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A Suspected Allergic Reaction to Boal Fish (Wallago Attu)

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Consumption of fish has increased around the globe due to its high nutritional value and this has led to an increase in incidence of allergic reactions to fish. Reactions to fish are not only mediated by the immune system causing allergies but are often also caused by proteins, metals, various toxins and parasites. Allergic reactions to fish can range from being mild and self-limiting to serious and life threatening. We report a case of an adult with suspected allergic reaction to Boal fish (Wallago Attu) who developed contact dermatitis during marinating process. Application of steroids and administration of oral antihistaminic led to a quick recovery.

KEYWORDS: Allergy, Contact Dermatitis, Parvalbumin

INTRODUCTION

Seafood has got a high content of nutrients mandatory for a good health. Fish has always been the staple food in coastal areas, but its consumption has risen tremendously worldwide. A large variety of international cuisines are available at eating joints and infinite cooking videos can be found online. Due to lockdown and work from home policies, during this COVID-19 time, countless people have inculcated the hobby of cooking. Seafood can provoke serious IgE antibody mediated adverse reactions in susceptible individuals.

Allergy to fish seems to vary with eating habits, type of processing, and fish species. Different routes include ingestion, skin contact or inhalational. Although most allergic reactions to fish happen when someone eats fish, sometimes people can react to touching fish or breathing in vapors from cooking fish. Approximately, ten percent of subjects having allergy to seafood report more severe reactions caused by skin contact or inhalation than by ingestion.²

The major fish allergen characterized is parvalbumin in addition to several less well-known allergens. Common symptoms of fish allergy include hives, skin rash, nausea, stomach cramps, indigestion, vomiting, diarrhoea, runny nose, sneezing, headaches and are mild to moderate in severity. Less common symptoms like anaphylaxis and shock can be life threatening. Wallago Attu is a freshwater catfish of the family Scuiridae, native to Southeast Asia. It is commonly known as helicopter catfish,

wallago catfish or the Bengal Boal and is one of the fish species that has been used for consumption in Southeast Asia since historic times.² We report a case of an adult with suspected allergic reaction to Boal fish. Written informed consent to publish this case report was obtained from the patient.

CASE REPORT

A 33-year-old male presented to us with a 24-hour history of redness and itching on the back of right hand accompanied with mild pain. The subject, a public health dentist by education, had been working as a pharmacovigilance scientist with a research organization since past 4 years with no contact with patients or dental material. Also, he had been working from home since March 2019 due to COVID outbreak ruling out any occupational exposure. There was no relevant medical history. He had been taking regular dose of chewable Vitamin C tablet and zinc supplements for 2 years and had not been exposed to any other medication since past few months. One day before presentation, while the subject was preparing dinner, he reported to have a sudden onset of redness and itching on back side of his hand accompanied with mild pain (Figure 1).

On detailing, it was brought to our notice that he had cooked boal fish and the rash appeared after marinating fish. Similar reaction had occurred to his wife who cooked same variety of fish a few days back but was self-limiting and was gone in a few hours. This reaction was thought to be unlikely due to ingredients used in marinating (corn flour, gram



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Figure 1. Clinical Presentation

flour, ginger paste, garlic paste, curd, lemon, salt, red chilli powder) as the same were being used daily for other food preparations. Moreover, such reaction was not seen while marinating other fish varieties. The patient was frequently consuming the same type of fish, but never experienced this before. A diagnosis of fish induced allergic contact dermatitis was suspected and the subject was asked to get evaluation done for IgE sensitization and challenge testing to which he refused. The patient was prescribed fluticasone propionate ointment and paraffin containing emollient, both twice daily for 2 weeks and oral levocetirizine twice daily for first week followed by once daily for second week. He was also advised to abstain from fish and fish products. He showed up after 15 days for a follow up visit with resolution of symptoms (figure 2).



Figure 2. Resolution of Symptoms

DISCUSSION

We present a report of an adult with suspected boal fish induced allergic contact dermatitis. Sensitization can result not only by consuming fish but also by skin contact or by inhalation of vapors during processing of fish.³ Allergic symptoms may

vary from oral allergy syndrome, cutaneous involvement including angioedema, gastrointestinal symptoms such as nausea and vomiting, or anaphylaxis with respiratory and circulatory involvement.⁴⁻⁶ Till date, allergens from many fish species have been described. Major allergen is parvalbumin which is a heat stable, calcium-binding protein present in the muscle of nearly all types of fish. Other fish allergens include aldolase, enolase, vitellogenin and tropomyosin. Cross-reaction can be seen among several types of fish, so once an individual becomes sensitized to parvalbumin, they tend to exhibit allergic reactions to other variety of fish as well.^{7,8} Onesimo et al. reported a case of contact urticaria involving specific IgE antibodies to parvalbumin.⁹ A recent experimental study demonstrated that the concomitant administration of antacids enhanced the IgE sensitization of mice to the major fish allergen parvalbumin.¹⁰ In our case, it is likely that the patients' fingers were moist when handling fish, potentially creating an ideal environment for antigen proteins to be absorbed through the skin and eventually leading to percutaneous sensitization to fish.¹¹ Fish allergy might not be permanent in all affected subjects. As per the results of a surveyed sample in telephonic survey conducted by Sicherer SH, 3.5% of the subjects reported loss of that allergy.¹² Abstinence from the food causing allergy is an important rule of treatment. The duration of avoiding seafood until the tolerance attainment is not known but it probably varies widely and probably depends on many factors like onset age, reaction severity, magnitude of sensitization, type of symptoms and extent of avoidance.^{13,14} However, the chances are bright that recurrence of intolerance might occur.¹⁵

The symptoms may be different at different exposures. Seitz et al reported a case of a truck driver in charge of seafood deliveries whose clinical symptoms of allergy gradually progressed from contact urticaria to generalized urticaria and later anaphylaxis and occupational asthma.¹⁶ Affected subjects often report reactions to seafood when prepared in a certain way but not in another and this phenomenon might be attributed to possible contamination with another food allergen or additive. Activities like drying, salting, freezing, boiling or grilling might decrease or intensify the potential to cause allergic reactions. Cooking can sometimes affect tolerance as the allergenicity to certain fish proteins seems to decrease by heat.¹⁷ But

this does not hold true always. Allergens in Seafood are usually heat stable and are not easily destroyed during cooking. Occasionally, some individuals seem to tolerate canned or tinned fish, but are not able to tolerate the same fish when freshly prepared. It has also been reported that storage conditions might impact the skin irritancy of fish as fish kept on ice for several days increases the severity and frequency of symptoms like erythema, stinging and itching.¹⁸ The presumptive diagnosis of fish allergy can generally be made based on a precise clinical history combined with additional IgE testing, in vivo skin prick testing, in vitro quantification of IgE, immunoCAP, and confirmation by challenge testing unless the reactions borne by it are too severe or life-threatening.

A negative skin test result or in vitro test result should alert the physician to possible reactions to substances in fish other than fish protein allergens. Our subject was neither evaluated for IgE sensitization nor verified by means of challenge testing as he refused for the same due to untold reasons. Treatment is focussed on steroids, anti-histaminics, emollients and most importantly avoidance of allergens. This strategy led to complete resolution of symptoms in our patient.

CONCLUSION

Increased fish consumption has led to rise in incidence of allergy. Not much literature is available on allergic reactions due to skin contact with fish. Our patient with suspected boal fish induced allergic contact dermatitis was successfully treated with complete disappearance of symptoms. A detailed research is required on the molecular structures of fish allergens with emphasis on the immunological and clinical reactivity in order to improve the management of medically significant allergic reactions. The progress in the analysis of fish allergens will not only amplify our knowledge regarding the physiological basis of fish allergy but also set down the foundation for the evolution of diagnostic and therapeutic measures for allergic reactions triggered by these fish allergens.

REFERENCES

1. Bahna SL. You can have fish allergy and eat it too!. *J Allergy Clin Immunol.* 2004;114(1):125-6.
2. Higham CFW, Kijngam A, editors. *The Origins of the Civilization of Angkor: Volume VI: The Excavation of Ban Non Wat: The Iron Age, Summary*

and Conclusions.1st edition. Bangkok: Fine Arts Department of Thailand;2012.

3. Taylor SL, Baumert JL. Worldwide food allergy labeling and detection of allergens in processed foods. *Chem Immunol Allergy.* 2015;101:227-34. <https://doi.org/10.1159/000373910>
4. Helbling A, Heydet R, McCants ML, Musmand JJ, El-Dahr J, Lehrer SG. Fish allergy: is cross-reactivity among fish species relevant? Double-blind placebo-controlled food challenge studies or fish-allergic patients. *Ann Allergy Asthma Immunol.* 1999;83:517-23
5. Sicherer SH, Munoz-Furlong A, Sampson HA. Dose response in double-blind placebo-controlled oral food challenges in children with atopic dermatitis. *J Allergy Clin Immunol* 2000;105:582-6.
6. Bock SA, Munoz-Furlong A, Sampson HA. Fatalities due to anaphylactic reactions to food. *J Allergy Clin Immunol.* 2001;108:191-3.
7. Heizmann CW: Parvalbumin, an intracellular calcium-binding protein; distribution, properties and possible roles in mammalian cells. *Experienta* 1984;40:910-21.
8. Gerday CH. Soluble calcium-binding proteins from fish and invertebrate muscle. *Mol Physiol.* 1982;40:910-21.
9. Onesimo R, Giorgio V, Pill S, Monaco S, Sopo SM: Isolated contact urticarial caused by immunoglobulin E-mediated fish allergy. *Isr Med Assoc J.* 2012;14:11-13.
10. Untersmayr E, Scholl I, Swoboda I, Beil WJ, Forster-Waldl E, Walter F et al. Antacid medication inhibits digestion of dietary proteins and causes food allergy: a fish allergy model in BALB/c mice. *J Allergy Clin Immunol.* 2003; 112:616-23.
11. Sano A, Yagami A, Suzuki K, Iwata Y, Kobayashi T, Arima M, et al. Two Cases of Occupational Contact Urticaria Caused by Percutaneous Sensitization to Parvalbumin. *Case Rep Dermatol.* 2015;7(2):227-32. <https://doi.org/10.1159/000439080>
12. Sicherer SH, Munoz-Furlong A, Sampson HA. Prevalence of sea food allergy in the United States determined by a random telephone survey. *J Allergy Clin Immunol* 2004;114:159-65.
13. Kajossari M. Food allergy in Finnish children aged 1 to 6 years. *Acta Paediatrica Scand* 1982;71:815-9.
14. Solensky R. Resolution of fish allergy: a case report. *Ann Allergy Asthma Immunol* 2003;91:411-2.
15. De Frutos C, Zapatero L, Rodriguez A, Barranco R, Alonso E, Martinez MI. Re-sensitization to fish after a temporary tolerance. *Allergy* 2003;58:1067-8.
16. Seitz CS, Bröcker EB, Trautmann A. Occupational allergy due to seafood delivery: Case report. *J Occup*

Med Toxicol. 2008;3:11. <https://doi.org/10.1186/1745-6673-3-11>.

17. Bernhisel-Broadbent J, Strause D, Sampson HA. Fish hypersensitivity.II: Clinical relevance of altered fish allergenicity caused by various preparation methods. J Allergy Clin Immunol 1992;90:622-9.

18. Halkier-Sorensen L, Thestrup-Pedersen K. Skin irritancy from fish is related to its postmortem age. Contact Dermatitis 1989, 21: 172-178. <https://doi.org/10.1111/j.1600-0536.1989.tb04731.x>.

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