Insulin Injection Site Dystrophic Calcification with Fat Necrosis: A Case Report of an Uncommon Adverse Effect

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ABSTRACT

We report a case of an uncommon adverse effect of insulin injection resulting in hard subcutaneous swelling in the lower abdomen of a 47-year-old female with type 1 diabetes. Extensive dystrophic calcification and fat necrosis was revealed on histopathological examination.

Keywords: Calcification, cutaneous, dystrophic, injection, insulin

Introduction

Cutaneous adverse effects of insulin injections can cause inadvertent fluctuation in the glucose levels by possibly causing interference with absorption at the site. In spite of improvements in the insulin therapy these adverse effects are still common particularly in type 1 diabetics and in patients who do not rotate the injection site.

We report one such case with poor glycemic control in which the injection site was cosmetically unsightly and histopathology revealed rare complication of dystrophic calcification.

Case Report

A 47-year-old woman diagnosed with type 1 diabetes at the age of 15 years and on subcutaneous insulin injections (insulin analog aspart) was admitted to the hospital with complaint of unsightly painless swelling in the lower abdomen at the injection site, which she noticed to be gradually increasing in size over the past 10 years. She also gave past history of recurrent abscesses at the same site.

On examination, the patient was of lean build with a body weight of 69 kg and a height of 167 cm with a body mass index of 24.7 kg/m^2. Blood pressure and pulse were normal. No pedal or sacral edema or lymphadenopathy noted. Chest and the cardiovascular system were normal. Abdominal examination revealed the presence of a large mass measuring 8 × 8 cm in left lower paraumbilical region [Figure 1]. The mass was firm to hard with irregular surface and in the subcutaneous plane with restricted mobility. Overlying skin was scarred. No other clinical abnormality was evident. Hematological and some biochemical investigations were practically normal (complete blood count, blood urea, creatinine, liver function tests, electrolytes, and thyroid function tests). Glycosylated hemoglobin was 12.0% and fasting blood glucose was 371 mg/dl. Serum calcium and phosphorous levels were 9.3 mg/dl and 3.7 mg/dl respectively. Lipid profile revealed cholesterol of 178, triglycerides 81, high density lipoproteins 39, and low density lipoproteins 123. Electrocardiogram and X-ray chest was normal. A diagnosis of lipodystrophy at insulin injection site was made in view of the past history, clinical, and laboratory investigations. Patient was posted for a mini abdominoplasty to remove redundant skin and for cosmetic purpose after control of blood sugar. Intraoperative findings showed necrotic subcutaneous fat with calcified areas corresponding to the swelling in the left lower abdomen.
abdomen. Partial excision was done as the swelling was found to be attached to the overlying skin. Histopathology revealed areas of fat necrosis with foreign body giant cell reaction along with thick fibrocollagenous tissue with extensive deposits of calcium (dystrophic calcification) [Figure 2].

Postoperatively, the patient was advised to avoid the abdominal site for injecting insulin and was instructed to use the multiple rotation method for injections. Subsequently, the glycemic control improved marginally with fasting blood glucose falling to 179 mg/dl.

**Discussion**

Fat necrosis with dystrophic calcification is a rare cutaneous complication of insulin injections. The more commonly reported adverse effects are lipohypertrophy (tumor like swellings at injection site due to adipose hypertrophy) and lipoatrophy (loss of subcutaneous fat at injection site). Other minor allergic reactions include pruritus, erythema, and induration.[1] Uncommonly reported chronic adverse effects include nodules of fibrocollagenous scar tissue, amyloidosis, dystrophic calcification, and calcinosis cutis.[2‑5]

The clinical presentation of these chronic complications is usually in the form of “tumor like” or “golf ball” swellings at the injection sites either in the abdomen or thighs, which are the common sites for insulin injection.[2‑5] Patients prefer the same site as it becomes relatively painless over time and is convenient.[1] This probably explains the chronic traumatic injury due to needles leading to tissue injury and fat necrosis with calcification in the dead tissues as in our case.

A background of lipodystrophy may exist in these areas as well, but was not seen in our case. The recurrent abscess at the injection site in our patient may have further contributed to tissue injury.

The prevalence of lipohypertrophy, the most common cutaneous complication at the injection site, varies from 27% to 48%[3,6‑7] and is seen more commonly with type 1 rather than type 2 diabetes.[8] Lipoatrophy is not commonly encountered these days due to the use of recombinant human rather than bovine or porcine insulin.[9] Pathogenesis of lipodystrophy is probably the lipolytic effect of insulin itself as well as some immunological factors related particularly to immune antibodies.

Poor glycemic control in diabetics with all such chronic cutaneous complications has been noted and postulated to be because of poor absorption at these sites.[10,11]

Like in other reports our patient also had slight improvement in glycemic control after removal of the swelling and advises to rotate injection sites.[2,11]

**Conclusion**

The present case attempts to highlight the need to examine the injection sites of all diabetics to look for cutaneous complications. This becomes particularly important if the glycemic control is erratic or poor. Dystrophic calcification is one of the rare complications of insulin injection and awareness of this entity will alert the clinician to the fact that the patient needs to rotate the injection site.

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How to cite this article: Ramdas S, Ramdas A, Ambroise M. Insulin injection site dystrophic calcification with fat necrosis: A case report of an uncommon adverse effect. J Fam Med Primary Care 2014;3:269-71.

Source of Support: Nil. Conflict of Interest: None declared.