidepressant trials.

One possible explanation for Ms. A's depression is that it was a direct effect of the surgery. However, there are no other reports of this; instead, similar surgical procedures have relieved treatment-refractory depression (2).