**CASE REPORT**

Nodules of fibrocollagenous scar tissue induced by subcutaneous insulin injections: a cause of poor diabetic control

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A 46 year old man with longstanding type 1 diabetes of 24 years’ duration presented with an abscess on his scalp. There had been a weight loss of 11 kg and worsening diabetic control. He had a history of microalbuminuria, peripheral neuropathy, background retinopathy, cerebrovascular disease, and hypertension and was taking Human Mixtard 30 insulin 26 units twice daily. For years he had given all his insulin injections into areas of abdominal lipohypertrophy within which hard collagenised fibrous tissue nodules had developed. Injecting insulin at different sites dramatically improved blood glucose control. Fibrocollagenous nodules induced by insulin injections have not been previously described. Examination of a further 73 type 1 patients revealed lipohypertrophy in 44% and hard subcutaneous nodules on two.

**DISCUSSION**

Previous studies of insulin injection sites have not reported discrete large hard nodules of fibrocollagenous scar tissue, although there is one report of a hard thigh nodule containing amyloid. Our audit identified a further two patients with similar hard nodules, both had poor diabetic control (HbA1c 14.4% and 11.1%), and one had weight loss similar to the index case. It is reasonable to assume that
Fibrocollagenous scar tissue and insulin injections

Learning points

- Lipohypertrophy is a common complication of subcutaneous insulin therapy.
- Hard fibrocollagenous nodules can occasionally be found in areas of lipohypertrophy and can be associated with poor diabetic control.
- Patients should be advised to rotate injection sites preferably avoiding the same patch of skin for a month.
- Injection sites should be examined at least annually and more frequently if diabetic control deteriorates.

Many of our patients with lipohypertrophy were aware of the importance of rotating insulin injection sites but cited habit as the main reason they continued to inject into the same area. Avoidance of sites with lipohypertrophy has been shown to improve glycaemic control,1 9 therefore repeated advice on the organised rotation of insulin sites needs to be built into patient education programmes.10 Persistent injections into areas of lipohypertrophy can lead to fibrocollagenous scar tissue “golf balls” and cause major deterioration in diabetic control.

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repeated trauma of localised subcutaneous injections may lead to fat necrosis and then nodules of fibrocollagenous scar tissue. These nodules would not be very vascular and injecting into them would lead to impaired insulin release and poor diabetic control. In our index patient there was a marked improvement in glycaemic control and weight gain after rotation of insulin injection sites and the hard collagen nodules shrank. All three patients with hard nodular lumps admitted to injecting all insulin injections into the nodules mainly due to habit and comfort despite being previously informed of the importance of rotation of insulin sites. Interestingly the abdominal nodules were only noticeable to the two patients after a rapid weight loss and were more apparent when standing up. Injection site lipohypertrophy remains a significant problem in our clinic population with 44% of patients surveyed having some degree of lipohypertrophy.16 Lipohypertrophy was associated with a longer duration of diabetes and it is possible that some of these patients would have been initially treated with animal insulins. It is disappointing that nearly half of our patients (45%) had not had their injection sites examined at the last annual review, although this is recommended.7