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CASE REPORT

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Anaphylaxis after prick-to-prick skin test to seafood allergy: A rare adverse event

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Abstract

Allergies to seafood are common all over the world. The prick-to-pricktest is used to diagnose allergic reactions. In this article, a femalepatient suffered an anaphylactic reaction 5 minutes following a Prick-to-Prick skin test. Therefore, it is important to stratify, recognize and treatthe anaphylactic reaction promptly.

KEYWORDS

anaphylaxis, diagnosis, prick-to-prick skin test, seafood allergy

1 | INTRODUCTION

Fish is one of the most common foods responsible for allergic reactions worldwide.[1] Prick-to-prick skin test (PTPST) is an appropriate diagnostic method to demonstrate immediate IgE-mediated allergic reaction due to its safety, nonetheless, in high-risk patients, it may lead to a systemic allergic reaction. Anaphylaxis can be triggered by PTPST in 0.02% of cases.[2] Therefore, all healthcare providers need to be aware of this possibility and recognize its onset.[1,2] In Ecuador, no case of anaphylaxis has been reported following prick-to-prick skin testing with seafood.

2 | CASE REPORT

A 23-year-old female came to our service complaining of runny nose, sneezing, itchy nose, throat, eyes, and post-nasal drip. Three years ago, she reported a dry cough and rash triggered by fish ingestion that resolved within 10 min after taking an antihistamine she does not recall its name. Her past medical history includes rhinitis and long-standing asthma initially managed with salbutamol and switched 1 year ago to budesonide/formoterol plus antihistamines. During her visit, we obtained a fractional exhaled nitric oxide (FeNO) of 21 ppb and performed a skin prick test (SPT) using the Immunotek commercial kit (Spain) that was positive for *Dermatophagoides pteronyssinus*, *Blomia tropicalis*, *Periplaneta americana*; however, bluefish, tuna, and crab were undetermined (Figure 1A).

Antihistamines were prescribed for her allergic rhinitis for 15 days and then discontinued during the week preceding the second test to rule out an allergy to bluefish, tuna, and crab. A PTPST was performed using raw and cooked fresh fish (tilapia, salmon, and tuna) and shellfish (king prawn, crab, and shrimp). Informed consent was

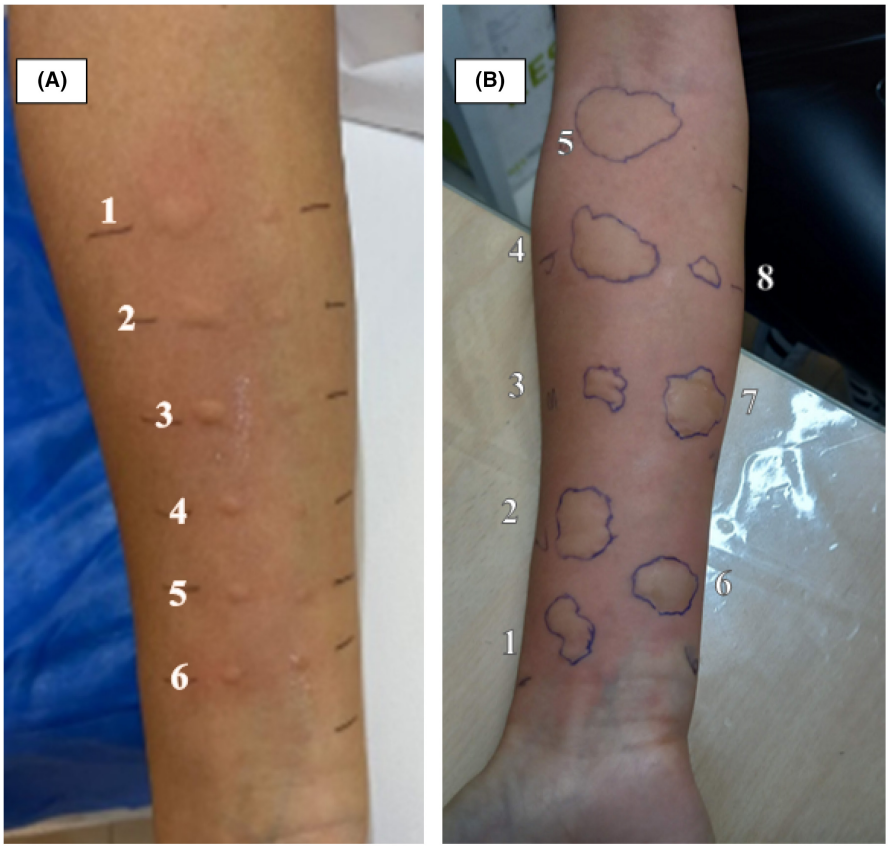

FIGURE 1 (A) Skin prick test using commercial extracts, positive to (1). *Dermatophagoides pteronyssinus*, (2). *Blomia tropicalis*, (3). *Periplaneta americana*, using histamine papule of 5 mm as reference. (4). Bluefish, (5). tuna, and (6). crab were undetermined; (B) Prick-to-prick skin test positive for (1). Tuna raw, (2). Tuna cooked, (3). Crab cooked, (4). Shrimp raw, (5). Shrimp cooked, (6). king prawn raw, (7). King prawn cooked, (8). Histamine control.

obtained. Using lancets, we prick the skin with one drop of a mixture of 1 g of crushed fish and shellfish with 2 ml of normal saline. Wheals of 10–25 mm diameter developed within 2 min (Figure 1B). Five minutes after applying the last allergen (cooked king prawn) the patient complained of localized itching that evolved into a generalized rash, with the presence of hives on the arms and neck. Fifteen minutes later, the patient reported a sore throat and cough, which led to difficulty breathing, wheezing, and tachypnoea. On physical examination, heart rate was 120 bpm, and respiratory rate was 28 per minute.

The patient was transferred to the emergency room and given intramuscular (IM) epinephrine at 0.01 mg/kg, 2 mg of clemastine intravenously (2 mg/2 ml), salbutamol nebulization, and oxygen at 2 L/min. Her symptoms resolved within 30 min, and she was monitored for 6 h. On her follow-up visit, she was instructed to avoid all seafood consumption and was provided with an anaphylaxis emergency action plan that included an epinephrine auto-injector.

3 | DISCUSSION

One of the most common foods responsible for allergic reactions in the overall population is fish.[1] The oral food challenge test (OFC) is the gold standard for food allergy diagnosis.[1] However, prick tests and allergen-specific IgE tests are frequently used as the first diagnostic test because they are rapid and inexpensive. PTPST has higher sensitivity (90%–100%) and negative predictive value (96%)[3] compared with SPT and allergen-specific IgE.[4] Even though the anaphylactic risk is low after skin testing, the use of fresh food allergens is the second most common factor to induce anaphylaxis.[5] Systemic reactions are reported in 15 to 23 per 100,000 SPTs, with a 0.02% risk of anaphylaxis,[6] this is the reason why we highlight the supervision of an allergist during this diagnostic approach.

A previous report described an overall risk of 0.008% systemic reactions from 34,905 PTPST using food allergens, with no severe reactions.[7] In addition, two previous studies have reported similar times for developing symptoms of anaphylaxis to fresh fish following PTPST, as well as a positive response to the treatment used.[8,9] To prevent life-threatening cardiovascular and respiratory outcomes, it is essential to recognize and treat anaphylaxis.[9] The symptoms of our patient met the diagnostic criteria for anaphylaxis.[5]

Ribeiro et al.[10] reported there is wide variation in physicians' knowledge about anaphylaxis diagnosis and treatment in different regions, the gap is wider in Ibero-American countries.[10] The fact that anaphylaxis mimics common conditions, such as asthma and urticaria, may play a role in its missed or delayed diagnosis.[5] Anaphylaxis management follows: removing the cause, administering

IM epinephrine, supplemental oxygen, IV fluid resuscitation, and keeping the patient supine, as described in the case of this patient.[5] Adjunctive agents to epinephrine are recommended, which include H1 and H2 antihistamines, bronchodilators, and corticosteroids.[5]

Ribeiro et al.[10] reported nearly 30% of physicians administer IM adrenaline only in shocked patients, not when symptoms appear, missing a great opportunity to avoid shock as the final outcome.[10] Only 23.8% of non-specialized ibero-American physicians elect IM adrenaline as the first-line option for anaphylaxis.[10] This study emphasized the need to promote international guidelines on the diagnosis and management of anaphylaxis among specialists and non-specialists.

A biphasic reaction can be present during anaphylaxis.[9] Monitoring during 6 to 8 h if they have respiratory compromise and at least 12–24 h if hypotension/cardiovascular instability occurs.[5,9] Our patient remained under observation for 6 h. Since she did not meet the factors leading to the need for prolonged observation, she was discharged. Our patient presented criteria for an adrenaline auto-injector,[5] being a challenge in our country, where adrenaline auto-injector is still not commercially available.

4 | CONCLUSIONS

The possibility of anaphylaxis during PTPST should not be underestimated. Tests with fresh foods have more risks, and it is better to use the commercial allergen extracts, but if unavailable, diluting the allergen, and minimizing the number of allergens tested during prick tests should be considered, especially with PTPST.[9] Clinical staff performing PTPST faces a lack of guidelines regarding prick test-related anaphylaxis, who should be well-trained and equipped to treat severe reactions[4,7] and stratify high-risk patients including those with a previous anaphylactic reaction, dermographism, children, pregnant women, poorly treated asthma, severe eczema, and high bronchial hyperreactivity.[4]

A reasonable period of observation after the test of 20–30 min should be addressed. A suitable environment under medical supervision once a patient's risk has been established could be implemented. Physicians should closely monitor the patient and be prepared to detect and treat anaphylaxis episodes promptly and appropriately to prevent major life-threatening complications.

AUTHOR CONTRIBUTIONS

Ivan Cherrez-Ojeda contributed to conceptualization, formal analysis, resources, writing—original Draft, writing—review and editing, and supervision. Karla Robles-Velasco and María F. Osorio contributed to writing—original draft and writing—review and editing. María José Farfán Bajaña and Maria Intriago-Alvarez contributed to writing—original draft. Hassan M. Mobayedh and Maryam Ali Al-Nesf contributed to conceptualization, formal analysis, writing—original draft, writing—review and editing, and supervision.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article.

CONSENT

The patient provided her consent to Respiralab and Universidad Espiritu Santo to publish protected health information, including treatment information and diagnoses for *Clinical Case Reports*, and additionally for materials for teaching, research, scientific meetings, other professional journals, medical books, broadcasts, advertising, and other purposes.

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