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Cutaneous reaction to zinc — a rare complication of insulin treatment

A case report

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Summary

A diabetic patient presented with furunculoid lesions at the sites of insulin injections. These lesions were diagnosed as representing a manifestation of a cutaneous reaction to the zinc component of an intermediate-acting insulin. The differential diagnosis of furunculoid lesions in insulin-dependent diabetic subjects is discussed.

S Afr Med J 1989; **75**: 342-343.

The cutaneous reactions to insulin administration have included, among others, 'wheal and flare' allergies, focal areas of pigmentation, hyperkeratotic papules, keloid and blister formation.¹⁻³ The incidence of these insulin-induced lesions has been reported to vary from 5% to 56%,¹⁻³ the majority thought to have been linked to 'impurities' in the insulin preparation. However, since the advent of highly purified monocomponent insulin preparations the reported cases of cutaneous reactions to insulin are rare.

A case of a diabetic patient with furunculoid lesions at the insulin injection sites, which were induced by a cutaneous reaction to the zinc component of an intermediate-acting insulin preparation, is reported.

Case report

A 55-year-old non-insulin-dependent diabetic woman was treated for hyperosmolar non-ketotic coma and was discharged

from hospital on insulin therapy comprising a combination of short-acting (Actrapid HM; Novo) and intermediate-acting (Monotard HM; Novo) insulin.

One month later the patient presented with skin lesions on the thighs and abdomen, which had developed within 48 hours of insulin administration at these sites. The patient's insulin injection technique was faultless. Clinical examination revealed skin lesions, which were a mixture of firm red nodules and furunculoid sores many of which discharged serosanguinous fluid (Fig. 1).

Since the initial diagnosis was thought to be pyogenic abscesses, the patient was hospitalised and appropriate diagnostic investigations to ascertain the infective organism were instituted. The patient was treated with a broad-spectrum antibiotic for the next 10 days. During this time the lesions showed no sign of improving and all the investigations to confirm an infective cause were negative. Since it was now considered possible that the lesions were due to an allergic reaction to the insulin, the Actrapid HM and Monotard HM were individually injected subcutaneously and revealed the formation of furunculoid lesions at the Monotard HM insulin injection sites only. Monotard HM insulin consists of insulin crystals complexed with zinc acetate plus the insulin diluting medium (containing a combination of sodium acetate 0,14%, sodium chloride 0,7% and methylparahydroxybenzoate 0,09-0,19%).

In order to determine which of the above components induced the cutaneous reactions, 0,5 ml of each individual component of Monotard HM was injected subcutaneously, after written consent for this procedure was obtained from the patient. Injection of the diluting medium and then its individual components evoked no cutaneous reaction; however, a furunculoid lesion similar to those previously described appeared within 48 hours at the site of the zinc acetate injection. The serum insulin-specific IgE level was undetectable, while the serum IgG insulin antibody level was negative.⁴ The patient was subsequently treated with Actrapid HM insulin alone, with satisfactory blood glucose control, and was discharged from hospital. Follow-up at the dermatology outpatients

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Accepted 8 Aug 1988.



Fig. 1. Numerous furunculoid lesions on the anterior aspect of the thighs corresponding to insulin injection sites. Note lesion exuding serosanguinous fluid.

department showed that all lesions had disappeared after 6 months.

Discussion

Zinc-induced cutaneous lesions are a well-documented, albeit rare, cutaneous complication of insulin therapy.⁵⁻⁷ The effects of zinc on cutaneous inflammation have previously been noted to be extensive, paradoxical and not fully characterised.⁸ In our patient the zinc-induced lesions resembled pyogenic subcutaneous abscesses, the latter being a complication to which insulin-dependent diabetic subjects (IDDS) with faulty injection technique and poor metabolic control are prone.

The most relevant differential diagnosis of furunculoid lesions in a diabetic patient would include in order of importance: pyogenic abscesses (predominantly staphylococcal); intradermal insulin injections; and injection of 'cold' insulin directly from a refrigerator. Since none of these diagnoses were relevant in our patient, an allergic basis for the lesions was sought, culminating in the eventual diagnosis of an insulin zinc-induced reaction.

Although in most IDDSs with furunculoid skin lesions the above differential diagnosis would be operative, this case is presented to remind clinicians to consider insulin zinc-induced cutaneous reactions in the differential diagnosis of furunculoid skin lesions in IDDS.

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