

### Discussion

Insulin allergy is due to IgE antibodies type 1,<sup>1,2</sup> which usually manifests in the form of local reaction with itching, urticaria and erythema at the site of injection. Generalised reactions are more frequent in cases where there is a time interval between the first and the subsequent injection, allowing antibodies to form<sup>8</sup>.

Insulin allergy is complex and not completely understood<sup>1</sup>. Large polypeptides, as are present in insulin are usually responsible for more severe allergic reactions<sup>1,4,5</sup>. However, inspite of containing larger polypeptides, insulin usually provokes milder reactions only<sup>1,2</sup>.

Probably all patients receiving insulin react with production of an insulin binding antibody of class IgG<sup>6</sup>. A small proportion of patients produce insulin binding antibodies not only to bovine insulin, but also to human insulin. This renders management of diabetic patients extremely difficult<sup>4,5,6,7</sup> and they usually require desensitisation to insulin. A patient population with insulin allergy having positive Coombs test and haemolytic anaemia due to insulin antibody complexes does exist<sup>1</sup>.

Pork origin insulin has generally similar polypeptide chain as human and hence is less immunogenic<sup>2,3,6</sup>, but for religious reasons porcine insulin is neither manufactured nor used in many countries. Although human insulin is comparatively much less immunogenic<sup>6</sup>, it is still not widely used by many patients in third world countries, because of its being expensive. Since those patients use bovine insulin only, by and large, the possibility of incidence of allergic reaction to insulin in them is higher.

1. Every patient, who is being prescribed insulin for the first time, should have his first and specially the second dose administered under medical supervision lest he may react with anaphylactic shock.
2. Special care must be taken in patients with history of allergy or bronchial asthma. These patients should have hypersensitivity test to insulin performed before a full dose of the same is administered.
3. In all patients with uncontrolled diabetes, or in those diabetics controlled on diet or oral antidiabetics and specially in unconscious patients who are likely to be treated with insulin injection, potential danger of anaphylactic reaction due to insulin allergy must always be borne in mind, since it may mimic hypoglycaemic state.
4. All patients who are found to be allergic to insulin must be instructed to carry on additional indication

mentioning the same which may be not only be helpful but life saving in case of an emergency.

5. Accepted method of desensitisation is as follows<sup>7</sup>. However this must be undertaken under strict medical supervision only;

TABLE 1

Desensitisation schedule

Day	1st	2nd	3rd	4th	5th	6th	7th
Morning	0.001	0.004	0.02	0.1	0.5	2.0	8.0
Evening	0.002	0.01	0.04	0.2	1.0	4.0	As required
Route	i/d	s/c	s/c	s/c	s/c	s/c	

Note: Above mentioned doses are in units of insulin.

i/d = intradermal; s/c = subcutaneous.

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## CASE REPORTS

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### Anaphylactic Reaction to Bovine Insulin

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#### Abstract

Allergic reactions although infrequent do occur while using bovine, porcine or even human insulin. These reactions may be local or general.

Insulin may have to be used in emergency situations, e.g. (a) when the diabetes is uncontrolled due to inter-current infection, or (b) when the patient is controlled on diet or oral antidiabetics but is either unconscious or needing surgical intervention. In these situations use of insulin may provoke an anaphylactic reaction and may prove fatal if it is not quickly recognised, specially as generalised (Anaphylactic) allergic reaction to insulin may mimic the hypoglycaemic reaction to insulin overdose.

The causes of insulin allergic reaction, desensitisation and treatment of anaphylaxis to insulin is discussed.

**Key terms:** Insulin antibodies -- Insulin anaphylaxis -- Insulin immunology.

#### Case Report

Mr. A.H., aged 36 years, was admitted in December, 1986 in semiconscious condition (Glasgow coma scale 3), with a history of having been under the effect of alcohol.

His relatives stated that he was a son of diabetic parents and was himself a known diabetic since 1983. Initially, at that time he was put on plain insulin injection. However, on starting the second vial of insulin, he reacted

with mild but generalised reactions. The make and origin of both vials of insulin could not be determined. He responded well to emergency measures and was discharged on oral antidiabetic agents with dietary control. He was also known to be suffering from bronchial asthma. The reaction to insulin was not investigated. He was however told that it was possible that he may be allergic to insulin but that the reaction was thought more likely to be hypoglycaemic.

During the present admission, his semicomatose condition and glycosuria was treated by supportive iv infusion and injection insulin prescribed on sliding scale related to the level of glycosuria. His first injection of 16 units of bovine insulin immediately caused an acute anaphylactic shock with a pulse rate of 120/mt and an unrecordable blood pressure. He experienced difficulty in breathing. This was promptly reversed by supportive treatment, oxygen, vasopressive drugs and hydrocortisone. Insulin was discontinued and he was prescribed Glibenclamide and dietary method to control the diabetes. He was eventually discharged with instructions that he should get himself desensitised to insulin according to schedule given in Table 1. He was also warned not to take insulin or any origin until proper sensitivity tests against insulin have been carried out.

Whilst we have not estimated IgE levels and do not have a record of his eosinophil count, we have no doubt that this was an insulin reaction.

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