



BRIEF REPORT

Allergic reaction to anisakis-contaminated fish after the first administration of BNT162b2 mRNA vaccine: a case report

Fumiue Harada^{1,2,*}, Kana Yamamoto^{3,4}, Tomoki Matsuda¹, Chika Yamamoto³, Yuta Tani⁴, Mutsuko Ohnishi⁴, Morihito Takita^{3,4}, Tetsuya Tanimoto⁴, Masahiro Kami⁴ and Ryusaburo Shineha¹

¹Department of Internal Medicine, Soma Central Hospital, Soma, Fukushima, Japan, ²Department of Disaster and Comprehensive Medicine, Fukushima Medical University, Fukushima, Fukushima, Japan, ³Department of Radiation Health Management, Fukushima Medical University, Fukushima, Fukushima, Japan and ⁴Research Division, Medical Governance Research Institute, Minato, Tokyo, Japan

*Corresponding author. Department of Internal Medicine, Soma Central Hospital, 3-5-18, Okinouchi, Soma, Fukushima 976-0016, Japan. Tel: +81-42-521-5334; Email: fumiueharada2002@gmail.com

Introduction

SARS-CoV-2 vaccination is an effective means to prevent severe illness and death due to SARS-CoV-2 infection [1]. Vaccine safety has been carefully monitored to be sure that the benefit outweighs the risk of adverse events (AEs). Common AEs of the BNT162b2 mRNA vaccine, for example, include fatigue (45%), headache (40%), and chills (28%) after the first administration in accordance with the adult phase III clinical trial [1].

We experienced a case of systemic urticaria early after the first dose of SARS-CoV-2 vaccination and, later, gastric anisakiasis was found endoscopically. Skin lesions after SARS-CoV-2 vaccination are commonly seen as a local reaction such as delayed edematous patches; however, systemic urticaria has not been listed as a common AE [2]. The detailed description of the case presented here provides valuable information which indicates that allergic reaction due to ingestion of anisakiasis-contaminated fish is a differential diagnosis of urticaria even after the SARS-CoV-2 vaccination.

Case presentation

A 72-year-old woman with no medical and allergic history was vaccinated with the first dose of the BNT162b2 mRNA vaccine on

8 June 2021 (Day 0). She ate the raw flounder for dinner the next day (Day 1). The flounder was provided by her friend. Around 2 a.m. on Day 2, she visited the emergency department of the general hospital (Soma Central Hospital [Soma, Fukushima Prefecture, Japan]) because of edematous eyelids and systemic urticaria with pruritus. She said that she was very concerned about the adverse event of the SARS-CoV-2 vaccination for her hives. The clinical diagnosis of urticaria was made based on the systemically inflamed rash, vascular swelling of the face, and positive scratch test. The attending physician suspected an allergic reaction due to the SARS-CoV-2 vaccination or the flounder in the dinner on Day 1. A hydroxyzine hydrochloride infusion was given to her. Her urticaria immediately disappeared after infusion. She was given an antihistamine medication and went home. The physician asked her to visit the clinic on the following day.

On Day 3, she visited the outpatient clinic due to mild epigastric pain, although her urticaria was not seen. Eophagogastroduodenoscopy (EGD) was performed since the anisakiasis was a differential diagnosis. The EGD revealed 10 larvae of anisakis in her stomach (Figure 1). Her medical history was again confirmed as not having food or drug allergies. All anisakis on her gastric mucosa were removed using EGD. Her gastric pain was relieved after EGD.

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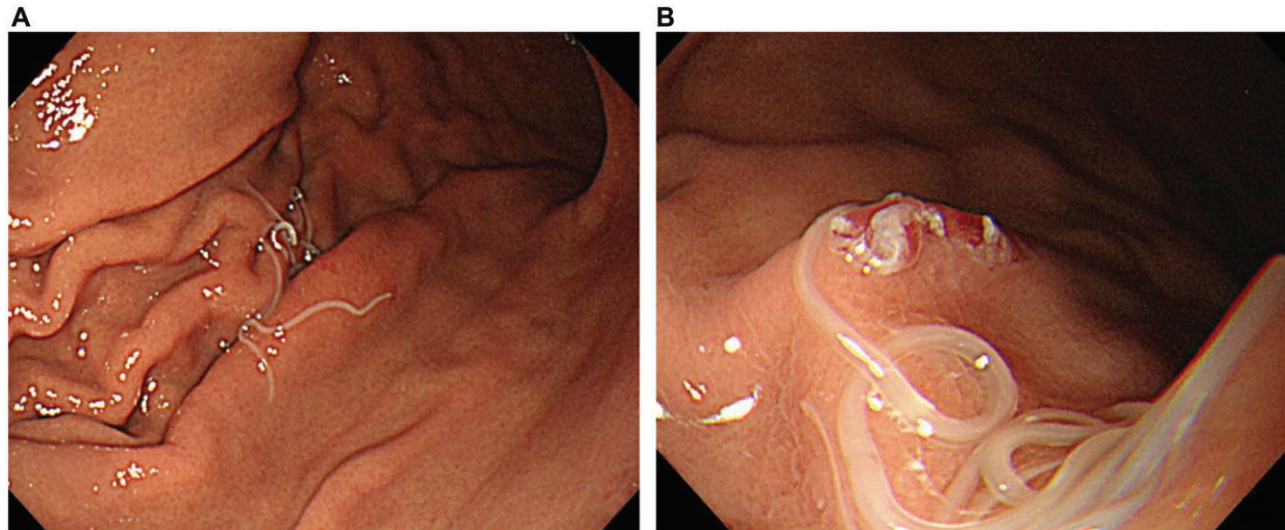


Figure 1. Endoscopic image of gastric anisakiasis. Larvae of anisakis were found in the greater curvature of the upper body of the stomach, where the mucosa was reddish and edematous (A and B for the distant and closer views, respectively).

Discussion

We presented here a case that showed systemic urticaria a day after the SARS-CoV-2 vaccination, which was associated with an allergic reaction to the ingestion of anisakiasis-contaminated fish confirmed by an EGD. This case made us aware of the *anchoring bias* as the attending physician and patient were concerned about an adverse event of SARS-CoV-2 vaccination.

Systemic urticaria has not been listed as a common adverse event after the BNT162b2 mRNA vaccine; however, it can be seen as a cutaneous reaction on the day of vaccine administration or the following couple of days [1]. Various causes such as infection, medication, food, and respiratory allergens can be associated with systemic urticaria [3]. A study with the international registry of the dermatology societies suggested that urticaria after SARS-CoV-2 vaccination might be related to the host immunity or immunologic response to non-steroidal anti-inflammatory agents commonly taken for pain and fever after vaccination, not to allergy to the vaccine since most of the urticaria occurred a day after the administration [4]. The Centers for Disease Control and Prevention defines an allergic event within 4 hours after injection as an immediate hypersensitivity reaction [5]. Physicians may recognize events early after vaccination as AEs due to the vaccination [6, 7]. The differential diagnosis should be carefully made when the reaction is an infrequent AE of the vaccination.

Of note, urticaria was a predominant symptom in her, albeit her epigastric pain was mild. In gastric anisakiasis, severe epigastric pain develops within hours of ingestion of anisakiasis nematodes, followed by urticaria [8]. She lived in the largest fishing port town of Soma, Fukushima Prefecture, in Japan, with a raw fish-eating culture. In this case, we performed an EGD since gastric anisakiasis was considered because of such a fish-eating culture in the community. The fact that she got the flounder in her private community, not through the commercial grocery store, is another point to suspect anisakiasis since the screening test for anisakis is performed in the grocery stores regularly. Anisakiasis has been an emerging disease as the consumption of raw fish is increasing in many parts of the world [9]. Both acute and chronic courses of gastrointestinal

anisakiasis were reported. We might under-diagnose anisakiasis, especially the chronic form, since it often runs an asymptomatic course [10].

This report demonstrates a case of systemic urticaria a day after SARS-CoV-2 vaccination, where gastric anisakiasis was endoscopically confirmed the following day. The differential diagnosis of anisakiasis might have been missed since her gastric pain was mild. The presented case suggests the *anchoring bias* of clinical events after SARS-CoV-2 vaccination. Physicians need to be aware that urticaria with mild stomach pain can be a manifestation of anisakiasis.

Authors' Contributions

F.H. and K.Y. drafted the manuscript. F.H., T.M., and R.S. collected and analysed the data. C.Y., Y.T., M.O., M.T., T.T., and M.K. interpreted the data and revised the manuscript. All authors read and approved the final manuscript.

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Conflict of Interest

M.K. received a donation from Ain Holdings Inc. and remuneration as an outside director of SBI Biotech Co., Ltd, outside of the submitted work. T.T. received personal fees from MNES Inc. and Bionics Co. Ltd, outside of the submitted

work. The other authors declare no competing interests in this study.

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