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Successful desensitization by Detemir administration in a patient with insulin allergy: A case report

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Abstract

Introduction: Insulin allergy is a rare clinical condition. The frequency of insulin allergy has decreased since highly purified insulin préparations became available. However, it remains a concern, and its frequency may have increased with the latest generation of insulin analogues.

Case Presentation: We report the case of a 51-year-old female patient with type 2 diabetes who required multiple daily insulin injections. The patient developed an allergy to human regular insulin and insulin analogues (insulin aspart and insulin glargine), which was resolved through subcutaneous insulin desensitization.

Conclusion: As reported in this case, desensitization with subcutaneously administered human insulin using an ultra-rush protocol in patients with insulin allergy may offer a simple and successful therapy within a few days.

Keywords: insulin, allergy, desensitization, insulin analogues.

Introduction:

Insulin allergy is a challenging problem to treat, although its prevalence has decreased with the introduction of recombinant human insulin, it has not been completely eradicated. The only cure for insulin allergy is desensitization.

We report the case of a patient who developed an allergy to human insulin and its analogues. These allergic reactions were resolved after progressive desensitization using subcutaneous insulin glargine administration.

Case Report:

A 63-year-old woman was diagnosed with type 2 diabetes 10 years ago, initially treated with oral antidiabetic medication. As normoglycemia was not achieved with maximal oral treatment and a low-calorie diet, the patient was switched to insulin therapy. However, upon starting this treatment, she developed local pruritus at the injection sites within a few seconds of injection.

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The administration of different insulins (insulin detemir, insulin glargine, and human insulin) led to the development of pruritic plaques with a diameter greater than 15 cm at each injection site, which persisted for several days. Splitting the dose and changing injection sites were unsuccessful in resolving the reaction. Local factors such as poor injection technique, misuse of the insulin injector, incorrect use of disinfectants, or contact allergy to disinfectants were ruled out. Skin tests with six different insulins were performed. Prick tests (1/20th) were first performed, and the patient experienced allergic reactions to human insulin and insulin analogues (Novomix 30, NovoRapid, insulin aspart, detemir, and insulin glargine). Intradermal tests were conducted for the latter and were all positive, except for detemir. A decision was made to carry out an insulin desensitization protocol. This involved introducing low doses of insulin detemir subcutaneously, starting with an initial dose of 0.00001 IU and progressively increasing it to 14 IU after 4 days. The patient was also given antihistamines and 60 mg of dexamethasone 30 minutes before starting the protocol, on the first and second days.

On the second day, the patient developed mild erythema at the injection site. After 10 days of therapy, the patient reported a skin rash and pruritus at the injection site, an urticarial lesion controlled by antihistamines. The patient was seen again after 1 month, 3 months, and 6 months, with no recurrence of allergic reactions.

Table 1: Insulin Desensitization Protocol

DAY	DOSE NO	Units/dose	Cumulative dose/day (units)
1	1	0.0001	0.0001
1	2	0.001	0.0011
1	3	0.01	0.0111
1	4	0.1	0.1111
1	5	1	1.1111
1	6	2	3.1111
2	7	1	1
2	8	2	3
2	9	4	7
2	10	6	6

Discussion:

The purification of animal insulin preparations and the use of recombinant human insulin have significantly reduced the incidence of insulin allergies, though they have not completely eliminated the occurrence of allergic reactions. Allergic reactions to human insulin are rarely reported (0.1 to 3%)【1】. Most of these cases involve simple allergic reactions such as injection site swelling, erythema, and itching. However, life-threatening conditions like angioedema and anaphylaxis have also been reported【2】. The patient's medical history did not indicate any other allergies, and this allergic reaction occurred after her first exposure to human insulin.

Several studies have been published on the diagnosis of insulin allergy, which is based on a compatible clinical history and skin allergy tests【3】. Several studies have shown that

switching to insulin analogues, such as aspart and lispro, has been effective in treating such allergies [4,5, 6].Our case demonstrated that switching to another insulin preparation was unsuccessful. Desensitization techniques can be beneficial for individuals who are allergic to different types of insulin and for those for whom insulin therapy is essential. In cases of failure, longer protocols or repeated desensitization may be required. Although the mechanism of action is not fully understood, depletion of allergic mediators from mast cells or the production of anti-insulin IgG blocking antibodies have been proposed as possible mechanisms【7】. This technique combines two important factors in inducing tolerance: continuous/regular administration of small, increasing doses, and the use of potentially less immunogenic molecules. It can be performed either by continuous subcutaneous insulin infusion (CSII) or by successive subcutaneous injections【8】. Several case reports have described the successful use of insulin lispro or insulin aspart for managing insulin allergy

【9, 10】. Our patient experienced less severe allergic reactions to insulin detemir than to other insulins. Therefore, we used insulin detemir subcutaneously for the desensitization therapy.

In conclusion, this is an unusual case of allergy to human insulin and its analogues, including both rapid-acting and long-acting insulins. Our method of desensitization was relatively simple, offering an alternative to CSII-based desensitization.

Disclosure of Interest:
The authors declare that they have no conflicts of interest concerning this article.

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