

Allergy, Shellfish

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Introduction

Shellfish reactions can occur as a result of immune system mediated effects and also through non-immunological processes. It is important to determine the underlying cause for the patient's presentation to best direct therapy and understand management implications. There is a wide array of consumables that falls under the category of shellfish, including crustaceans (such as crab or shrimp) or mollusks (such as clams or scallops), and this adds to the difficulty in dealing with "shellfish" allergies. Not all individuals react to both. One group notes only 14% cross-reactivity between crustacean and mollusk allergies.

Etiology

Reactions or symptoms due to shellfish consumption may be attributable to a variety of factors. Some reactions are not a true allergy and are due to infectious agents such as parasites, bacteria, viruses, and parasites. Bacteria implicated with shellfish include *Vibrio*, *Listeria*, and *Salmonella*. Toxin-mediated reactions may also occur and trigger symptoms such as ciguatera or saxitoxin. True allergic reactions may occur to substances in the shellfish (such as tropomyosins), or from a component ingested with the shellfish such as spices or chemical additives.

Epidemiology

Fish and shellfish combined are suspected to be responsible for a significant portion of allergic reactions. The actual incidence of shellfish allergies is difficult to identify due to the numerous possible etiologies and underreporting. Even in cases that a true allergic reaction is identified, it is difficult to determine if there could have been a chemical agent or another additive that could have been the triggering agent. Overall, food allergens are responsible for an approximate 30,000 anaphylactic events. Foods as a whole are responsible for around one-third of anaphylaxis cases.

Pathophysiology

There are multiple allergens responsible for crustacean allergies, with tropomyosins being one of the better-characterized agents. Tropomyosins can be heat-stable and act through an immunoglobulin E (IgE)-dependent mechanism with antibody binding. Other agents responsible include a substance thought to be similar to arginine kinase, a myosin light chain, and a protein that binds to sarcoplasmic calcium. The agents responsible for mollusk allergies are not well identified.

Toxicokinetics

While shellfish toxicity is secondary to a non-allergic pathway, it is important to be aware of in cases difficult to differentiate. As mentioned above there are multiple potential toxins to be aware of in shellfish. Saxitoxins are responsible for causing paralytic shellfish poisoning and are secondary to dinoflagellates. The toxin is a voltage-gated sodium channel antagonist, which can result in neurologic symptoms including paralysis and death from respiratory suppression. In a small case series, the effects were noted to start to resolve after four hours, with the patient returning to normal after 12 hours.

Neurotoxic shellfish poisoning can also occur and may resemble paralytic shellfish poisoning, but is much milder. Symptom onset is within three hours and includes gastrointestinal symptoms in addition to neurologic symptoms. Symptoms include reversal of hot and cold temperature sensation, paresthesias, aches, nausea, vomiting, and diarrhea. It is also believed secondary to a dinoflagellate, and specifically due to brevetoxins.

Another disease state secondary to shellfish is amnesic shellfish poisoning, which occurs due to domoic acid. These patients demonstrate gastrointestinal symptoms within 24 hours of ingestion and may develop neurologic symptoms such as confusion, disorientation, or memory loss within 48 hours.

Azaspiracid shellfish poisoning is due to marine toxins that can accumulate in shellfish and trigger severe gastrointestinal symptoms. While the toxin may be secondary to dinoflagellates, its origin is not definitively known. Symptoms last for two to three days, and the substance can induce widespread organ damage.

The mildest toxin-associated illness found with shellfish ingestion is diarrhetic shellfish poisoning, and it is also associated with biotoxins from dinoflagellates. Symptoms are primarily gastrointestinal, though may also include fevers, chills, or headaches. Timing is generally between 30 minutes to six hours after ingestion.

History and Physical

Asking the patient about recent ingestion or their handling of crustaceans or mollusks will be helpful in narrowing etiologic agents. Most allergic reactions begin within minutes to a few hours after ingestion of the food. The severity of symptoms can vary widely from one individual to another. Mild allergies will manifest with pruritus and urticaria, while severe cases can have true anaphylaxis with respiratory compromise such as angioedema or wheezing and hypotension. Other signs and symptoms associated with shellfish allergies are atopic dermatitis (eczema), coughing or sneezing, coryza, circumoral paresthesias, nausea, diarrhea, vomiting, dizziness, and fainting.

Evaluation

The evaluation and diagnosis of shellfish allergy in an acute setting are made on clinical grounds as no rapid tests exist to diagnose this entity accurately. Assessment of vital signs, with a particular focus on respiratory status and blood pressure, is crucial in distinguishing anaphylaxis from a more benign course. A thorough examination of the oropharynx and auscultation of lung sounds to detect edema or wheezing is important. Many patients will have gastrointestinal symptoms, so a thorough exam of the abdomen is also advised. Close examination of the skin for exanthems or edema should also occur.

Treatment / Management

There is no specific treatment for shellfish allergies. Intravenous fluids are often given to patients who have been vomiting. Standard allergic reaction therapy includes antihistamines (H1 and H2) and steroids. In cases of anaphylaxis intramuscular (IM) or intravenous (IV) epinephrine should be given immediately. This should be followed by antihistamines, steroids and IV fluids. In rare cases, refractory to standard treatment intubation may be required to protect the airway. The duration of symptoms and response to treatment is highly variable, and there is no one agreed upon period of observation. In general, benign presentations that respond to standard treatment and improve while in the emergency department can be safely discharged home with oral antihistamines and steroids with clear instructions to return for worsening symptoms. True cases of anaphylaxis should be admitted for further monitoring and close observation.

Following treatment, patients should be instructed to avoid the offending agent or food. For example, patients who have an allergic reaction triggered by crab should avoid other crustaceans. Despite avoidance, consideration of a prescription for an epinephrine auto-injector may be wise due to the potential for anaphylactic reactions and cross reactivity.

Other Issues

Shellfish allergies do not increase the risk of radiocontrast material allergic reactions. The myth that shellfish allergy is secondary to iodine is still prevalent despite literature despite this information having been dispelled. With that noted, any food allergy or a history of atopy is associated with an increased risk of reaction to contrast.

Questions

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