OBSERVATIONS

Lipoatrophy in a Girl With Type 1 Diabetes: Beneficial Effects of Treatment With a Glucocorticoid Added to an Insulin Analog

Lipoatrophy has been reported in association with the use of human insulin analogs (1). We report on a girl with severe lipoatrophy who was treated with betamethasone added to the insulin analog, after which the areas of lipoatrophy improved.

A 7-year-old girl with type 1 diabetes, treated with insulin-aspart by continuous subcutaneous insulin infusion, developed areas of lipoatrophy at her insulin infusion sites, which initially only involved the buttocks. A few months later, areas of lipoatrophy were also seen on her thighs. The areas of lipoatrophy on her left and right buttocks measured 7 × 7 cm and 7 × 6 cm, respectively. Laboratory investigation excluded the presence of insulin antibodies. A skin biopsy was not performed.

Initially, insulin-aspart was substituted with insulin-lispro. Because of a lack of improvement, betamethasone (1 μg per IU of insulin) was added to the insulin-lispro. Two months later, the lipoatrophic areas had improved. However, glycemic control became significantly worse as HbA_{1c} levels rose from 9.0 to 9.9%. The basal daily dose of insulin increased from 0.35 to 0.39 IU/kg. Because of fluctuating blood glucose values, the betamethasone/insulin-lispro solution had to be stopped after 6 months. At that time, the areas of lipoatrophy at her left and right buttocks measured 5.5 × 4 cm and 5.5 × 6 cm, respectively. Presently, the process of lipoatrophy remains stable.

The pathophysiology of insulin analog–induced lipoatrophy is not completely understood, but it is considered to be an immunological phenomenon induced by insulin crystals (2). The inflammatory response includes local hyperproduction of tumor necrosis factor-α from macrophages that can lead to a dedifferentiation of adipocytes (3). Tryptase-positive/chimase-positive mast cells could also contribute to the destructive immune process (1).

Corticosteroids have been used in the treatment of lipoatrophy because of their immunomodulating properties and their ability to produce a differentiation of adipocytes (4). Ramos and Farias (5) report a case of lipoatrophy with successful treatment with betamethasone using 0.075 mg in each injection. However, Lopez et al. (1) did not describe any improvement.

In our patient, blood glucose levels fluctuated more after adding betamethasone to the insulin analog. This can occur when the betamethasone/insulin analog solution becomes inhomogenous, causing unsteady insulin administration. Furthermore, betamethasone may reduce insulin sensitivity. In our patient, the daily basal dose of insulin increased after the addition of betamethasone to the insulin analog. However, clinical signs of hypercortisolism were not observed in our patient and were not reported by other authors (5).

The addition of betamethasone to an insulin analog appears to be helpful in the treatment of insulin analog–induced lipoatrophy. However, this improvement must be viewed in the context of an increased insulin demand and an increased chance for worsening glycemic control. In our case, glycemic control was not optimal at the time we considered adding betamethasone to the insulin analog. If this treatment is being considered, more intensive insulin dosing may be required to address the increased glycemia resulting from treatment. Prospective studies are needed to further demonstrate the effectiveness of different treatment modalities and to adequately assess the risk/benefit ratio.

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DOI: 10.2337/dc11-2135

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Acknowledgments—No potential conflicts of interest relevant to this article were reported.

H.T.S. wrote the manuscript. C.W. contributed to discussion and reviewed and edited the manuscript. E.v.P.-N. contributed to discussion and reviewed and edited the manuscript. G.B. wrote, reviewed, and edited the manuscript and is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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