Insulin-induced lipoatrophy (LA) is defined as a loss of subcutaneous fat around the site of insulin injections, which is a rare complication of analogue insulin (AI) therapy seen mostly in patients with type 1 diabetes (T1DM). However, there have been a few reports of LA associated with AI such as insulin lispro and glargine, as well as with continuous subcutaneous insulin infusion in T1DM. So far, few case reports describe AI detemir related LA in the up-to-date literature. We here describe detemir related LA in a series of five patients.

We reviewed patients with T1DM on insulin detemir at either the general diabetic outpatient or the antenatal clinic, who were screened by the diabetes team for the presence of LA at insulin injection sites. We noted that most of the patients were being advised by diabetes specialist nurses, as part of a diabetes nursing education programme, to inject insulin aspart (NovoRapid; NR) and insulin detemir (Levemir; LV) at various sites away from each other – NR in the abdomen and LV in the thighs.

Case 1. A 54-year-old female, known T1DM with medical history significant for coeliac disease, hyperthyroidism, bronchiectasis and sarcoidosis, was injecting LV (14 units at bedtime) in her thighs and NR (7–10 units with meals) in her abdomen. She was found to have disfiguring (Figure 1) lipoatrophic areas of various sizes in her thighs. Her LV injection site was changed to her abdomen and her hypoglycaemic spells improved.

Case 2. A 29-year-old female, known T1DM for the last 13 years on LV (40 units at bedtime) and NR (12–14 units with each meal according to amount of carbohydrates), came in her second trimester for her routine fortnightly check-up. She was found to have cosmetically disfiguring LA in her left thigh as well some other LA areas in her right thigh; she remembered having these areas for the last seven months. She had been injecting LV in her thighs and NR in her abdomen unfaithfully for the last three years. She was avoiding injecting in her left thigh after LA started to develop, and she was advised to exclude the thighs for LV injection for the future.

Case 3. A 26-year-old female, known T1DM on LV (20 units in the morning and 22 units at teatime) and NR (on average 8–12 units with each meal), came in her first trimester for her routine three-monthly check-up. She was found to have LA which she has had for the last three months in both thighs. She was advised to stop injecting LV in her thighs.

Case 4. A 32-year-old female, known T1DM on LV (12 units in the morning, 20 units in the evening) and NR (on average 8–11 units with each meal), was found to have LA which she has had for the last year in her left thigh. She gave birth to a healthy baby nine months ago and was also injecting LV in her thighs only.

Case 5. A 60-year-old female, known T1DM who was switched to continuous subcutaneous insulin infusion (CSII) therapy a couple of years ago due to problems with hypoglycaemia, was also found to have LA on the thighs which she recalls having for at least five to six years. She had been injecting LV insulin in the thighs for the last eight years which was stopped when she commenced CSII. The LA subsequently resolved.

Discussion

Nowadays with recombinant AI, although the risk of LA is greatly diminished, it still exists and, with the recent advances and a trend towards CSII therapies, this risk may increase in the future. There is a need to identify patients at risk for developing LA with different types of AI to prevent this disconcerting complication that may lead to erratic insulin absorption from the site. Although the mechanism is not fully understood, the presence of IgM, IgA, C3 and fibrin in these lesions and improvement with steroids do suggest the possibility of an immune-mediated process with release of lysosomal enzyme and tumour necrosis by local macrophages postulating a redifferentiation of adipocytes causing fat loss.

It is also speculated that adipocytes which are chronically exposed to high local insulin concentrations may subsequently develop severe insulin resistance, leading to increased lipolysis, and slimming of adipocytes.

Our patient series demonstrated common grounds for developing LA: female sex, T1DM, and use of the thigh as a site for injecting LV insulin. We were able to determine that common practice among the diabetes nurses at our diabetes department was to inject NR in the abdomen and LV in the thighs. Therefore we also suggested that the thigh should not be regularly used as a possible site for LV injection for patients, to avoid developing lipoatrophy until further evidence is available.

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Consent
Written informed consent was obtained from all of the patients.

Declaration of interests
There are no conflicts of interest declared.

References
References are available online at www.practicaldiabetes.com.
References