

Letter to the Editor



Received: Sep 26, 2017

Accepted: Jan 4, 2018

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Jellyfish ingestion was safe for patients with crustaceans, cephalopods, and fish allergy

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To the editor,

For centuries, the umbrella of edible jellyfish has been consumed in Asia, usually cooked and sliced in salads. Edible jellyfish has a type of collagen which acts as an auxiliary agent in preventing arthritis and some peptides with antihypertensive effect [1].

As well as the potential health benefits of jellyfish consumption, the United Nations Food and Agriculture Organization has recommended the use of jellyfish in food and cosmetics, in attempt to recover falling fish stocks [2]. Hence, a worldwide expansion of its consumption is expected.

Portugal has a native Rhizostomeae jellyfish, named *Catostylus tagi* by Haeckel in 1869, which occurs abundantly in the summer in the Sado and Tejo estuaries. Previous studies demonstrated that the umbrella of this species contains relevant concentrations of very long chain fatty acids, antioxidants, collagen, and taurine [3], making it a possible source of food supplements. However, jellyfish consumption is not common in Portugal although the country has one of the highest seafood consumption per capita in Europe (61.1 kg/capita) [4]. One of the reasons for this disinterest may be the well-known deleterious effects of jellyfish stings, such as acute cutaneous inflammation with erythema, swelling, vesicles, and bullae [5]. These reactions are attributed to the compounds stored in its nematocysts which are not present in the edible umbrella. Also, jellyfish occasionally induce cutaneous lesions through delayed allergic mechanisms [5, 6] whereas immediate anaphylactic allergy to jellyfish stings is extremely rare, and there are only 2 case reports of anaphylaxis by jellyfish stings [7, 8].

A recent study reports the first case of anaphylaxis, produced by the ingestion of salt-preserved jellyfish. Curiously, the patient was a surfer and was frequently stung by jellyfish [9].

As far as we know, the possibility of allergic reactions attributed to cross reactivity has not been ruled out yet, particularly in shellfish and fish allergic patients to whom small traces of the potential allergen may trigger severe reactions. Our aim is, therefore, to establish the safety of jellyfish ingestion in seafood allergic patients and, secondarily, if they liked it and were willing to introduce jellyfish in their diet.

Adult subjects (18–65 years) with evidence of IgE-mediated sensitization and severe systemic reactions to crustaceans, cephalopods and/or fish were selected. Participants were recruited

& editing: Luís Amaral, António Raposo, Zilda Morais, Alice Coimbra.

Table 1. Demographic and clinical characteristics of the seafood allergic patients (n = 20)

Characteristic	Value
Age (yr)	38.5 (29.5–44.5)
Female sex	14 (70)
House dust mite sensitization	15 (75)
Polysensitization	11 (55)
Atopic comorbidities	18 (90)
Allergic rhinitis	17 (94)
Asthma	10 (56)
Food allergy index reaction	
Anaphylaxis	12 (60)
Cutaneous	20 (100)
Other*	12 (60)
Time since last seafood allergic reaction (yr)	2 (0.9–2.7)
Shrimp allergy	14 (70)
Wheal size of skin prick test with shrimp extract	5.7 ± 2.6
Wheal size of skin prick-to-prick test	10.1 ± 6.3
Shrimp sIgE (kU/L)	13.4 ± 28.7
Cephalopod allergy	11 (55)
Wheal size of skin prick test with cephalopod extract	3.8 ± 3.2
Wheal size of skin prick-to-prick test	8.2 ± 4.1
Cephalopod sIgE (kU/L)	16.3 ± 11.4
Fish allergy	5 (25)
Wheal size of skin prick test with codfish extract	4.7 ± 4.1
Wheal size of skin prick-to-prick test	9.3 ± 2.7
Parvalbumin (r Gad c 1) sIgE (kUA/L)	2.8 ± 1.6

Values are presented as median (interquartile range), number (%), or mean ± standard deviation. sIgE, specific IgE.

*Dyspnea, throat tightness, oropharyngeal pruritus, hypotension, emesis, abdominal pain, and diarrhea.

from the food allergy unit of an Allergy Department of a University Hospital. A control group of atopic, nonfood allergic individuals were also invited to participate.

Twenty-five subjects were enrolled, including 20 patients with severe seafood allergy, most of them also had atopic comorbidities (**Table 1**) and 5 atopic, nonfood allergic, controls.

Skin prick-to-prick tests (SPPT) with raw and boiled umbrella were performed, as well as challenges with *C. tagi* umbrella in all subjects. The challenges were carried out on the same day. Four pastes were made with tiny round portions of cooked *C. tagi* mixed with normal mayonnaise at 5%, 10%, 15%, and 20% w/w, samples 1, 2, 3, and 4 respectively, with 15-minute intervals. The snack pastes were prepared a few minutes before consumption by spreading the paste on wheat toasts. Upon completion, subjects remained in observation and, in case of any delayed reaction, participants were instructed to contact the investigators. A 9-point hedonic scale was applied after sensory analysis and they were also asked to answer a short questionnaire.

The research ethics committee approved the study (Ethics Committee Centro Hospitalar São João / Faculty of Medicine, University of Porto - Ref. no CES 41-15, date of approval: 19 March 2015), and signed informed consent was obtained from all subjects.

All the participants had negative SPPT to raw or boiled *C. tagi* umbrella.

None of the 20 seafood severe allergic patients, nor the control subjects had immediate or late phase reactions to any of the pastes. No subjective symptoms were reported and therefore no medical intervention was necessary.

The participants rated the samples with a mean score of 6.75 ± 0.91 . Seventeen of the seafood allergic patients (85%) were willing to introduce *C. tagi* into their diet.

This study shows that *C. tagi* umbrella may be safely consumed by seafood allergic individuals. All the patients with severe crustacean, cephalopods and/or fish allergy, including 60% with anaphylaxis, tolerated all the pastes. Consequently, it is unlikely that individuals with a similar history of allergic reactions or milder reactions would react to this edible jellyfish and these findings could also be extrapolated to a larger nonallergic population.

To our knowledge, this is the first study evaluating the safety of an edible jellyfish in patients with severe seafood allergy, using skin tests and oral challenges.

These findings contribute to increase the data regarding jellyfish ingestion in seafood allergic patients. In spite of their food allergy and consequent food avoidance, the vast majority of patients appreciated *C. tagi* and were willing to include it in their diet.

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