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Is It Prudent to Screen the Thyroid before Initiating Treatment for Acromegaly?

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Authors' contributions

This work was carried out in collaboration between all authors. Authors CR, SA and KVV were responsible for conception of the idea, writing the preliminary draft and editing the images. Authors SA, KVV and NSS were responsible for investigating and treating the patient and following up the patient. All the authors were responsible for editing and proof reading the manuscript.

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Case Study

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ABSTRACT

Aim: To present a case of acromegaly with coexisting thyrotoxicosis and to emphasize the relevance of screening the screening the thyroid before initiating treatment for thyrotoxicosis.
Presentation of the Case: A 55-year-old lady presented with palpitations, and weight loss of two months' duration. She also noted her fingers and toes had swollen up, inability to incise properly since two years. Upon examination, she had morphological features clinically diagnostic of acromegaly. Her thyroid was enlarged was on investigation found to have biochemical evidence of thyrotoxicosis. Fine needle aspiration cytology of the thyroid yielded colloid goiter. Insulin like growth factor-1 was elevated. Serum growth hormone after an oral glucose tolerance test was elevated. Magnetic resonant imaging (MRI) of the brain revealed a hypo enhancing focal lesion of size 11X10X12 mm at the pituitary region with delayed contrast enhancement suggestive of pituitary adenoma. Patient was started on anti-thyroid medications and referred to higher centre, and is awaiting surgery for pituitary adenoma.
Discussion: Among patients with acromegaly the incidence of thyroid diseases is around 78% and it has the most common presentation being nodular thyroid disease as the initial presentation. It is

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uncommon to see patients presenting with symptoms of thyrotoxicosis initially, who had florid morphological features of acromegaly. The prevalence of toxic nodular goiter to the tune of 14.3% in acromegaly. Goiters seen in acromegaly were euthyroid or autonomous, are due to the elevated growth hormone levels independent of TSH action. In about 13 to 17%, thyroidectomies were performed before acromegaly was diagnosed. When patients with acromegaly presents with a weight loss should arouse the possibilities of thyroid cancer or hyperthyroidism.

Conclusion: Screening the thyroid is important, as inadvertent thyroidectomies were performed before acromegaly was diagnosed. When acromegaly co-exists with thyroid dysfunction, the burden of cardiovascular abnormality should be addressed especially, to reduce the morbidity and mortality rate.

Keywords: Acromegaly; thyrotoxicosis; toxic nodular goiter; insulin like growth factor-1 (IGF-1); growth hormone; thyroidectomy; hypopysectomy.

1. INTRODUCTION

Acromegaly is a rare disease with an incidence of 3 to 4 per million people. Thyroid disorders are a commonly associated with acromegaly in 78% [1]. Thyroid disorders are known to be associated with acromegaly, although the prevalence of toxic nodular goiter is low [1]. Thyrotoxicosis in acromegaly can be due to a TSH secreting pituitary adenoma or secondary to the effect of excess growth hormone. In our patient with typical clinical manifestations of acromegaly, such as acral and facial features symptoms and signs of thyroid hyperfunction were minimal. Thyrotoxicosis was made out solely based on biochemical investigations. As inadvertent hypopysectomies were performed before a thyrotoxicosis was diagnosed, screening the thyroid is of utmost importance. We present a case of acromegaly associated with toxic multinodular goiter.

2. PRESENTATION OF THE CASE

A 55-year-old lady, belonging to an iodine sufficient area with no previous comorbidities presented with complaints of palpitation and weight loss over two months. She noted that her fingers and toes had enlarged in the last three years. She had attained menopause eight years back. She did not complain of headache or loss of vision. There was no family history dibetes mellitus, hypertension or thyroid disease. Her pulse rate was 110/minute, and her blood pressure was 120/80 mm of mercury in the right upper limb. She had a muscular build with enlarged fingers and toes, shiny, oily skin with skin tags, prominent supra orbital margins, swollen lips, (Fig. 1 Panels A, B, C,) and malocclusion of teeth. She had no evidence of thyroid orbitopathy. Thyroid was enlarged. Sexual characters were normal. Her visual acuity, field of vision, and optic fundi were normal. Nervous system examination and examination of other systems were within normal limits.

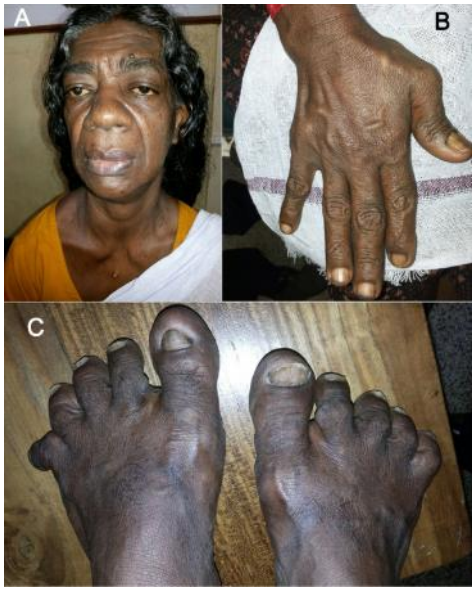

Fig. 1. Panels A. Facial image demonstrating coarsened, enlarged facial features and swollen lips, shiny oily skin with skin tags and prominent supra orbital margins. Panel B. Showing enlarged fingers and Panel C. Showing enlarged toes

Haemoglobin was 125 g/L, Total leucocyte count was $10.9x10^9$/L, Erythrocyte sedimentation rate was 12 mm/hour, Platelet count was 200 $x10^{9/}$L, Serum bilirubin was 1.3 mg/dL, Aspartate aminotransferase (AST) was 24U/L, Alanine aminotransferase (ALT) was 21U/L, Alkaline phosphatase was 53U/L, Blood urea was 22 mg/dL, Serum creatinine was 1 mg/dL Fasting blood glucose was 98 mg/dL, Post prandial blood glucose 132 mg/dL, Thyroid stimulating hormone (TSH) was <0.001 mU/l

(0.34-4.25 mU/l), Free T3-7.8 pmol/L (3.7-7.65 pmol/L), Free T4 -29 pmol/L (9.0-16 pmol/L),Serum insulin like growth factor-1 (IGF-1) was 420 ng/ml (130-350 ng/ml), Serum growth hormone (GH) post oral glucose tolerance test was 12 ng/ml (Normal<1 ng/ml), Follicle stimulating hormone (FSH) 72 mIU/L (18-153 mIU/L), luteinizing hormone 38 U/L (16-64 U/L), Fasting serum cortisol was 479 ng/ml (138-690 ng/ml). Anti-thyroperoxide antibodies, anti-thyroglobulin antibody and thyroid receptor antibody were negative. We could not do a thyroid scintigram as it was not available at our institution. Her electrocardiogram was normal. Plain X-ray of foot revealed pseudo foramina sign on distal phalanx (Fig. 2 Panel A). Plain X-rays of hands revealed spade-like appearance of distal phalanx (Fig. 2 Panel B). Plain X-ray of lumbo-sacral spine showed posterior scalloping of vertebrae (Fig. 2 Panel C), which were features consistent with acromegaly. Plain X-ray of foot lateral view revealed increased foot pad thickness of 27 millimeter (21-23 millimeter) (Fig. 2 Panel D). Plain X-ray of chest PA view was normal. Ultrasound scan of neck revealed thyroid enlargement with right lobe measuring 40X23X14 mm, isthmus measuring 3 mm, and left lobe of thyroid measuring 38X18X48 mm. Both the lobes and isthmus showed multiple hypoechoic leisions with hyperechoic rim with increased vascularity and no lymphadenopathy, suggestive of toxic multinodular goiter. The fine needle aspiration cytology revealed features of colloid goiter. High resolution computed tomographic (CT) scanning of thorax was normal. CT scan of head was normal. MRI T1 weighted images of brain showed hypoenhancing mass of 11X10X12 mm in region of the pituitary on right anterior aspect, which showed delayed contrast enhancement in T1 post contrast images, suggestive of pituitary adenoma with no features of compression. The patient was started on propranolol 40 milligrams twice daily and propyl thiouracil 50 milligrams thrice daily and is awaiting elective transphenoidal surgery.

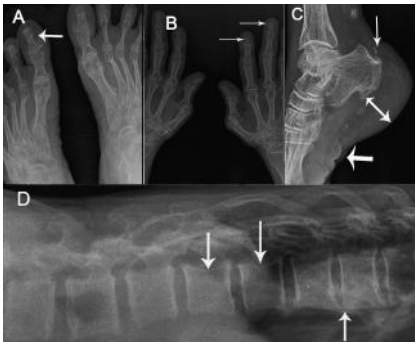

Fig. 2. Panel A. Plain X-ray of foot demonstrating 'pseudo foramina sign' on distal phalanx (arrow), Panel B. Plain X-ray of the hand displaying spade-like appearance of distal phalanx (arrow), Panel C. Plain X-ray of lumbo sacral spine showing posterior scalloping of vertebrae (top arrow) and anterior osteophytes (bottom arrow), Panel D. Plain X-ray of foot lateral view showing calcified tendoachilles (top arrow) and increased foot pad thickness of 27 millimeter (21-23 millimeter) (bottom arrows)

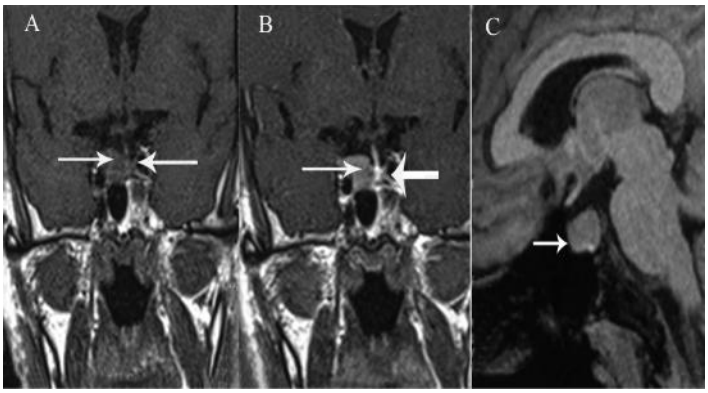

Fig. 3. Panel A. MRI Brain T1 weighted post contrast image coronal section, showing a hypo dense area in the right lobe of pituitary (arrow) suggestive of adenoma and early enhancement of the normal gland (arrow), Panel B. Showing a hypodense area on the right lobe of pituitary, with delayed enhancement (right sided arrows) suggestive of adenoma and normal gland on the left (left sided arrows), Panel C. MRI Brain T1 weighted images sagittal section, showing a hypodense area in the region of pituitary suggestive of adenoma

3. DISCUSSION

Thyrotoxicosis as the first presenting illness in acromegaly is uncommon [1]. Prevelance of thyroid disorders in acromegaly is around 78% [2], with nodular thyroid disease being the most common presentation. Prevalence of toxic nodular goiter is low, to the tune of 14.3% [2]. Inadvertent thyroidectomies were performed in 13 -17 percent of cases before acromegaly was diagnosed [3]. Studies revealed that the patients with acromegaly had twice as large thyroids when compared to persons in the control group, which had a positive correlation with the duration of the disease [1]. There are few cases reported acromegaly presenting for the first time with thyrotoxicosis [2]. Elevated GH levels irrespective of TSH action lead to the formation of goiters which can be euthyroid or hyperthyroid [3]. In the initial stage of acromegaly, a diffuse goiter appears, thyroid autonomy gradually develops, and patients with a longer disease duration develop nodular goiter, which is explained by the prolonged exposure of thyroid cells to an increased level of GH, IGF-1, and decreased sympathetic activity [4,5]. IGF-1 increases the production and stability of vascular endothelial growth factor by affecting m RNA expression and protein synthesis. The elevated IGF-1 in acromegaly thus can increase angiogenesis and vascularity of the thyroid gland [6]. High levels of IGF-1 in acromegaly play a role in the development of thyroid cancers, which warrant a careful monitoring of thyroid function and morphology in this population [7]. Cancer and hyperthyroidism has to be considered when an acromegaly patient presents with weight loss [8]. IGF-1 used in the diagnosis of acromegaly depends on liver function, chronic illness, and age. With increasing age, the serum IGF-1 will decrease and always should be interpreted on the basis of age adjusted lab standards [9]. Mortality from cardiovascular dysfunction will be accelerated in the presence of both these disorders and a high index of suspicion is needed to reduce the same. It is particularly important to keep in mind that IGF-1 should be interpreted on the basis of age and other co-morbid illnesses.

4. CONCLUSION

Screening the thyroid is important, as inadvertent thyroidectomies were performed before acromegaly was diagnosed. When acromegaly co-exists with thyroid dysfunction, the burden of cardiovascular abnormality should be addressed specially, to reduce the morbidity and mortality rate.

CONSENT

Written informed consent was obtained from the patient for submission of the images in the journal.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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