

Anaphylaxis to Beluga caviar

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Abstract

Fish roe is an extremely rare cause of anaphylaxis and although its consumption has increased in recent years. We described the case of a 59-year-old man, who experienced an anaphylactic reaction after consuming caviar. Skin prick-test were performed with Beluga caviar, salmon caviar, cod, salmon, hen egg yolk and egg white, ovalbumin, ovomucoid, shrimp and mold. Only SPT to Beluga caviar was positive. The absence of sensitization to fish and hen egg was confirmed by undetectable specific IgEs to cod, parvalbumin (Gad c 1 and Cyp c 1), egg yolk and egg white, ovalbumin and ovomucoid. An immunoblot was also performed and showed an IgE-reactive band indicated that the patient was sensitized to a 26 kDa protein in Beluga caviar.

In the present case, immunoblotting of the patient's serum revealed a single IgE-reactive band at 26 kDa band, which does not appear to correspond to the previous cases.

Key words: Anaphylaxis; caviar; food allergy; immunoblot; vitellogenin

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Introduction

Fish roe is an extremely rare cause of anaphylaxis and although its consumption has increased in recent years, little has been published on allergic reactions to these caviar products.¹⁻⁵ Beluga caviar is a luxury delicacy that is eaten as a garnish or spread. Only two cases of Beluga caviar-induced anaphylaxis have been reported in the literature.¹ We report herein a new anaphylaxis case to Beluga caviar without allergies to other roes.

Methods

A 59-year-old man, with no atopic history, experienced an anaphylactic reaction after consuming caviar. Until now, he was accustomed to consuming caviar without reaction, once a year for Christmas. Ten minutes after the consumption of approximately one teaspoon of Beluga caviar without any other food or alcohol, he presented a severe anaphylactic reaction with hypotension (60/40 mmHg) and dyspnea, requiring intramuscular epinephrine (0.3 mg) in prehospital care enabling clinical improvement. Tryptase was sampled during the first hour after the onset of the anaphylactic reaction and showed an increase at 16.8 µg/L. The basal tryptase rate was measured 24h later at 5.6 µg/L.

IgE sensitization was investigated by skin prick tests (SPTs), specific IgE measurements (ImmunoCAP® Thermo Fisher

Scientific, Wattham, USA) and immunoblotting. SPTs were performed with Beluga caviar (from sturgeon Petrossian, Paris, France), salmon caviar (Petrossian, Paris, France), cod, salmon, hen egg yolk and egg white.

Results

Only SPT to Beluga caviar was positive (wheal 15 mm). In order to rule out irritation causing these results, the same tests were performed in 3 healthy volunteers. Positive controls were 10% histamine chlorhydrate (7 mm) and 9% codeine sulfate (5 mm). Negative control was physiological serum (no reaction).

The absence of sensitization to fish and hen egg was confirmed by undetectable specific IgEs to cod, parvalbumin (Gad c 1 and Cyp c 1), egg yolk and egg white, ovalbumin and ovomucoid (ImmunoCAP® Thermo Fisher Scientific, Wattham, USA).

Since ImmunoCap® to Beluga caviar was not commercially available, specific IgEs were detected by immunoblot. Briefly, a protein extract from Beluga caviar was prepared and proteins separated by Sodium Dodecyl Sulfate (SDS)-PAGE, showing numerous proteins mainly around 25 kDa as well as greater than 70 kDa. Separated proteins were then transferred onto a Polyvinylidene difluoride (PVDF) membrane and the immobilized proteins were incubated overnight at +4°C with the patient's serum. After washing and incubation with an enzyme-labeled

anti-human IgE antibody, the addition of enzyme substrate allowed detecting bands in the presence of specific IgEs in the patient's serum. The resulting IgE-reactive band indicated that the patient was sensitized to a 26 kDa protein in Beluga caviar. A control immunoblot performed in the absence of the patient's serum did not show any nonspecific IgE reactive bands (**Figure 1**).

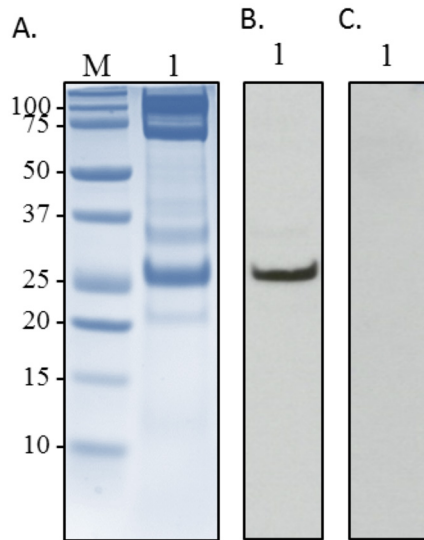


Figure 1. Coomassie blue-stained-SDS-PAGE with Beluga caviar (A) and corresponding IgE immunoblots with (B) or without (C) patient's serum. Lane 1: Beluga caviar. M: molecular weight markers in kDa.

Discussion

The main component in fish roe is yolk, the latter of which is comprised of 3 major proteins: lipovitellin (21 kDa), phosvitin (35 kDa) and β' -component (β' -c, 18 kDa). These three proteins derived from the same precursor, vitellogenin, with an apparent molecular mass of 580 kDa, appear as two major bands corresponding to 180 kDa and 120 kDa after SDS-PAGE.^{6,7}

Gonzalez-de-Olano et al. have identified several proteins in salmon roe (18 and 21 kDa), trout roe (18 kDa) and slated hake roe (18 and 30 kDa).⁵

In their description of the first case of Russian Beluga caviar anaphylaxis, Untersmayr et al. performed an immunoblot with the patient's serum which revealed four unidentified IgE-reactive bands of 30, 84, 100 and 118 kDa, the latter two being more reactive.¹ In the reported case of Iranian Beluga caviar anaphylaxis, immunoblotting showed a broad spectrum of IgE-reactive bands ranging from 23 to 120 kDa, identified as fragments of vitellogenin by mass spectrometry.³ In the present case, immunoblotting of the patient's serum revealed a single IgE-reactive band at 26 kDa band, which does not appear to correspond to the previous cases (**Figure 1**). Moreover, we can speculate that this protein is not a fragment of vitellogenin since another reactive band would likely have been found in this instance.

Conclusion

To the best of our knowledge, this is the first case of Beluga caviar anaphylaxis described in France. Our patient presented a selective food allergy to Beluga caviar. Both skin prick testing and immunoblotting pointed to an IgE-mediated reaction. The resulting sensitization appeared to be due to a 26 kDa protein, which has not been described previously.

Conflicts of interest

S Lefèvre, L Moumane and E Beaudouin: none

S Jacquenet is employed by Genclis SA, a biotechnology company specialized in allergy

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