

LETTER TO THE EDITOR

Case with anaphylactic shock induced by heparin-lock flush injection

Dear Editor,

Intravenous flush injection with heparin, known as heparin-lock, is widely used to prevent obstructions of venous line catheters. Here, we report a case of anaphylactic shock induced by heparin lock flushing.

A 61-year-old man, who had a medical history of cerebral infarction and drug eruption established by computer tomography, was to undergo surgery for thoracoabdominal aortic aneurysm under general anesthesia with i.v. anesthetics (fentanyl, remifentanyl and propofol) and a muscle relaxant (rocuronium bromide), and a tracheal tube was placed with lidocaine spray. Half of an hour later, cefazolin sodium (CEZ) was administered via the peripheral venous line. Seven minutes later, a central venous line latex catheter was inserted under local anesthesia with lidocaine, and flushed with a heparin sodium injection (50 units/5 mL). Acute rash and a rapid drop in blood pressure were observed immediately. Clinicians diagnosed his condition as anaphylactic shock by CEZ. At a later date, he went for surgery, avoiding CEZ, and with a different anesthetic, ketamine. However, within 10 min after insertion of a central venous catheter, anaphylactic shock was observed again.

Skin prick testing and intradermal testing were performed with CEZ (Cefazolin Sodium®; Nipro, Osaka, Japan), and with rocuronium bromide (Eslax Intravenous®; MSD, Tokyo, Japan), heparin sodium (Heparin Sodium® [Mochida Pharmaceutical, Tokyo, Japan] and Heparin Sodium Lock Syringe® [Otsuka Pharmaceutical, Tokyo, Japan]), lidocaine (Xylocaine Pump Spray 4%® [AstraZeneca, Osaka, Japan] and Lidocaine Hydrochloride Injection® [Nisshin Pharmaceutical, Yamagata, Japan]) and a latex extract that were all used in both surgeries. Results of skin prick testing were negative for all. While muscle relaxants and antibiotics have frequently been reported to induce perioperative anaphylaxis,¹ positive reactions only to heparin sodium, even to 1 unit/mL of heparin sodium, were observed in intradermal skin testing (Table 1), which were diagnosed according to the statement by the American Academy of Allergy, Asthma and Immunology, and American College of Allergy, Asthma and Immunology.²

In 2008, there were many reports of severe anaphylactic reactions to bolus heparin, which were induced by contaminants of heparin products via the kinin–kallikrein system.³ Since the recall of heparin products, the number of reported heparin-associated deaths has returned to baseline.

Although the contaminants have been removed from heparin products, it has been reported that heparin-induced

Table 1. Results of prick testing and intradermal testing

Drug tested	Erythema diameter of wheal/erythema (mm)	
	Prick testing	Intradermal testing
Cefazolin sodium 10 mg/mL (concentration for administration)	0/0	N/A
Cefazolin sodium 0.1 mg/mL	N/A	0/0
Cefazolin sodium 0.01 mg/mL	N/A	0/0
Rocuronium bromide 10 mg/mL (concentration for administration)	0/0	N/A
Rocuronium bromide 0.1 mg/mL	N/A	0/0
Heparin sodium 1000 units/mL	0/0	N/A
Heparin sodium 100 units/mL	N/A	0/30 × 22
Heparin sodium 10 units/mL (concentration for administration)	0/0	N/A
Heparin sodium 1 unit/mL	N/A	0/20 × 22
Lidocaine 40 mg/mL (concentration for surface anesthesia)	0/0	N/A
Lidocaine 4 mg/mL (concentration for local anesthesia)	N/A	0/0
Latex extract	0/0	N/A
Latex extract 1/10	N/A	0/0
Positive control (histamine)	9 × 8/22 × 21	N/A
Negative control (saline)	0/0	0/0

N/A, not applicable.

hypersensitivity reactions occasionally occur during heparinization with continuous i.v. or s.c. injections of heparin products including several kinds of low-molecular-weight heparin.⁴ In our acknowledgment, our case is the first of anaphylactic shock due to a flushing with low dose of heparin. In addition, some of the cases reported previously may show just non-specific histamine liberation by high-concentration heparin (1000 units/mL).⁴ As is our case, extensive skin testing using a series of dilutions is necessary to confirm an immunoglobulin E-mediated allergy to heparin.

Results of a retrospective observational cohort study indicate that there are no significant differences for occlusive events, even in central venous line catheters, between the two groups of flushing with heparin and with saline.⁵ Because there

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is a possibility that even a negligible dose of heparin could induce hypersensitivity reactions, further studies are necessary to evaluate the risks of heparin use in catheter flushing.

CONFLICT OF INTEREST: None declared.

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