When Green Becomes Mean:
Green Tea Extract Reduces Ziprasidone's Effect and Causes Psychosis

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Ziprasidone is an atypical antipsychotic that is approved by the US Food and Drug Administration for the treatment of schizophrenia, acute mania, and mixed states associated with bipolar disorder. Food influences the bioavailability of ziprasidone, and guidelines advise taking ziprasidone with meals containing approximately 500 kilocalories. Failure to do so can result in a decrease in intestinal absorption by 50% and inconsistent efficacy.[1]

"Fat burner," a green tea extract, is a widely used over-the-counter preparation for weight loss. Key ingredients include epigallocatechin gallate (EGCG) and caffeine, with 400 mg and 160 mg per serving, respectively, as well as antioxidants and other botanic components. Significantly, EGCG can affect medication intestinal absorption and liver metabolism, thereby altering medication efficacy. The following case describes a patient with schizophrenia stable on ziprasidone, who decompensated and became psychotic within days of using a green tea extract preparation for weight loss.

Case Report

A 23-year-old single Asian man with no significant medical history and a psychiatric history of schizophrenia presented with worsening of paranoia, delusions, and auditory hallucinations commanding him to kill himself. Prior to admission, he overdosed on 20 pills of ziprasidone 80 mg with the hope that increasing the dose could eliminate the voices. For years, he was maintained on risperidone 2 mg daily. Because of weight gain, he was switched to ziprasidone 80 mg twice daily a few months prior to admission with good control of his psychotic symptoms. He reported being compliant and taking ziprasidone regularly with meals. He reported no recent dietary changes or substance use, and his laboratory results, including urine toxicology screen, were normal at admission. He admitted to recently taking 6 pills (the recommended daily dose is 4 pills) of green tea extract/fat burner preparation for 2 weeks before admission. His psychotic symptoms occurred 10 days following the use of green tea extract.

He was cautiously started on ziprasidone 40 mg twice daily, and his psychotic symptoms resolved in 2 days. He was discharged with a recommendation to stop using green tea extract.

Discussion

As stated previously, guidelines recommend that oral ziprasidone be taken with meals containing approximately 500 kilocalories for optimal intestinal absorption and bioavailability, as taking it with inadequate kilocalories can cause a 50% reduction of medication bioavailability.[1] Despite being a lipophilic medication, a minimum requirement of fat in meals needed for optimum absorption of ziprasidone has not been established.[2] Proposed mechanisms of food on ziprasidone absorption include delayed gastric emptying, increased bile or splanchnic blood flow, and gastric pH changes.[3]

Consumption of green tea as a beverage or dietary supplement is a common practice worldwide. Several ingredients, namely the catechins such as EGCG, can impair lipid absorption and uptake, thereby reducing the absorption of lipophilic compounds.[4] They may also induce liver enzymes, all of which can affect medication bioavailability. Some antipsychotics were reportedly affected by green tea extract.[5,6] In an animal study[5] of quetiapine, pretreatment with green tea extract reduced the maximum plasma concentration and area under the curve by 45% and 35%, respectively, compared to quetiapine alone with no effect on half-life or clearance. Another animal study[6] on the effect of green tea extract on clozapine found a lower plasma maximum concentration and area under the curve for the green tea extract group.

Our patient was stable on ziprasidone for several months and became psychotic within days following the use of green tea extract. His symptoms resolved subsequent to its elimination. To our knowledge, there are no data on the effect of green tea extract on ziprasidone pharmacokinetics or pharmacodynamics and, hence, its efficacy. Moreover, a study[7] advocated for the use of green tea extract to counteract the metabolic side effects of psychotropic medications. This recommendation is concerning, as our case as well as other animal studies[5,6] on quetiapine and clozapine all raise questions about the safety and potential negative impact of green tea extract preparations on patients taking ziprasidone and other antipsychotics.

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