

Latex Anaphylaxis Caused by a Swan-Ganz Catheter

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Abstract

A 78-year-old woman visited the division of cardiovascular disease in our hospital. She underwent a cardiac catheter examination, and a Swan-Ganz catheter was inserted. Several minutes later, she developed anaphylactic shock. She had no past history of latex allergy, but did have a banana allergy. Skin prick tests showed a positive reaction to an extract of latex gloves and an extract of the balloon of a Swan-Ganz catheter. Anaphylactic shock caused by the latex balloon of a Swan-Ganz catheter was diagnosed. It is necessary to pay attention to not only latex allergy but also fruit allergies with a cross-reactivity to latex.

Key words: anaphylaxis, latex allergy, Swan-Ganz catheter, skin prick test, cross-reactivity

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Introduction

Natural rubber latex is a sap from the rubber tree, and is used in various daily necessities and medical implements. In particular, healthcare workers have a high possibility of contact with latex products. Latex allergy can be caused by the repeated use of latex products. The incidence of latex allergy in the general population is 1-2% (1). The reactions to latex allergy are type I immediate hypersensitivity and type IV delayed hypersensitivity (2). Type I immediate hypersensitivity reactions are immunoglobulin E (IgE)-mediated responses to latex protein. The reactions range from urticaria to anaphylaxis (1). Type IV delayed hypersensitivity is caused by chemical antioxidants in latex gloves. The reactions are contact dermatitis (3). Also, latex has cross-reactivity to banana, avocado and kiwi fruit (4). Since the first report of type I immediate hypersensitivity caused by latex rubber gloves by Nutter (5) in 1979, there have been many reports on latex allergy. However, most of the reports are regarding latex rubber gloves used by healthcare workers and operative patients. We report a rare case of a patient with banana allergy who was not a healthcare worker and had never undergone surgery who experienced anaphylaxis caused by the balloon of a Swan-Ganz catheter containing latex. Most healthcare workers are not aware that almost all

Swan-Ganz catheters contain a latex balloon.

Case Report

A 78-year-old female having chest discomfort and shortness of breath visited the division of cardiovascular disease in our hospital. She had never had a disease that required treatment. However, when she would eat a banana, urticaria would appear over her entire body. She had not worked as a healthcare worker and had never undergone surgery in the past.

She was suspected of having a cardiovascular disease and underwent a cardiac catheter examination. She had not previously undergone a cardiac catheter examination. Her inguinal lesion was sterilized using 10% povidone-iodine. Two percent lidocaine as a local anesthetic was administered by intradermal injection in her inguinal lesion. Afterward, a Swan-Ganz catheter was inserted into the femoral vein through the inguinal region. Within 3 minutes, she complained of nausea and dyspnea. Then, her blood pressure decreased to 70/40 (systolic/diastolic) mmHg, stenotic murmur was heard from her chest and her arterial blood oxygen saturation decreased to 85% without oxygenation. In other words, she developed anaphylaxis. She was immediately given oxygen, and 0.1% adrenaline (0.3 mL) was administered by intramuscular injection in her left upper arm. How-

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Table 1. Results of Skin Prick Tests

Sample	Prick tests (stock solution)
2% lidocaine	0×0/0×0
10% povidone-iodine	0×0/0×0
extract of latex rubber gloves	4×4/10×10
extract of the balloon of a Swan-Ganz catheter	2×1/4×4
dihydrochloride histamine (10mg/mL)	4×4/12×8
saline	0×0/0×0

Date are expressed as wheal diameter (mm×mm)/flare diameter (mm ×mm)

ever, her blood pressure did not increase and the stenotic murmur in her chest did not disappear. Although her cardiac rate did not decrease, the vasovagal reflex was suspected and atropine sulfate hydrate was administered by intravenous injection. However, her condition did not improve. Therefore, the Swan-Ganz catheter was removed and 0.1% adrenaline (0.1 mL) was administered by intravenous injection. About 1 minute later, her blood pressure increased and the stenotic murmur in her chest disappeared. No iodinated contrast medium was used, and the operator and the helpers used latex-free gloves.

The cause of anaphylaxis was considered to be lidocaine or povidone-iodine at first. We performed skin prick tests using lidocaine and povidone-iodine. Two percent lidocaine and 10% povidone-iodine were diluted at 1 : 1,000, 1:100, and 1 : 10 (using 0.9% saline). Skin prick tests were performed using dilutions of 1 : 1,000, 1 : 100, 1 : 10 and stock solution. Skin prick tests using lidocaine and povidone-iodine showed negative reactions.

We focused on her banana allergy. Banana has a cross-reactivity to latex. Therefore, the level of specific IgE against latex in serum was measured with a radioimmunosorbent test (RIST) by an enzyme-linked immunosorbent assay (ELISA). The measured level of the specific IgE against latex was 6.08 IU/mL and was significantly elevated. We performed skin prick tests using an extract of latex rubber gloves. The extract of latex rubber gloves was prepared in accordance with the method of Turjanmaa et al (6). One gram of sterile latex rubber gloves was soaked in 5 mL of 0.9% saline for 30 minutes, and the fluid was used in the skin prick test. Furthermore, the balloon of a Swan-Ganz catheter was soaked in 1 mL of 0.9% saline for 30 minutes, and the fluid was used in the skin prick test. Dihydrochloride histamine (10 mg/mL) was used as a positive control, and 0.9% saline was used as a negative control. Prick tests were performed using a Prick-Lancetter (EWO CareAB; Gislaved, Sweden). Skin prick tests showed a positive reaction to the extract of latex rubber gloves as well as dihydrochloride histamine. The extract of the balloon of a Swan-Ganz catheter showed a positive reaction (Table 1), but the reaction was weaker than those of the extract of latex rubber gloves and dihydrochloride histamine. From these results, anaphylactic shock caused by the latex balloon of a Swan-Ganz catheter was diagnosed.

Discussion

In recent years, latex allergy has become noticed, and an effort to use latex free products has been made. However, it is difficult for latex products to be completely discontinued, because they have superior functionality and cost performance. When healthcare workers are not aware of latex allergy, latex allergy can readily occur. Latex allergy can be diagnosed with clinical history, the skin prick test, the level of specific IgE against latex, and the glove provocation test. The main goals of latex allergy management are avoidance of exposure to latex allergens and appropriate treatment of allergic reaction.

Cases of latex allergy caused by contact with a barium enema catheter were reported in the past (7-10). The present case was anaphylactic shock caused by the latex balloon of a Swan-Ganz catheter. Most healthcare workers are not aware that almost all Swan-Ganz catheters contain a latex balloon. In this case, we did not suspect latex allergy at first. The operator and the helpers had used latex-free gloves, and we were unaware of the presence of latex included in the Swan-Ganz catheter. Owing to the presence of banana allergy in her clinical history, we considered latex allergy. Latex has a cross-reactivity to banana, avocado and kiwi fruit (4). If there is an allergy to latex, the probability of having an allergy to banana or kiwi or avocado is 35%, and if there is an allergy to banana or kiwi or avocado, the probability of having latex allergy is 11% (11). We determined that the measured level of specific IgE against latex was significantly increased, and latex allergy was diagnosed by the skin prick test. Also, the reaction shown in the skin prick test with the extract of the balloon of a Swan-Ganz catheter was positive. Therefore, we diagnosed that the cause of anaphylaxis was the balloon of the Swan-Ganz catheter. However, the reaction was weaker than those of the extract of latex rubber gloves and dihydrochloride histamine. We consider that this was because there was only a small amount of latex in the balloon of the Swan-Ganz catheter. We were unaware of the exact latex content included in the balloon of the Swan-Ganz catheter. Even if the latex content is small, anaphylaxis can easily occur because latex enters the blood vessel directly during a catheter examination. The latex allergy in this case may be due to

cross-reactivity by banana sensitization, because the patient had no significant exposure to latex in the past. However, it is difficult to definitely conclude that the latex allergy in this case was due to cross-reactivity by banana sensitization, because we cannot deny possibility of exposure to latex products in everyday life. A clinical history is essential for preventing anaphylaxis caused by latex. It is necessary to pay sufficient attention to whether latex is present in products. Moreover, it is necessary to pay attention to not only latex allergy but also fruit allergies with a cross-reactivity to latex. Allergic disorders cannot be diagnosed if we do not consider them. Some cases of anaphylaxis of unknown origin may actually be latex anaphylaxis.

The authors state that they have no Conflict of Interest (COI).

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