

Use of Amiodarone in a Patient With a Shellfish Allergy

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Abstract: A 65-year-old Caucasian male with a shellfish allergy developed atrial fibrillation and hypotension after coronary artery bypass and duodenal ulcer surgery. Following electrical cardioversion, oral amiodarone was continued chronically without an allergic reaction. There is a common misconception that a shellfish allergy correlates to an iodine allergy. There is little documentation of the association between an allergy to shellfish and an allergy to iodine. Food allergies can be subcategorized based on the involvement of IgE. Upon further investigation, it was discovered that shellfish allergies are not due to the iodine component, but rather, to a protein found in the shellfish. Amiodarone can be safely used in patients with shellfish allergies. A shellfish allergy does not necessarily imply an iodine allergy.

Key Words: amiodarone, shellfish, iodine, allergy

There is a common misconception that a shellfish allergy is equivalent to an iodine allergy.^{1,2} In actuality, there is no evidence which links a shellfish allergy to the iodine contained in those foods, and the link between the two appears to have been spread by word of mouth alone.² This misconception results in a reluctance to use amiodarone or other iodine-containing medications in patients with shellfish allergies.

Case Report

A 65-year-old white man with mild idiopathic hypertrophic subaortic stenosis and normal left ventricular systolic function underwent three-vessel coronary artery bypass surgery on. He reported allergies to shellfish and penicillin. Almost two weeks later, the patient was re-admitted

with hypotension and rectal bleeding requiring two units of packed red blood cells (PRBCs) and IV hydration. Enteric-coated aspirin (325 mg/d) was discontinued. His other medications were metoprolol 25 mg b.i.d., digoxin 0.25 mg/d, furosemide 40 mg/d, potassium 20 mEq/d, Amaryl 2 mg/d and nystatin suspension q.i.d. The following day, the patient's gastrointestinal bleeding recurred and 7 U of PRBCs were transfused. Two duodenal ulcers were found endoscopically, requiring laparotomy and suture ligation of the ulcers. The patient remained hemodynamically stable for 3 days until he developed atrial flutter with a 2:1 atrioventricular conduction at a rate of 140 beats per minute with hypotension. Synchronized electrical cardioversion at 100 J (J) and then 200 J restored sinus rhythm. Procainamide (500 mg) was given intravenously followed by a 2 mg/min infusion. A subsequent echocardiogram revealed cardiomyopathy, and procainamide was discontinued 3 days later. Amiodarone hydrochloride is an antiarrhythmic agent that contains 37.3% iodine and is contraindicated in patients with a known hypersensitivity to the drug.³ It has been our practice that patients with a shellfish allergy are also considered to be allergic to iodine¹ and are entered as such into the computerized patient profile. When the current patients' amiodarone order was entered, the computer flagged the order as an allergic interaction. The patients' reaction to shellfish was verified, but no documented link was found in the literature between these allergies. Oral amiodarone was given cautiously to the patient without incident, and he was discharged on 200 mg twice daily with no signs of a drug allergy.

Key Points

- There is no documentation that supports the link between a shellfish allergy and an iodine allergy.
- Patients with an allergy to shellfish are actually allergic to tropomyosin, a protein found in shellfish.
- Those patients with allergies to shellfish should be able to safely receive iodine-containing compounds without concern of cross sensitivity.

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Discussion

Food allergies, such as shellfish allergy, are relatively common in the general population. Approximately 25% of children and adults claim to have a food allergy, yet the actual prevalence, according to epidemiologic studies, is 1.5%.⁴ It is important to understand the terminology used when discussing adverse reactions to food. "Food allergy" is often used synonymously with food hypersensitivity, an immunologic or allergic reaction to food or food additives. "Food intolerance," also referred to as nonallergic food hypersensitivity, usually describes an abnormal response to food and may result from toxins, pharmacology or an abnormal response from the host.⁵ If an adverse reaction to a food is mediated by the interaction between a food antigen and IgE, that reaction may be considered allergic in nature.⁶⁻⁸ Oral allergy syndrome is a type of hypersensitivity reaction that is localized when other organ system involvement does not occur. Patients may experience oral itching or tingling after ingesting the causative food.⁹ Food allergies are usually caused by a specific food protein that induces an immunologic response. These proteins have a molecular weight between 10,000 and 60,000, are heat stable and proteolysis resistant.⁴ Food allergies can be stratified into either IgE-mediated or non-IgE-mediated (eg, cell-mediated) hypersensitivity reactions. IgE-mediated reactions occur when IgE antibodies on basophils and mast cells bind to food antigens and induce release of mediators, such as histamine, leukotrienes, cytokines and prostaglandins.^{1,4,5} IgE-mediated reactions occur within minutes after ingestion and can present in various ways.⁵ The oropharynx, gastrointestinal tract, skin, lungs, nose and eyes are usually involved and, in severe cases, the cardiovascular system may be involved. The most common immune-mediated food reactions are angioedema and urticaria, resulting from food proteins entering the skin via circulation.⁹ Non-IgE-mediated reactions, or T-cell-mediated reactions, usually manifest in the gastrointestinal tract as enterocolitis, enteropathy or celiac disease (also known as gluten-sensitive enteropathy).^{4,10}

Shellfish allergies are most likely the result of tropomyosin, an allergen in shrimp and lobster. Tropomyosins are a protein found in invertebrates, such as shellfish, and vertebrates, such as fish, and are needed for muscle contraction in these creatures.¹¹ Tropomyosins are present in other foods as

well, such as beef, pork, and chicken, but rarely cause reactions in these foods.⁷ In theory, any food that contains a protein could result in an allergic reaction.¹² The possibility of a correlation between an allergy to shellfish and an iodine allergy is highly unlikely. Atoms or molecules are not complex enough to be antigenic. At most, they could act as haptens, an agent that may provoke a hypersensitivity response when complexed to a carrier but will not act as an antigen alone.

There is no evidence that the iodine content of shellfish is responsible for allergic or hypersensitivity reactions. There is some evidence of cross-reactivity between a seafood allergy and sensitivity to contrast material, which typically contains iodine. However, the relative risk of a reaction to contrast material in a patient with an allergy to shellfish is similar to the relative risk in a patient with other allergies.¹

Shellfish allergies are most likely the result of tropomyosin, an allergen in shrimp and lobster.

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