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Case Report

Insulin resistance and pseudoacromegaly: A case report

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ABSTRACT

Patients with acromegaly have soft tissue overgrowth that induced characteristic clinical presentation. A growth hormone-secreting adenoma of the anterior pituitary gland is the most common cause of acromegaly. Metabolic and somatic features of acromegaly caused by high serum concentrations of insulin-like growth factor-I (IGF-I) and excess growth hormone (GH) production. we present a case of 'pseudoacromegaly' with an acromegaloid features, suppressed IGF-I levels and marked elevation of serum insulin. Endocrinologists should consider this diagnosis when assessing patients with clinical features of acromegaly and insulin resistance, in the absence of elevated levels of GH and IGF-I.

1. Introduction

Acromegaly induced by high level of serum growth hormone (GH) that this leads to characteristic metabolic and somatic effects. These patients present with soft tissue and acral overgrowth and have characteristic features. Acromegaly is associated with impaired glucose tolerance, insulin resistance and diabetes. However, an acromegaloid appearance associated with insulin resistance is seen in the absence of elevation of serum GH. The etiology of this condition may be related to a selective post-receptor defect of insulin signaling, affecting the metabolic actions of insulin, but not its mitogenic effects.

2. Case

A 19-year-old Iranian female was referred to the endocrine service because of suspected acromegaly. She had been also seen for the same concern approximately 3 years previously and had been told that "everything was normal." She complained of chronic headaches for 3 years and has tried several medications with partial relief. Over the years she had noticed an increase in her shoe and ring size. At age 18 years, she had scanty vaginal spotting for two days, after which she became amenorrheic. There was no history of visual disturbance, excessive sweating, learning disability or dizziness. On examination, she was 153 cm in height and 55 kg in weight. The coarse facial feature, showed prominent supraorbital ridges, bitemporal recession of scalp hair, a protruding chin and a large nose (Fig. 1).

Acanthosis nigricans was seen on the axillae, back of the neck, antecubital fossae (Fig. 2).

Her fingers and toes were large and her palms and soles were thick (Fig. 3).

There was terminal hair on the face. Her visual fields and funduscopy were normal. Her cardiovascular and respiratory examinations were normal. The patient s clinical symptoms and signs were consistent with a diagnosis of acromegaly. Routine laboratory tests such as complete blood count, electrolytes, urea, creatinine, cholesterol, triglycerides were all normal. Her serum GH and IGF-1 levels were suppressed (GH:0.48micro/L, IGF-1 201 ng/ml [274–482 ng/ml]). In addition, GH levels were suppressed to <1micro/L during 75 g oral glucose tolerance test (OGTT). Her pituitary MRI showed bulging of pituitary gland upper surface superiorly along with well defined hypointense area within right side of pituitary gland measuring about 5*5 mm in favor of microadenoma and stalk of gland deviated to left side. Pituitary function tests including serum TSH, free T4, LH, FSH, prolactin, and cortisole at 8; 00 after 1 mg dexamethasone were normal. She had marked elevation of serum insulin (61microunit/ml [3–17microunit/ml]).

X-ray of the feet demonstrated increased soft tissue thickness and ultrasound of the pelvis showed normal ovaries with multiple cysts and follicles. Her clinical features and laboratory data were consistent with a diagnosis of insulin-mediated pseudoacromegaly. She was treated with metformine, pioglitazone, cyproterone acetate and ethinyl estradiol.

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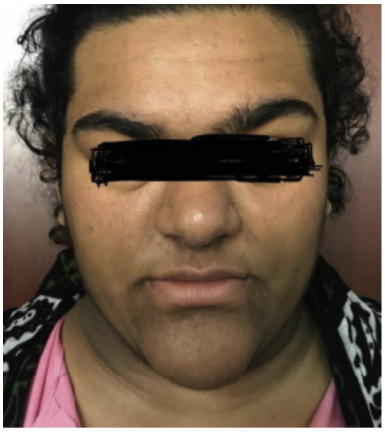

Fig. 1. Coarse face of patient.

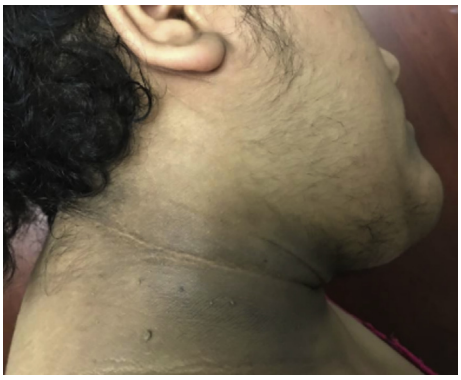

Fig. 2. Acanthosis nigricans and terminal hair on face.

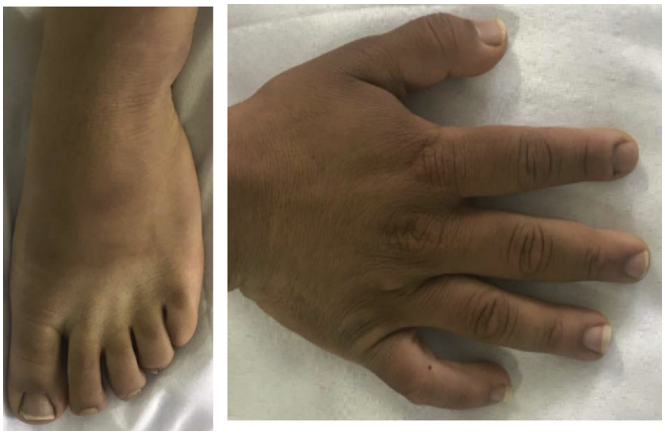

Fig. 3. Large hand and foot with increased soft tissue.

3. Discussion

The metabolic and somatic features of acromegaly induced by elevation of GH production. GH stimulates hepatic synthesis and secretion of IGF-I. Due to the pulsatile nature of GH production, random serum GH is not a reliable test for diagnosis of acromegaly.

Measurement of serum IGF-I is the best screening test for acromegaly. However, nonalcoholic fatty liver disease giving falsely low IGF-I levels in acromegalic patients presenting with uncontrolled diabetes may be seen [1]. Patients with 'insulin-mediated pseudoacromegaly' have an acromegaloid features without high level of GH production [2]. For establishing the diagnosis of acromegaly, the OGTT is the most specific dynamic test. It has been proposed that if both the IGF-I is normal and the GH value is less than 0.3 μg/L, then acromegaly may be excluded [3]. The exess soft tissue growth in these patients has been attributed to the marked elevation of serum insulin [2]. IGF-I and Insulin share a range of biological activities [4].

The differential diagnosis of acromegaloid appearance in the absence of high GH level includes a number of rare genetic syndromes described in some kindreds and pachydermoperiostosis [5–10]. The rare genetic syndromes associated with acromegaloid features are almost always associated with abnormalities of the mucosa, the skin and its appendages, e.g. cutis verticis gyrata (longitudinal folds and furrows in the scalp), hypertrichosis, keratitis and thickened mucosa [5–7,9,10]. These rare syndromes have unknown underlying causes. Acromegaloid appearances with a pericentric inversion of chromosome [11] segregating has been reported in one family [11]. A case of pseudoacromegaly in a patient receiving an unusually high dose of minoxidil for a long period has been reported [12]. The clinical features of pachydermoperiostosis include alopecia, thickening of the skin or the periosteum (the long bones or skull) and acrolysis [13–15]. Unlike insulin-mediated pseudoacromegaly, there is no insulin resistance in pachydermoperiostosis and the other syndromes associated with acromegaloidism [11]. In most patients with non-pachydermoperiostosis acromegaloid syndromes, the features of acromegaly are confined to the face [11].

4. Conclusion

Selective post-receptor defect in insulin signallingy, may be explained the exess soft tissue growth in patients with insulin-mediated pseudoacromegaly. Activation intact mitogenic signaling pathways and stimulation pathological tissue growth induced by the extreme elevation of serum insulin occurring in compensation for the impaired metabolic signaling. This diagnosis should be considered when assessing patients with clinical presentation of acromegaly and insulin resistance in the absence of high IGF-I and GH levels.

Conflicts of interest

The authors declare that they have no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dsx.2018.12.009.

References

[1] Volzke H, Nauck M, Rettig R, et al. Association between hepatic steatosis and serum IGF1 and IGFBP-3 levels in a population-based sample. Eur J Endocrinol 2009;161:705–13.
[2] Yaqub A, Yaqub N. Insulin-mediated pseudoacromegaly: a case report and review of the literature. W Va Med J 2008;104:12–5.
[3] Trainer PJ. Editorial: acromegaly–consensus, what consensus? J Clin Endocrinol Metab 2002;87:3534–6.
[4] Lee YH, White MF. Insulin receptor substrate proteins and diabetes. Arch Pharm Res (Seoul) 2004;27:361–70.
[5] R osenthal JW, Kloepfer HW. An acromegaloid, cutis verticis gyrata, corneal leukoma syndrome. A new medical entity. Arch Ophthalmol 1962;68:722–6.
[6] Kozlova SI, Altshuler BA, Kravchenko VL. Selflimited autosomal recessive syndrome of skin ulceration, arthroosteolysis with pseudoacromegaly, keratitis, and oligodontia in a Kirghizian family. Am J Med Genet 1983;15:205–10.
[7] Hughes HE, McAlpine PJ, Cox DW, Philipps S. An autosomal dominant syndrome with 'acromegaloid' features and thickened oral mucosa. J Med Genet 1985;22:119–25.

[8] Dallapiccola B, Zelante L, Accadia L, Mingarelli R. Acromegaloid facial appearance (AFA) syndrome: report of a second family. J Med Genet 1992;29:419–22.
[9] Irvine AD, Dolan OM, Hadden DR, Stewart FJ, Bingham EA, Nevin NC. An autosomal dominant syndrome of acromegaloid facial appearance and generalized hypertrichosis terminalis. J Med Genet 1996;33:972–4.
[10] Farah S, Farag T, Sabry MA, et al. Cutis verticis gyrata-mental deficiency syndrome: report of a case with unusual neuroradiological findings. Clin Dysmorphol 1998;7:131–4.
[11] Stratakis CA, Turner ML, Lafferty A, et al. A syndrome of overgrowth and acromegaloidism with normal growth hormone secretion is associated with chromosome 11 pericentric inversion. J Med Genet 2001;38:338–43.
[12] Nguyen KH, Marks Jr JG. Pseudoacromegaly induced by the long-term use of minoxidil. J Am Acad Dermatol 2003;48:962–5.
[13] Rimoin DL. Pachydermoperiostosis (idiopathicclubbing and periostosis): genetic and physiologic considerations. N Engl J Med 1965;272:923–31.
[14] Harbison JB, Nice Jr CM. Familial pachydermoperiostosis presenting as an acromegaly-like syndrome. Am J Roentgenol Radium Ther Nucl Med 1971;112:532–6.
[15] Hedayati H, Barmada R, Skosey JL. Acrolysis in pachydermoperiostosis. Primary or idiopathic hypertrophic osteoarthropathy. Arch Intern Med 1980 Aug;140:1087–8.