

SlimQuick™-Associated Hepatotoxicity Resulting in Fulminant Liver Failure and Orthotopic Liver Transplantation

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Abstract

Green tea extract is a popular ingredient in herbal weight loss supplements. There have been reports of hepatotoxicity associated with the use of dietary supplements, some of these cases lead to fatal outcomes. To our knowledge, we report the first case of fulminant hepatic failure requiring orthotopic liver transplantation caused by SlimQuick™ (Wellnx Life Sciences, Wilmington, DE), a widely available weight loss supplement containing green tea extract.

Introduction

Green tea extract is a relatively ubiquitous herbal product long celebrated for its antioxidant properties; the proven health benefits create the illusion of benignity.¹ Its reported fat-burning ability has led to its inclusion in many herbal weight loss supplements. Since its introduction into a largely unregulated weight loss market, several cases of hepatotoxicity have arisen, yet it still remains a key ingredient in many supplements.²

Case Report

A 52-year-old woman presented to the emergency department with 1 week of vomiting and progressive jaundice. Three weeks before presentation, she drank SlimQuick™ for 2 days while fasting. Past medical, surgical, and family histories were unremarkable. Medication history included only metoprolol. Physical examination revealed normal mental status, icteric sclera, mild abdominal distension, and lower extremity edema. Initial laboratory values revealed total bilirubin 16.5 mg/dL, aspartate transaminase (AST) 1507 IU/L, alanine transaminase (ALT) 945 IU/L, alkaline phosphatase 210 IU/L, and international normalized ratio (INR) 2.82. Abdominal computed tomography (CT) showed nodular liver with small amount of ascites (Figure 1). Serological tests for viral hepatitis, autoimmune hepatitis, Wilson disease, and primary biliary cirrhosis were negative. Liver biopsy was consistent with confluent hepatic necrosis with collapse (Figure 2), and prednisone 60 mg was initiated.

Soon after, the patient developed slurred speech and asterixis and required intubation with transfer to the ICU, where the patient was expeditiously evaluated and listed for liver transplant. She underwent liver transplantation 2 days later. The patient was discharged home post-operative day 8. Explant biopsy revealed extensive centrilobular and confluent necrosis with zonal distribution of necrosis favoring drug/toxin-related injury.

Discussion

Green tea extract is derived from the herb *Camellia sinensis*. Polyphenolic compounds called catechins are present in high concentrations, and are responsible for green tea extract's well-known anti-carcinogenic and anti-

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Figure 1. Abdominal CT revealing nodular liver with small amount of ascites.

inflammatory properties.³ It has been linked to weight loss due to the thermogenic properties of catechins, particularly epigallocatechin-3-gallate (EGCG).⁴ Case reports of green tea extract hepatotoxicity are linked to higher concentrations of EGCG, which exerts its toxic effects through generation of reactive oxygen species, mitochondrial damage, and depletion of glutathione in hepatocytes.²⁻⁶ In animal models, consumption of EGCG while fasting leads to greater morbidity due to higher plasma concentrations, a troubling fact since many weight loss supplements are taken with a low-calorie diet.⁷

Despite reports of hepatotoxicity and attempts to quantify safe amounts of catechin consumption, catechins have a continued presence in the market in products such as Slimquick™. Exolise® (Laboratoires Arkopharma, Carros, France), a European herbal weight loss product, was withdrawn from Spanish and French markets in 2003 after being linked to 13 cases of hepatotoxicity, one of which required orthotopic liver transplantation.² Exolise® was 25% by content catechins and mostly EGCG.⁸ In 2008, the United States Pharmacopeia reviewed 34 cases of hepatotoxicity linked to green tea extract and studies that examined the safety of catechin dosage in humans and animals; they concluded that green tea extract does have potential for hepatic injury.² Patel et al reported a case of hepatotoxicity in an adolescent who ingested Applied Nutrition Green Tea Fat Burner® (Applied Nutrition, Los Angeles, CA) in combination with other supplements; it was felt that prolonged ingestion of catechins caused his injury.⁹ Boehm et al found increasing adverse effects with catechin consumption exceeding 250

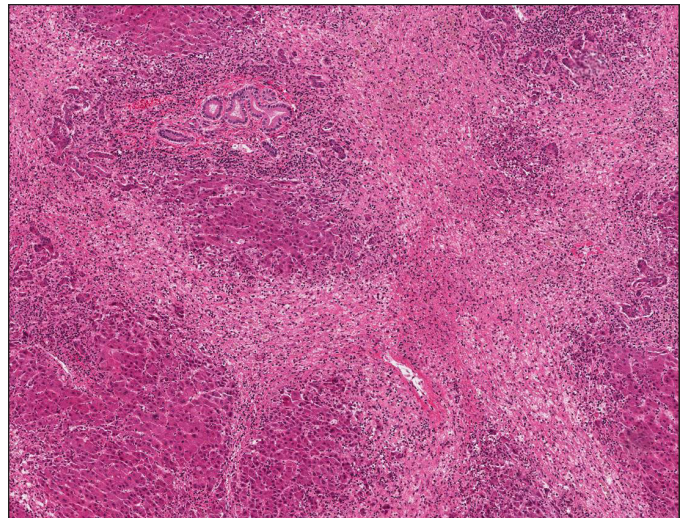


Figure 2. Liver biopsy showing confluent hepatic necrosis with collapse.

mg daily.¹⁰ Makers of SlimQuick™, which contains 135 mg EGCG, recommend twice daily dosing with a 1,350 calorie per day diet for maximum weight loss results.¹¹

Our patient's ingestion of green tea extract while fasting likely led to her precipitous deterioration. While beta-adrenergic antagonists, particularly labetalol, have been linked to hepatotoxicity, our patient began her beta-blocker months before without incident.¹² Weinstein et al reported a case of hepatotoxicity from Slimquick™ in a woman with the alpha-1-antitrypsin MZ phenotype, suggesting that in seemingly healthy patients, phenotypic variations may explain their predisposition to hepatic injury with drug or supplement ingestion.¹ No studies yet exist that correlate the MS phenotype, which our patient had, with increased risk of liver injury.¹³

Our case highlights many important facts about herbal supplemental use and its implications for patients and health care providers. Herbal supplement medicinal use, particularly for weight loss, is common in the United States.¹⁴ According to U.S. Drug-Induced Liver Injury Network (DILIN), between 2003 and 2011, 16% of drug-induced liver injury was attributed to herbal supplements, with 26% of these cases involving weight loss supplements.¹⁵ In 2009, Americans spent nearly \$3 million on green tea extract products alone,¹⁶ and many patients may be unknowingly consuming catechins in other herbal supplements. Navarro et al analyzed over 90 supplements implemented in 47 cases of drug-induced liver injury (DILI) to determine the hidden presence of catechins.⁵ Nearly 40% of supplements analyzed contained catechins despite non-disclosure on supplement labels.⁵ There is a need for providers to counsel on the safety of green tea extract and remind patients of the dangers of herbal supplement use.

Disclosures

Author contributions: M. Whitsett and D. Haleboua-De Marzio researched the literature, and drafted and critically reviewed the manuscript. D. Haleboua-De Marzio is the article guarantor. S. Rossi critically reviewed the manuscript.

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