

Near-fatal anaphylaxis to topical bacitracin ointment

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Bacitracin ointment is a widely used topical antibacterial medication. It is generally well-tolerated, but in rare cases may cause life-threatening reactions.¹⁻⁷ We report a severe anaphylactic reaction after topical administration of bacitracin.

CASE REPORT

A 45-year-old man with tinea pedis applied bacitracin ointment to an excoriated area on his foot. Almost immediately he experienced pruritus of that foot. Despite an attempt to wash off the ointment, within minutes the pruritus became generalized. He then developed flushing of his torso followed by swelling of his tongue and face. Subsequently he became lightheaded and lost consciousness. Emergency medical technicians arrived within 5 minutes, finding the patient unresponsive and without a pulse. After a brief period of cardiopulmonary resuscitation, his pulse returned, and he regained consciousness. Four years earlier he had had a similar, but less severe, episode after applying bacitracin to his foot.

On arrival at the emergency department, the patient had no

residual signs of anaphylaxis and was admitted to rule out a cardiac cause for his sudden life-threatening event. He had normal serial cardiac enzyme levels, and his electrocardiogram results were in the normal range. He also had normal results on an exercise tolerance test. The allergy service was consulted.

METHODS

Given the severity of the patient's reaction, skin testing was not performed. An ELISA for IgE antibody and a basophil histamine release assay were performed.

Prausnitz-Küstner (PK) testing was carried out following previously established methods.⁸ A rhesus monkey who had never been exposed to bacitracin was anesthetized. One-tenth of a milliliter of serial twofold dilutions (ranging from undiluted to 1:16) of the patient's serum were then injected intradermally into five separate sites on the monkey. A control injection of phosphate-buffered saline diluent was also given. After 48 hours, 4 ml of 0.5% Evans blue dye was injected intravenously to serve as a marker of increased capillary permeability at positive skin test sites. Fifteen minutes later, all six sites were injected intradermally with 0.02 ml of bacitracin at 0.1 mg/ml (Sigma Chemical Co., St Louis, Mo.). This concentration had been determined earlier by a titration experiment to be the highest that would not cause an irritant reaction. After 30 minutes, the sites were examined for positive reactions, characterized by cutaneous blueing and edema.

RESULTS

The immunoassay results for IgE antibody and the basophil histamine release test results were negative. The results of PK testing were positive, with the patient's serum diluted up to 1:8.

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DISCUSSION

Although rare, anaphylaxis has been reported after topical administration of bacitracin ointment.¹⁻⁷ All reported patients, including ours, had applied the drug to a compromised skin barrier (i.e., leg ulcers, excoriated dermatitis, or burns). Thus ready access to the systemic circulation seems to be a prerequisite for the development of anaphylaxis from this externally applied agent. The severity of reported anaphylaxis to bacitracin is particularly noteworthy, with hypotension documented in six of eight cases.^{1-4, 6} Four of eight reported cases demonstrated the presence of IgE to bacitracin, two by direct skin testing^{1, 5} and two by PK testing.^{2, 4}

Given his near-fatal reaction, our patient declined to be skin tested. Immunoassay results for IgE antibody and basophil histamine release test results were negative. However, without a positive control, these negative *in vitro* assays do not exclude the presence of IgE antibody to bacitracin. Bacitracin, a low molecular weight polypeptide, may have to act as a hapten, and a protein carrier is not present in these *in vitro* systems. Furthermore, bacitracin is labile in aqueous solution, which may also have led to the negative *in vitro* assay results. Therefore PK testing on a rhesus monkey was pursued. The passive transfer of immediate-type hypersensitivity between heterologous species

has been described by using human serum in rhesus monkeys.⁸ Serum from our patient, as well as from one of the reported cases, caused positive PK test results in monkeys, thus confirming the presence of IgE antibody to bacitracin.

We report this case of anaphylaxis after the topical administration of bacitracin so that physicians may be aware of this rare, but potentially life-threatening, reaction to a commonly used medication.

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