

# Correspondence

## Pulmonary Edema Following a Licorice Binge

TO THE EDITOR: Licorice has been known to cause hypertension, sodium and water retention, and hypokalemia through the hypermineralocorticoid effect of glycyrrhizic acid.<sup>1</sup> There have been reports of peripheral and facial edema connected with licorice ingestion.

Pulmonary edema, however, is very unusual in conjunction with licorice consumption, and we have been able to find only one report without other comorbid conditions.<sup>2</sup> We here describe a case of pulmonary edema in which the only precipitating event was excessive consumption of licorice over a brief time period. We also review the available medical literature dealing with this subject.

### Report of a Case

A 64-year-old previously healthy man came to the Salt Lake City VA Medical Center after 2 days of dyspnea on exertion, orthopnea, and fatigue. He described having eaten four packages (~1020 g) of black licorice (Hershey Twizzlers) during the previous 3 days. This amount of licorice contains ~3.6 g of glycyrrhizic acid, a compound that ultimately can cause a pseudohypermineralocorticoid condition. The licorice binge was the patient's only deviation from his usual dietary or behavioral practices. On admission, his blood pressure was 180/80 mmHg. On physical examination, he appeared to be in mild respiratory distress with inspiratory crackles over the lower third of both lungs. Oxygen saturation was 90% on room air, potassium 3.5 mmol/l. A radiograph of the chest (Figure 1) showed cardiomegaly compared with prior films, bilateral pleural effusions, and bilateral interstitial edema. Serial electrocardiograms (ECGs), cardiac isoenzymes, and transthoracic echocardiogram were all normal. The patient was given 40 mg furosemide intravenously, several doses of oral enalapril, potassium, and oxygen, with complete resolution of pulmonary edema during the first 2 days in the hospital. A subsequent exercise thallium test did not reveal any pathology. The patient did not take any medications or eat any more licorice on discharge, and on follow-up 2 months later, was normotensive, without any shortness of breath, with a normal potassium level (4.5 mmol/l) and a normal chest radiograph (Figure 2). On outpatient clinic visits 8 and 13 months after discharge, the patient was still normotensive and without any signs of heart failure or hypokalemia.

### Discussion

Only three cases of congestive heart failure after high doses of licorice have been reported previously.<sup>2-4</sup> The

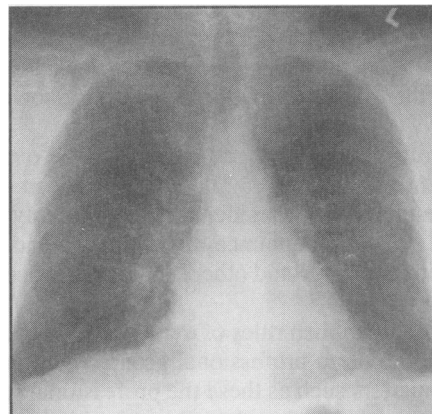


Figure 1.—Chest radiograph on admission with pulmonary edema.

most recent case, and the only one without additional complicated issues, occurred after ingestion of 700 g of licorice candy over 9 days prior to the development of pulmonary edema.<sup>2</sup> In that report, however, the only measurements of heart function were an ECG, treadmill test, and chest radiograph. Edema has been reported previously with licorice, especially in the older medical literature; it has been used to treat Addison's disease.<sup>3,4</sup> In one report in which ulcers were treated by a licorice extract, "cardiac asthma" or edema was noted in 20% of patients.<sup>5</sup> Ours is the first case of pulmonary edema following licorice consumption in which significant structural heart abnormality has been ruled out. Despite the rarity of such occurrences, this consequence of a licorice binge warrants attention.

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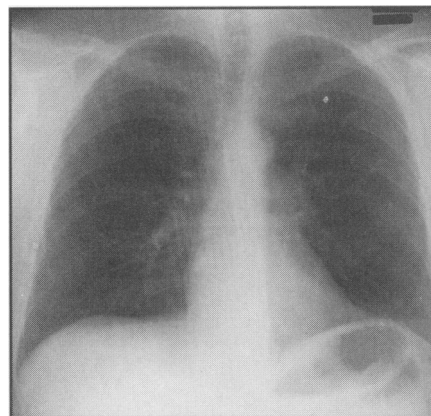


Figure 2.—Chest radiograph 2 months after discharge.

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## Food Poisoning in Flight

TO THE EDITOR: Inflight medical emergencies are rare but can be extremely serious, especially when they occur during extended international flights. In 1992, for example, 75 passengers on a commercial airline flight from Lima, Peru, to Los Angeles were diagnosed with cholera; 10 were hospitalized and one died.<sup>1</sup> These emergencies often present a management dilemma because of the limited onboard medical resources available, the length of time spent in the air, and the sparsity of nearby landing sites. Recently my wife and I, together with our 1-year-old daughter, were flying back to the US from a vacation in Pakistan when we encountered a challenging case of severe food poisoning.

One of our fellow passengers was a 62-year-old woman who was returning to the United States after 3 weeks of missionary work in India. She was healthy and had no significant medical history. Her stay in India had been uneventful. She had eaten her last meal in India just before boarding the airplane. She had a good appetite, and had two inflight meals before our plane arrived in Tokyo. After a short stopover in that city, the plane departed for Los Angeles. Two hours after the inflight dinner was served (roughly 15 hours after she boarded the flight from India), she began to develop severe vomiting and diarrhea accompanied by abdominal cramps so painful and intense that she could not even make it to the restroom. Her diarrhea was profuse, watery, and uncontrolled. She was pale, diaphoretic, and very weak, and the flight crew requested help from any onboard physicians. My wife and I (a practicing internist and a gastroenterology fellow, respectively) volunteered to assist. We found the woman in a semiconscious state in her seat, soiled with feces. She appeared toxic, with sunken eyes and dry mucous membranes. She was awake but very lethargic. We were stunned at how sick and miserable she looked. We immediately placed her flat on the floor and requested the emergency medical kit. We were relieved for a brief moment when we noted that her supine blood pressure was 107/70 mmHg with a pulse of 80 beats per minute. Her abdomen was soft, with mild diffuse tenderness and hyperactive bowel sounds. The medical kit contained a liter of intravenous fluid, along with a few other medications. We inserted an intravenous line, rapidly administered fluids, and gave her 10 mg of prochlorperazine via intramuscular injection to control her persistent vomiting. Flight attendants helped us clean her, but despite all efforts the patient continued to soil herself. At this time Los Angeles was still 7 hours away. With no more intravenous fluids available and with the patient

showing persistent signs of severe dehydration, possible electrolyte imbalance, and impending shock, the situation appeared critical. We discussed the seriousness of her condition with the pilot and flight crew, and we made the decision to land the plane at the nearest airport, Honolulu, Hawaii—still 2 hours away. During this time the patient remained comfortable, with no further episodes of vomiting but with continued diarrhea. Upon our arrival in Honolulu paramedics transported the patient to the nearest hospital and our flight resumed soon after refueling. None of the other passengers developed any symptoms of food poisoning, which suggested that our patient had most likely contracted the infection (possibly salmonella or shigella food poisoning) before boarding the plane in India.

For several hours during the flight my wife and I were stressed and challenged by the severity of the patient's condition and the lack of adequate medical supplies. Making an emergency landing in the interest of the patient was a major decision, since it delayed arrival in Los Angeles for more than 350 passengers, some of whom missed their onward connections. Our unscheduled stopover might well have been avoided if we had had the supplies necessary to alleviate the patient's condition on board.

This was a classic case of food poisoning, with its life-threatening complications of severe dehydration and shock.<sup>2</sup> Our patient could not be sufficiently hydrated; this placed her life in grave danger. Clearly, airlines need to consider improving their onboard emergency medical preparedness. This would mean ensuring adequate and appropriate supplies and perhaps even training crew members to handle inflight medical emergencies. We have written the Federal Aviation Administration (FAA) recommending that airliners carry more intravenous fluids, especially on long international flights.

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