

## Hepatotoxicity Associated with Herbal Tea Containing Kelp

Lavanya Viswanathan, MD, MS<sup>1</sup>, and Anish Patel, DO<sup>2</sup>

<sup>1</sup>Division of Internal Medicine, Brooke Army Medical Center, San Antonio Uniformed Services Health Education Consortium (SAUSHEC), Fort Sam Houston, TX

<sup>2</sup>Division of Gastroenterology/Hepatology, Carl R. Darnall Army Medical Center, Fort Hood, TX

### Abstract

A 40-yr-old Sri Lankan female presented to the gastroenterology clinic with jaundice. Further work-up revealed extrahepatic cholestasis with a hepatocellular component; however, subsequent work-up revealed no significant findings. Hospitalization revealed hepatotoxicity associated with ingestion of a homemade herbal tea containing kelp (*Laminaria*), which was confirmed with further history. Hepatotoxicity associated with herbal tea ingestion is rare, but should be a consideration in patients with unexplained jaundice. Inquiries into dietary or herbal supplements should always be made during routine history taking, as it may be useful in achieving the diagnosis.

### Introduction

Dietary and herbal supplements are a popular alternative therapy option in the United States. However, regulation of herbal supplements has not kept up with the growing demand due to limited oversight by the FDA. Patients are often hesitant to admit to the use of alternative medicine and herbal supplements to their physicians. As use of herbal supplements continues to rise, it becomes more important to obtain complete medication histories from patients. We present the first reported case of kelp (*Laminaria*) hepatotoxicity in a patient drinking homemade Chinese rice tea.

### Case Report

A 40-year-old Sri Lankan female presented to the outpatient gastroenterology clinic with jaundice and pruritus, but complained of no other significant symptoms. Her past medical history was significant for type 2 diabetes mellitus. She reported stopping her medications at least 1 month prior to her visit due to failure to refill her prescription. Her medication only included metformin therapy, which she had been using for at least 2 years. The patient denied any new medications, blood transfusions, drug/alcohol abuse, herbal supplementation, or recent travel upon initial evaluation.

On physical exam, she was icteric and jaundiced with no organomegaly or abdominal tenderness. The initial laboratory studies revealed elevated bilirubin (total 9.2 mg/dL and direct 7.4 mg/dL), alkaline phosphatase (435 IU/L), transaminases (AST 219 IU/L and ALT 435 IU/L), and gamma glutamyl transpeptidase (416 IU/L). Hemoglobin and hematocrit were 13.6 g/dL and 40%, respectively. Hospitalization was recommended for further work-up. Further hepatic work-up, including viral serologies, iron panel, alpha-1 antitrypsin, ceruloplasmin, and ANA/ASMA were negative. Ultrasound of the right upper quadrant was significant for minor common bile duct dilation without gallstones. Abdominal CT to better evaluate the pancreaticobiliary system was benign without any masses. ERCP revealed a minor amount of sludge with a slightly dilated common bile duct (CBD). Liver biopsy revealed intrahepatic centrilobular cholestasis with discrete microvesicular steatosis, but with few eosino-

ACG Case Rep J 2013;1(1):55–57; doi:10.14309/crj.2013.19. Published online: October 8, 2013.

**Correspondence:** Anish Patel, Carl R. Darnall Army Medical Center, 36000 Darnall Loop, Ft. Hood, TX, 76544 (anish.a.patel.mil@mail.mil)

**Copyright:** © 2013 Vishwanathan and Patel. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

phils and no significant lymphocyte infiltrate.

As the patient's hospitalization progressed, bilirubin and transaminase levels began to normalize (Table 1). A more detailed history taken later on during her hospitalization revealed the use of homemade Chinese rice tea, which was used as a natural remedy for her diabetes. Further discussion revealed that ingredients included long grain white rice, herbal tea blend (flavoring without significant tea component), kelp, and boiled water. The patient reported drinking up to 3 cups per day for over the past 2 months. She did not drink any herbal tea during her hospitalization and was advised to stop using it upon discharge. Follow-up in 1 month's time after discontinuation of the herbal tea revealed normalization of bilirubin (total 2.0 mg/dL and direct 1.3 mg/dL), transaminases (AST 17 IU/L and ALT 26 IU/L), and alkaline phosphatase (161 IU/L).

## Discussion

Neutraceuticals are used by 158 million Americans who spent \$17 billion in 2000 and increasingly more every year.<sup>1</sup> A large number of herbal remedies have been found to damage the liver from mild liver enzyme elevations to severe damage leading to death.<sup>2</sup> As several herbal and dietary supplements can cause harmful and sometimes fatal results, it is imperative to obtain a complete medication history that includes supplements.

Under the Dietary Supplements Health and Education Act of 1994 (DSHEA), herbal supplements are not to be marketed using specific medical claims. Herbal supplements, therefore, do not fall under any regulation. Many patients are not aware of this, and have learned that even natural substances can cause adverse symptoms and events under the right conditions. Patients may be reluctant to mention herbal supplements to their physicians due to fear that doctors may not approve of herbal supplements, or fail to mention over-the-counter medications and supplements during routine history taking. Alternatively, providers may not ask about non-prescription preparations during the initial or subsequent visits.<sup>3</sup>

Tea has historically been an important part of the Sri Lankan

culture and Chinese rice tea has been used to control diabetes. Kelp or *Laminaria*, one of the main ingredients in rice tea, is primarily used for weight loss and thyroid disorders, due to its rich source of iodine. Kelp has been associated with adverse reactions with levothyroxine and other thyroid replacements leading to hyperthyroidism.<sup>4</sup> To our knowledge, kelp has not been shown to have a significant adverse effect on the liver.

The mechanism by which kelp leads to a cholestatic syndrome has not yet been elucidated. One theory involves a pseudo-inflammatory process in the liver due to hypothyroidism from excessive kelp consumption. The high iodine content in kelp has been found to decrease normal thyroid function, leading to hypothyroidism.<sup>5</sup> Burnett et al observed an association between elevated liver enzymes and hypothyroidism. They concluded that hypothyroidism involves an undetermined rise in muscle enzymes, which include AST and ALT.<sup>6</sup> Thyroid hormone naturally increases metabolism and oxygenation to tissues.<sup>7</sup> In the hypothyroid patient, liver metabolism is diminished, causing the improper breakdown of products such as bilirubin, potentially leading to jaundice. However, as no definitive mechanism has been agreed upon, more research is needed to elucidate the link between kelp and hepatotoxicity.

To our knowledge, this is the first reported case of hepatotoxicity linked to the use of Chinese rice tea with kelp. Our patient did not report a history of herbal remedy use during the initial evaluation. Her liver enzyme and bilirubin levels slowly declined since Chinese rice tea was absent from the patient's diet during hospitalization. This case underscores the importance of obtaining all forms of iatrogenic supplementation in patients, including any herbal preparations, during routine history taking.

## Disclosures

Author contributions: L. Viswanathan and A. Patel contributed equally to article creation and editing. A. Patel is the article guarantor.

Financial disclosure: There is no financial support or conflict of interest to disclose for this article.

**Table 1.** Bilirubin, Transaminase, and Alkaline Phosphatase Levels During and After Hospital Stay

Test	Day 1	Day 3	Day 5	Day 8	Day 10	Day 20	Day 30
T. Bilirubin (mg/dL)	9.2	14.2	11.3	9.0	7.2	3.2	2.0
D. Bilirubin (mg/dL)	7.4	11.2	9.6	7.4	5.6	2.3	1.3
AST (IU/L)	219	103	99	73	50	25	17
ALT (IU/L)	408	269	201	141	110	34	26
ALP (IU/L)	435	448	400	327	290	195	161

ALP=alkaline phosphatase; ALT=alanine aminotransferase; AST=aspartate aminotransferase.

Disclaimer: The view(s) expressed herein are those of the author(s) and do not reflect the official policy or position of Brooke Army Medical Center or Carl R. Darnall Army Medical Center, the U.S. Army Medical Department, the U.S. Army Office of the Surgeon General, the Department of the Army, Department of Defense or the U.S. Government.

Received: June 6, 2013; Accepted: August 30, 2013

## References

1. Eisenberg DM, Kessler RC, Foster C, et al. Unconventional medicine in the United States. Prevalence, costs, and patterns of use. *N Engl J Med*. 1993;328(4):246–52.
2. Stickel F, Egerer G, Seitz HK. Hepatotoxicity of botanicals. *Public Health Nutr*. 2000;3(2):113–24.
3. Langer S. Herbal medicines are potent healers. In: *Better Nutrition* 1990: 4–5.
4. Miller LG. Herbal medicinals: Selected clinical considerations focusing on known or potential drug-herb interactions. *Arch Intern Med*. 1998;158(20):2200–11.
5. Clark CD, Bassett B, Burge, MR. Effects of kelp supplementation on thyroid function in euthyroid subjects. *Endocr Pract*. 2003;9(5):363–9.
6. Burnett JR, Crooke MJ, Delahunt JW, Feek CM. Serum enzymes in hypothyroidism. *NZ Med J*. 1994;107(985):355–6.
7. Ganong, W. *Review of Medical Physiology*. 22nd ed. New York, NY: McGraw-Hill Companies; 2005.

### Publish your work in ACG Case Reports Journal

ACG Case Reports Journal is a peer-reviewed, open-access publication that provides GI fellows, private practice clinicians, and other members of the health care team an opportunity to share interesting case reports with their peers and with leaders in the field. Visit <http://acgcasereports.gi.org> for submission guidelines. Submit your manuscript online at <http://mc.manuscriptcentral.com/acgcr>.