Case Report

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Old Wine in a New Bottle: Acromegaly Presenting as Diabetic Ketoacidosis

Internal Medicine Section

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ABSTRACT

Acromegaly is a rare disease characterised by chronic excess of Growth Hormone (GH) levels. Insulin signalling is impaired, gluconeogenesis is excess and peripheral insulin resistance is increased in acromegaly causing hyperglycaemia and diabetes. Diabetic Ketoacidosis (DKA) is a rare but known complication of diabetes in acromegaly. Most cases of acromegaly come into light due to the classical soft tissue changes in the face and extremities. A high index of suspicion is required to diagnose this condition in early stage. Here, a case of 22-years-old male presented with DKA and on investigation was found to have acromegaly due to a GH secreting pituitary macroadenoma. This management and subsequent follow-up of the case along with review of literature is also done. Such a presentation of acromegaly was rare but rewarding.

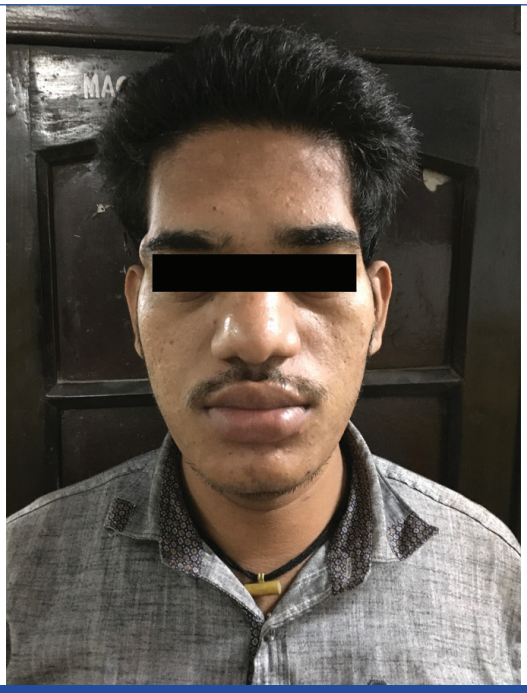
Keywords: Growth hormone excess, Ketosis, Pituitary macroadenoma

CASE REPORT

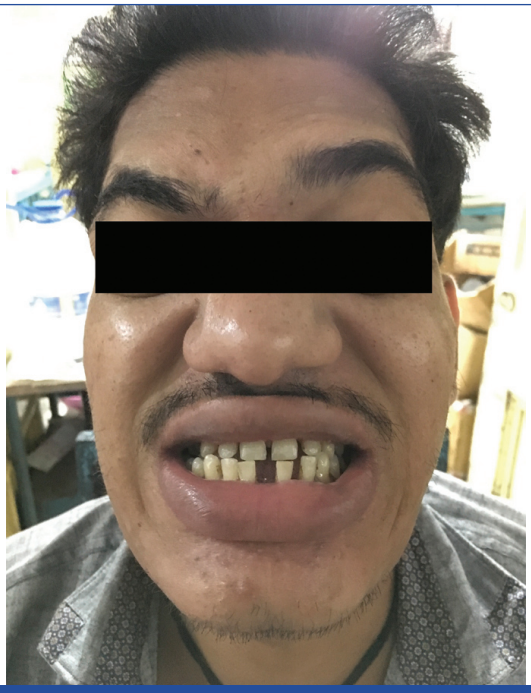
A 22-years-old male patient presented to the Emergency Department with generalised weakness, increased thirst, frequent urination, and weight loss since one month. On inquiry, he gave a history of an increase in the size of his hands and feet and changes in his facial appearance from past last three years. He also complained of headache, vomiting, and decreased vision since three months. He was not a known diabetic or was not on any antidiabetic medication. There was no family history of diabetes. On examination, he was conscious and oriented. His blood pressure was 130/80 mmHg, pulse rate was 110/min, weight was 78 kg and Body Mass Index (BMI) was 30.1 kg/m^2. He looked dehydrated. Features of acromegaly such as coarse facial appearance, thick lips, macroglossia, large hands, and feet were obvious [Table/Fig-1,2]. Immediate investigations revealed blood glucose of 430 mg/dL, serum sodium (Na) 132 meq/l, serum potassium (k) 3.9 meq/l. Arterial blood gas analysis showed high anion gap metabolic acidosis and blood ketones were positive suggestive of DKA.

Patient was treated with intravenous fluids and intravenous regular insulin as per the DKA protocol. Once the patient recovered from DKA, acromegaly was confirmed by a serum Insulin-like growth factor level of 746 ng/mL and a serum GH level of 50 ng/mL two hours post 75 g oral glucose load. Morning serum cortisol was 2.46 mcg/dL, prolactin 22 ng/mL, free T4 was 0.679 ng/dL, Thyroid Stimulating Hormone (TSH) 1.15 mIU/mL, Follicle-Stimulating Hormone (FSH) was 0.498 mIU/mL, Luteinizing hormone (LH) 0.159 mIU/mL and testosterone was <20 ng/dL. Magnetic Resonance Imaging (MRI) revealed a mass measuring 29×28×34 mm in the sellar-suprasellar region, completely encasing the right cavernous sinus and extending to the left cavernous sinus and also compressing the optic chiasma [Table/Fig-3,4]. Visual field testing showed bitemporal hemianopia.

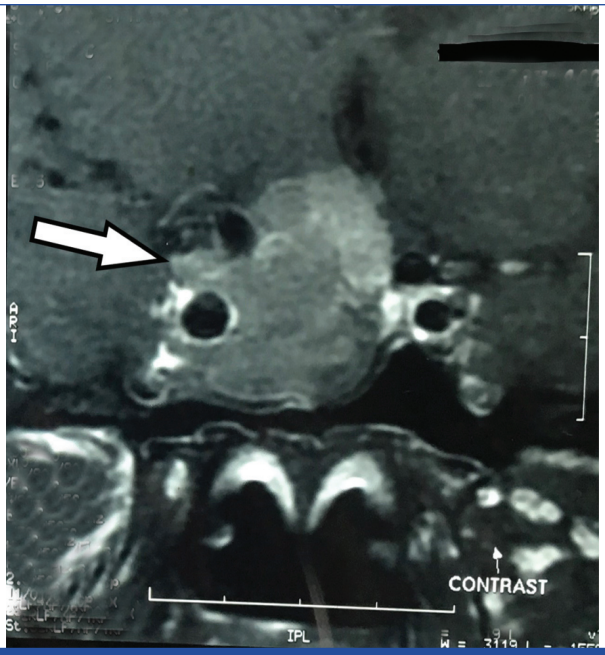
The patient underwent transnasal transsphenoidal, decompression of the tumour. He was started on hydrocortisone, thyroxine, and testosterone supplementation. Multiple daily subcutaneous insulins (40 units per day) were administered to maintain adequate glycaemic control. The patient followed-up after six months. The postoperative



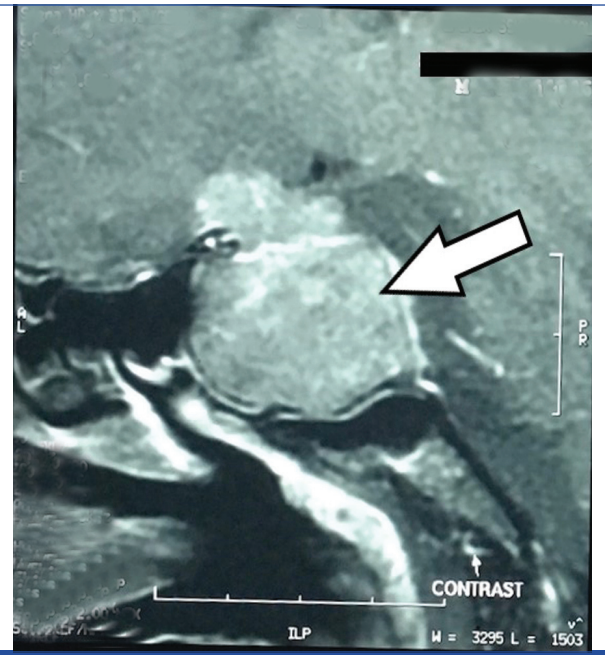
[Table/Fig-1]: Coarse facial appearance showing thick lip and fleshy nose.



[Table/Fig-2]: Front view of the patient (Note the gap between teeth).



[Table/Fig-3]: MRI T1 weighted image (coronal section) with contrast showing pituitary macroadenoma encasing the right cavernous sinus and extending to the left cavernous sinus (white arrow).



[Table/Fig-4]: MRI T1 weighted image (Saggital section) with contrast showing pituitary macroadenoma compressing the optic chiasma (white arrow).

MRI of the sella revealed a residual component of the tumour on the right cavernous sinus although the optic chiasma was free of tumour. In view of clinical and biochemical active acromegaly, the patient was started on long-acting octreotide injections. Currently, the patient is on metformin 1000 mg per day with reasonable glycaemic control.

DISCUSSION

Glucose intolerance and diabetes are known complications of acromegaly [1]. GH hypersecretion may lead to insulin resistance causing impaired glucose tolerance or diabetes in 15% to 38% of cases of acromegaly [2]. Clinically, acromegaly presents with coarse facial features, acral enlargement and features of metabolic and multisystem involvement. Screening test for for diagnosis is Insulin-like Growth Factor-1 (IGF-1), followed by confirmatory testing with glucose suppressed GH and MRI hypothalamopituitary region with dyanamic contrast. Usual aetiology is GH secreting adenoma (macroadenoma more common than microademona), however ectopic GH secreting tumours have also been reported. Treatment is usually done with transsphenoidal surgery followed by radiotherapy or medical therapy (somatostatin analogue or pegvisomant) [1]. GH and IGF-1 modulate insulin action by altering the number of insulin receptors and post-receptor mechanisms. It initially manifests as increased fasting insulin levels and exaggerated insulin response to a glucose load. Later there is fasting hyperglycaemia and a loss of insulin response to glucose [3].

In a large study, on 522 patients of acromegaly presence of diabetes correlated with active disease and serum IGF-1 levels and diabetes was less prevalent in those patients who achieved biochemical control of acromegaly through surgery or pharmacological treatment [4]. Although diabetes significantly improves after control of GH hypersecretion, the prevalence of diabetes in acromegaly patients who are in remission is higher than in the general population [5,6]. In some treated acromegaly patients co-existent hypogonadism, hypothyroidism and the treatment of adrenal insufficiency may contribute to insulin resistance and persistent diabetes [7]. Our patient continued to have a need for oral hypoglycaemic drugs despite biochemical control of acromegaly, which matched with the other cases reported in literature [8,9].

DKA as a presenting feature of Cushings syndrome has been reported previously in the literature [8]. Kabadi UM, reported two cases of acromegaly presenting as moderate to severe DKA and they underwent complete remission of diabetes after surgery in one and surgery followed by somatostatin analog injection in the other patient [9]. Similarly, Simmons LR et al., reported a young patient of acromegaly who presented with DKA which resolved completely with transsphenoidal adenohypophysectomy [10]. Recently, Quarella M et al., reported a case of unrecognised acromegaly presenting with DKA precipitated by an Sodium Glucose Co-transporter-2 (SGLT-2) inhibitor [11].

In the present case patient was not a known case of diabetes or did not have any family history of diabetes. He presented with the acute complication of DKA. Typical features of acromegaly on examination lead to confirmation of the diagnosis. This emphasises the importance of considering the diagnosis of acromegaly in a young patient presenting with diabetic complications.

CONCLUSION(S)

Secondary causes of diabetes is common and should always be suspected in young age or if presentation is with atypical features. A high index of suspicion is essential, especially when the clinical findings are subtle. The insidious nature of soft tissue changes in acromegaly may cause them to go unnoticed by the patient leading to a delayed diagnosis, but may present with metabolic decompensated state like diabetes ketoacidosis. Proper workup and management of acromegaly is rewarding to prevent further complications.

REFERENCES

[1] Fieffe S, Morange I, Petrossians P, Chanson P, Rohmer V, Cortet C, et al. Diabetes in acromegaly, prevalence, risk factors, and evolution: Data from the French Acromegaly Registry. Eur J Endocrinol. 2011;164(6):877-84.
[2] Colao A, Ferone D, Marzullo P, Lombardi G. Systemic complications of acromegaly: epidemiology, pathogenesis, and management. Endocrine Reviews. 2004;25(1):102-52.
[3] Rizza RA, Mandarino LJ, Gerich JE. Effects of growth hormone on insulin action in man: Mechanisms of insulin resistance, impaired suppression of glucose production, and impaired stimulation of glucose utilization. Diabetes. 1982;31(8):663-69.
[4] González B, Vargas G, de Los Monteros AL, Mendoza V, Mercado M. Persistence of diabetes and hypertension after multimodal treatment of acromegaly. J Clin Endocrinol Metab 2018;103(6):2369-75.
[5] Ferraù F, Albani A, Ciresi A, Giordano C, Cannavò S. Diabetes secondary to acromegaly: physiopathology, clinical features and effects of treatment. Front Endocrinol. 2018;9:358.
[6] Rochette C, Graillon T, Albarel F, Morange I, Dufour H, Brue T, et al. Increased risk of persistent glucose disorders after control of acromegaly. J. Endocrinol. 2017;1(12):1531-39.

[7] Ebrahimi F, Christ-Crain M. Metabolic syndrome and hypogonadism–two peas in a pod. Swiss Med. 2016;21:146(1112).
[8] Acharya R, Kabadi UM. Case of diabetic ketoacidosis as an initial presentation of Cushing's syndrome. Endocrinol. Diabetes Metab. Case Rep. 2017:16-0123.
[9] Kabadi UM. Cases of diabetic ketoacidosis as an initial presentation of acromegaly Integr Obesity Diabetes. 2017;3(2):01-04. Doi: 10.15761/IOD.1000171.
[10] Simmons LR, Hughes K, Markovic TP, Chua EL. Diabetic ketoacidosis as a presenting feature of acromegaly: When excess hormone meets hormone deficiency. Clinical Diabetes. 2012;30(4):170-72.
[11] Quarella M, Walser D, Brändle M, Fournier JY, Bilz S. Rapid onset of diabetic ketoacidosis after SGLT2 inhibition in a patient with unrecognised acromegaly. J Clin Endocrinol Metab. 2017;102(5):1451-53.

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