13-year-old boy, the offspring of first cousins, presented with long-standing, brown-black, hyperpigmented, velvety, hyperkeratotic plaques over both ankles, axillae, neck, and groin (Figure 1). His face was acromegaloid and he had a generalized paucity of subcutaneous fat (Figure 2). His muscles were prominent and his abdomen distended (Figure 3). In addition, he was hirsute and his genitalia were enlarged. A paternal uncle has had similar skin lesions since he was a child.
Generalized Lipodystrophy

**Figure 1.** The axilla appears hyperpigmented and velvety, characteristic of acanthosis nigricans.

**Figure 2.** The face is acromegalic and the neck shows changes of acanthosis nigricans.

**Figure 3.** The muscles are prominent and the abdomen is distended secondary to hepatomegaly.

*Generalized lipodystrophy, also known as lipomatosis diabetes, is a progressive multisystem disorder characterized by the loss of subcutaneous and other body fat. The congenital form of generalized lipodystrophy, known as the Lawrence-Seip syndrome, has its onset in the first 2 years of life and is inherited in an autosomal recessive fashion. A sporadic, acquired generalized form has its onset in the first to third decades of life. Partial acquired lipodystrophy occurs sporadically and is characterized by the loss of fat in localized areas.

Individuals affected with the generalized form of lipodystrophy develop a cadaveric appearance with acromegalic face and prominent muscles, the result of accelerated growth and the loss of subcutaneous fat. A complete loss of body fat does not occur in generalized lipodystrophy. There seems to be preservation of fat in sites where fat serves a mechanical function. Large blood vessels beneath the skin may appear prominent because of the loss of fat. Other features of the disorder are hepatomegaly, acanthosis nigricans, genital hypertrophy, and hirsutism. Metabolic abnormalities include insulin resistance with the eventual development of nonketotic, hyperinsulinemic diabetes mellitus, an increased basal metabolic rate, and hyperlipidemia leading to generalized atherosclerosis with coronary artery disease and fatty infiltration of the liver, eventually leading to cirrhosis and portal hypertension.

Acanthosis nigricans invariably develops in affected individuals as a symmetric dermatosis with a hyperpigmented, velvety appearance that gives a sandpaper-like sensation on palpation. The sites of predilection of acanthosis nigricans include the neck, groin, axillae, and inframammary areas. Affected areas over the knees, elbows, and knuckles have a pebbly feel, more common in the acquired form of the disease. Acanthosis nigricans is associated with other disorders that include obesity, endocrinopathies, autoimmune metabolic diseases, and malignant neoplasms, many of which also feature insulin resistance.

Hyperinsulinism, a hallmark of lipodystrophy, is due to heterogeneous defects in insulin binding, receptor expression, receptor kinase function, or postreceptor signaling. There is resistance to ketone production secondary to a paucity of stored fat and elevated circulating insulin levels. The presence of hypothalamic releasing factors in the serum of some patients with lipodystrophy suggests a lack of hypothalamic regulation. The acromegalic appearance of these patients suggests elevated growth hormone secretion, but their circulating levels of growth hormone and insulin growth factor-I may be normal, high, or low. The bone age is usually advanced. Thyroid and adrenal function are generally normal. Plasma glucagon levels range from normal to markedly elevated.

**ENDOCRINE ABNORMALITIES**

The treatment of generalized lipodystrophy is supportive. Caloric restriction may improve hyperlipidemia and carbohydrate tolerance. Good control of blood glucose levels is very difficult to achieve because of the underlying insulin resistance. In one report, the selective dopaminergic blocking agent, pimozide, reversed the physical abnormalities as well as the biochemical disturbances.

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**REFERENCES**