

Case Report

Increased Insulin Requirement Due To Lipohypertrophy - A Case Report

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ABSTRACT

Diabetes patients are expected to take insulin injections themselves. At the initiation of insulin treatment, they are taught the technique of taking injections as well as the need for and method of site rotation. Despite this training, injection site adverse effect of lipohypertrophy is reported to be very high, especially in Type 1 diabetes patients. Continued use of affected sites is known to hamper insulin absorption and disturb glycemic control. We present a case with severe lipohypertrophy. On shifting the injections from lipohypertrophic site to a normal site, the Type 1 diabetes patient suffered from severe hypoglycemia. About 30% reduction in insulin dose was required to control hypoglycemia and restore the glycaemic control.

Key words: Insulin absorption, injection site rotation, hypoglycemia, patient education, Type 1 diabetes.

INTRODUCTION

Insulin injection is the mainstay of treatment of Type 1 diabetes. These patients are taught to take insulin injections themselves. At the initiation of Insulin treatment, training about the injection technique and rotation of injection sites is integral. In spite of this, reported occurrence of lipohypertrophy is as high as 72% in Type 1 diabetes patients. [1] Continued use of sites already affected with lipohypertrophy has been shown to hamper insulin absorption. [2] Corollary to this observation, shifting the same dose to unused normal sites may lead to hypoglycemia due to better absorption of Insulin. [3] We present the case of a Type 1 diabetes patient with severe lipohypertrophy at insulin injection sites. On shifting the site of injection to unused normal areas, drastic

reduction in insulin dose was required to avoid hypoglycemia.

CASE REPORT

A 62 year old lady had been diagnosed with Type 1 diabetes at the age of 12 years. Though her overall glycemic control looked satisfactory (HbA1c 6.7%) at 50 years after diagnosis, she reported intermittent occurrence of unexplained hypoglycemia. She was taking total 84 units of premixed Insulin (50/50) per day (44 units before breakfast, 40 units before dinner).

On examination, she had massive lipohypertrophy on both the thighs (Fig 1). She had been using thighs and arms for insulin injections since diagnosis. She reported that she had noticed some changes at the injection sites over last 20 years. About 10 years ago she had stopped using

arms for injections due to development of stiff hypertrophic areas and started using abdomen instead. On examination, abdomen

also showed localized raised but soft areas of lipohypertrophy on either side, in line with the umbilicus.

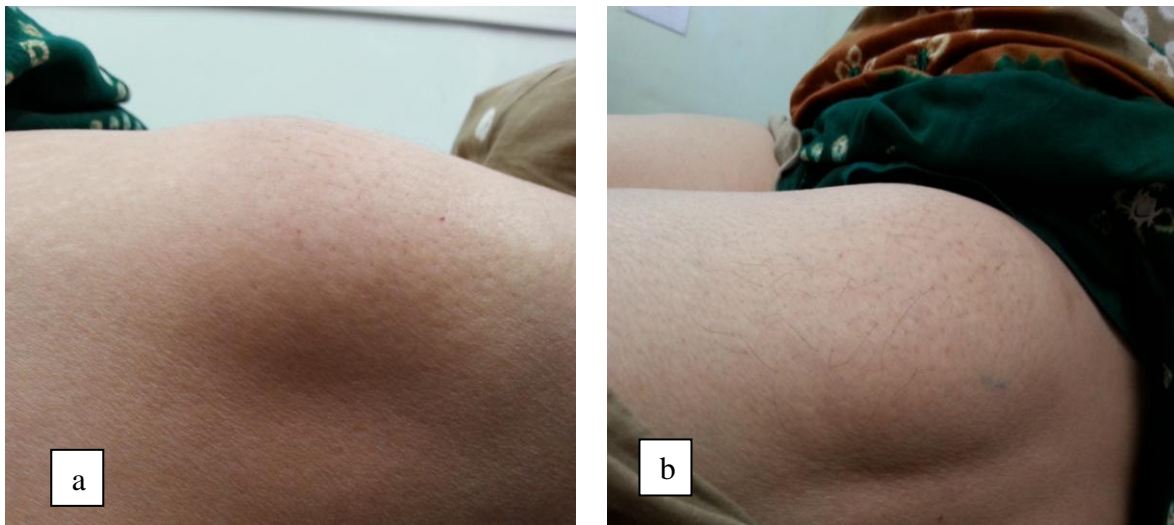


Fig 1: Right (a) and left (b) thighs showing massive lipohypertrophy

What was done

The patient was explained about lipohypertrophy, its causes and clinical implications of continued use of affected sites. She was advised to stop further use of the affected area and explained the measures to avoid further development of lipohypertrophy, including site rotation and self inspection by palpation. Systematic method of site rotation was explained and demonstrated to her by diabetes educators. She was warned to keep a close watch on her blood sugar levels when she shifted injections to normal skin areas, as absorption of Insulin is expected to be better from unused normal sites, warranting dose reduction.

Follow up

On changing the site of injection, the patient reported with severe hypoglycemia episodes on two consecutive nights, resulting in unconsciousness and convulsions. Her Insulin doses were gradually down titrated over a fortnight to a total daily dose (TDD) of 78 Units (42-0-36) and then 65 Units (40-0-25) of premixed (50/50) Insulin. Despite this dose reduction, episodes of early morning Hypoglycemia persisted. Hypoglycemic episodes finally stopped when she was shifted from premixed insulin to basal bolus regimen

(regular human insulin 20-10-14 before meals and basal 6 units at bed time). Subsequently, about a month after switching to normal injection areas, her insulin regimen stabilized at pre meal doses of 24-16-10 Units of regular Insulin and 8 units of Basal insulin at bed time. Thus, on shifting insulin injections from lipohypertrophic sites to normal skin, her TDD had been reduced to 58 units, a 30.95% reduction in dose compared to the total daily dose of 84 units which she had been taking on the sites showing lipohypertrophy.

DISCUSSION

Lipohypertrophy at insulin injection sites remains an important adverse effect of insulin, even with human insulin [4] and the newer insulin analogues. [5] Many studies have demonstrated a significant delay in insulin absorption from insulin injection sites with lipohypertrophy, as compared to corresponding normal sites in diabetes patients. [2,6] This altered kinetics of insulin absorption from lipohypertrophic sites is known to result in erratic glycaemic control. [7]

It has been recommended that clinicians should look for Lipohypertrophy and inspect injection sites at the follow up visits, particularly in patients with illusive

glucose targets. [8] Our patient, appeared to have 'satisfactory' glycaemic control as evidenced by her HbA1c (6.7%), in spite of continued use of sites affected by lipohypertrophy. On changing the site, the total dose had to be reduced by 30.95%. This clearly indicates the control was being achieved with unnecessarily increased doses of Insulin. Krishnan Swaminathan has also reported similar improvement in glycaemic control with dose reduction of 30% on shifting from sites showing massive hypertrophy to normal sites. **Error! Bookmark not defined.**, while other reports quote similar improvement with 10% reduction in dose. [3,9]

Lipohypertrophy is a preventable injection site adverse effect of insulin, but once set in, may take months or even years to resolve. [10] This warrants every effort to prevent lipohypertrophy, given the adverse implications it has on glycaemic control. This needs attention & involvement at 3 levels - clinicians, diabetes educators, as well as patients. It has been recommended that clinicians should look for lipohypertrophy and inspect injection sites at the follow up visits, particularly in patients with illusive glycaemic control. [8] Our patient exemplifies the need for regular inspection even in patients with apparently 'good' glycaemic control. Diabetes educators do advise site rotation at the initiation of insulin treatment. Not only is there a need to explain it in depth and actually demonstrate the technique of site rotation at the initiation of treatment, it is also necessary to emphasize it at each follow-up visit to ensure that the patients follow correct injection technique. This will automatically improve awareness amongst patients and their relatives and motivate them to practice what they have been taught; self examine the injection sites regularly and report any abnormalities that they may notice.

CONCLUSION

Thus, lipohypertrophy needs to be recognized and remembered as an important

adverse effect of insulin, often resulting in disturbed blood sugar control. On the other hand, as in our patient, it may also masquerade as apparently good glycemic control, but with unnecessarily increased doses. This highlights the need for proper patient education about the injection technique, emphasizing the need for methodical site rotation and self examination. Inquiry about site rotation method and inspection of injection sites by health care providers should also be made a regular feature of all follow up visits, irrespective of the reported glycaemic control.

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