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CASE REPORT

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Aneurysmal dilation of sinus of Valsalva in a patient with undiagnosed acromegaly

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Key Clinical Message

In patients presenting with aortic ectasia and myxomatous valve diseases at young ages, possible underlying acromegaly should be in mind.

Abstract

Acromegaly is a chronic systemic disease mainly caused by the benign pituitary adenoma secreting growth hormone (GH) in excess. Acromegaly is associated with various complications such as cardiovascular diseases. In this regard, timely diagnosis, and management of these patients could be life-saving. Herein, a case of aneurysmal dilation of the sinus of Valsalva with severe aortic and mitral regurgitation in a patient with undiagnosed acromegaly is presented.

KEYWORDS

acromegaly, ascending aortic aneurysm, growth hormone, valve prolapse

1 | INTRODUCTION

Acromegaly is an uncommon chronic endocrine disorder mostly in adulthood, characterized by excessive growth hormone (GH), and subsequent increase of insulin-like growth factor-1 (IGF1).[1] In the majority of patients, acromegaly is developed secondary to the pituitary adenomas.[2] Furthermore, the incidence of acromegaly is about 3–5 million per year, with a prevalence of 40–130/million patients worldwide.[3,4] Nevertheless, recent studies indicated that the true prevalence of acromegaly may be underestimated due to the slow progression of the disease and its late diagnosis.[5] In addition, acromegaly is associated with various systemic complications such as cardiovascular, metabolic, respiratory, and bone diseases.[6] Furthermore, cardiovascular complications are thought to be the most prevalent complications in patients with acromegaly.[7] In this regard, timely diagnosis, management, and treatment of these patients can be life-saving. Herein, a case of aneurysmal dilation of the sinus of Valsalva with severe aortic and mitral regurgitation in a patient with acromegaly is presented.

2 | CASE PRESENTATION

A 32-year-old man was referred to our center (Shahid Rajaee Heart Center, Tehran, Iran) for the evaluation of aortic insufficiency. The patient was complaining of a three-year history of exertional dyspnea, chest discomfort, and palpitation (NYHA functional class 2). At the time of admission, his vital signs were normal. The patient had no remarkable family history. The physical examination revealed no signs of pallor, cyanosis, clubbing,

and lymphadenopathy. Also, jugular venous pulsation was normal. Heart auscultation revealed a decrescendo-blowing diastolic murmur at the left lower sternal border and a pansystolic murmur at the apex. The lungs auscultations were normal and no extremity edema was found. The patient's general appearance was as follows: he was tall of stature and had broad hands and feet (Figure 1), and his face had a large lower jaw. Also, the patient had chest wall deformity similar to pectus excavatum, which upon history-taking was revealed to be secondary to previous trauma. In addition, high-arched palate and lens dislocation were not observed. He mentioned gradual recent changes in shoe size and facial features. The routine laboratory tests were normal except for the high blood glucose (Table 1). The performed electrocardiogram showed a normal sinus rhythm, normal QRS axis, and tall R wave in V3-5 with no significant ST-T change (Figure 2). The echocardiography indicated a severe left ventricle (LV) enlargement (LVEDVI: 134 mL/m^2), normal systolic function (LVEF: 60%); normal right ventricle size and normal systolic function; severe left atrium enlargement with normal right atrium size; proleptic and myxomatous mitral valve prolapse; myxomatous with severe mitral regurgitation; a proleptic and tricuspid aortic valve with moderate to severe aortic regurgitation; a proleptic pulmonary valve with mild to moderate pulmonary regurgitation; a proleptic tricuspid valve with moderate regurgitation, a tricuspid regurgitation gradient (TRG), 34 mmHg, and systolic pulmonary pressure, 39 mmHg; an enlarged sinus of Valsalva (6.2 cm), ST junction (4.7 cm), and ascending aorta (4 cm) (Figure 3). A computed tomographic scan confirmed the echocardiography data with the sinus of Valsalva at 6.14 cm and the ST junction at 5.97 cm (Figure 4). He was a candidate for the Bentall procedure and mitral valve replacement. It should be noted that since the patient did not have any chest pain, or coronary diseases risk factors, he did not receive any preoperative coronary artery assessment.

Due to the abnormal general appearance and high blood glucose level, we requested an endocrine consult, and the diagnosis of acromegaly was suspected. Further laboratory workups revealed a high serum IGF-1532 C.L (94–237) and a glucose tolerance test was done and acromegaly was confirmed (Table 2). Furthermore, the magnetic resonance imaging revealed a homogeneous microadenoma (9-6-3 mm) in the right-sided inner border of sellaturcica (Figure 5). The endocrinologist suggested trans-sphenoidal surgery, however regarding it was impossible to defer the Bentall procedure: medical therapy was started and long-act somatostatin analog and bromocriptine were prescribed. The Bentall procedure and mitral valve replacement were performed without any complication and the trans-sphenoidal pituitary surgery was performed 6 months after the cardiac surgery. Postoperative pathological evaluation confirmed the myxomatosis changes of excised valves.

3 | DISCUSSION

According to the studies, patients with acromegaly have significant higher rates of mortality and cancers.[8] In this regard, acromegaly is associated with various cardiac complications such as hypertension, valvulopathies, myocardial hypertrophy, arrhythmia, and cardiac insufficiency.[9] In addition, although the exact mechanism of cardiac complications in patients with acromegaly such as aortic root dilatation is not completely understood yet, prolonged exposure to excessive GH and IGF-I is thought to be the main contributing factor.[6,10] Excessive levels of GH and IGF-I lead

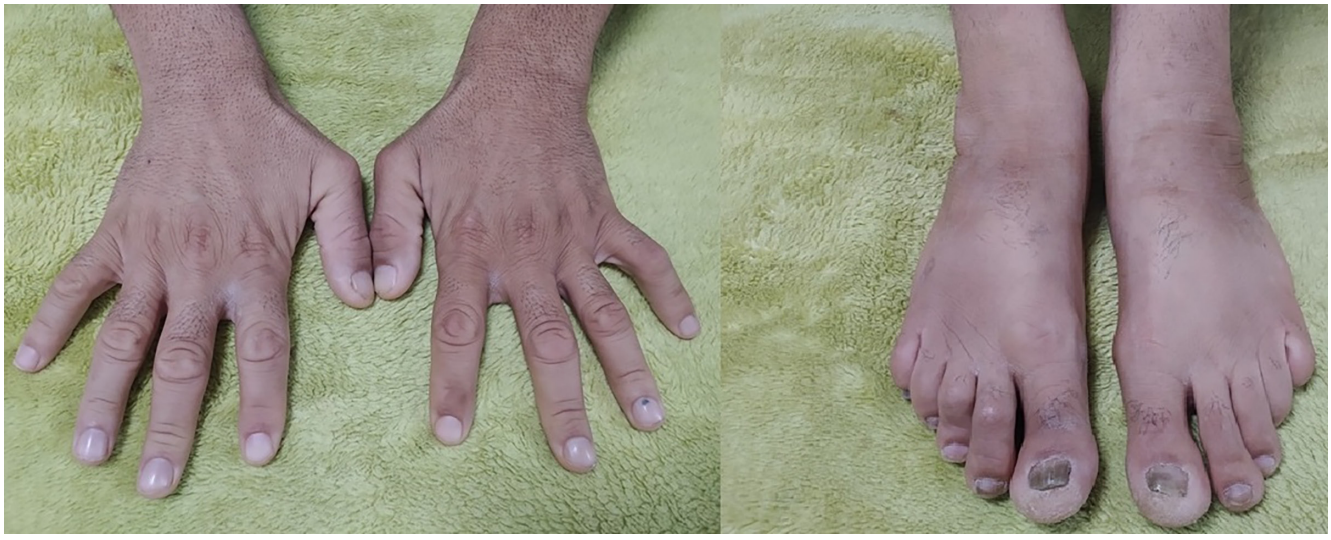

FIGURE 1 The patient's general appearance was tall of stature and had broad hands[21] and feet (right).

TABLE 1 Performed laboratory tests at the time of admission.

Test	Result	Unit	Reference value
Hemoglobin	12.6	g/dL	12–15.6
White blood cell	6000	Cells/mm^3	4500–11,000
Platelet	220,000	Cells/mm^3	150,000–450,000
BUN	14	mg/dL	7–20
Cr	0.6	mg/dL	0.6–1.4
Na	143	mg/dL	135–145
k	4.1	mg/dL	3.5–5.5
Ca	9	mg/dL	8.5–10.5
Phosphorus	4.4	mg/dL	2.5–5
mg	2.2	mg/dL	1.9–2.5
Fasting blood sugar	187	mg/dL	70–115
Erythrocyte sedimentation rate (ESR)	20	mm/h	<20
C-reactive protein	4	mg/L	<6
Cholesterol	105	mg/L	Up to 200
Triglyceride	14	mg/L	Up to 200
High-density lipoprotein (HDL)	29	mg/L	≥35
Low-density lipoprotein (LDL)	56	mg/L	Up to 130
AST	17	IU/L	5–40
ALT	19	IU/L	5–40
ALK phosphatase	189	IU/L	64–306
Total bilirubin	4.3	mg/dL	0.4–1.5
Direct bilirubin	0.3	mg/dL	
Uric acid	2.7	mg/dL	2.3–7.9
Albumin	40	g/L	34–53
TSH	1.1	IU/L	0.5–5
Serum iron	76	μg/dL	40–155
TIBC (total iron binding capacity)	379	mg/dL	260–460
Ferritin	69	ng/dL	20–210
Vitamin-D3	15.7	ng/mL	20<

to elevated expression of the matrix metalloproteinases, this in turn, amends the extracellular matrix resulting in the hypertension, and abruption of glucose and lipid metabolism, cardiac remodeling and hypertrophy.[9,11,12] In addition, timely diagnosis of acromegaly is associated with a reduced risk of cardiovascular complications.

Valve diseases in patients with acromegaly are commonly reported in the literature.[13] The most commonly involved valves are mitral and aortic, and it is known to be a result of mucopolysaccharides and collagen deposition in leaflets, leading to myxomatous valves and regurgitation.[14,15] As seen in our patient, all valves were myxomatous, and aortic and mitral valves had severe regurgitation. In addition, aorta aneurysms as a complication of acromegaly are rarely presented in the literature. Nevertheless, based on previous studies aortic ectasia is more common in patients with acromegaly.[12,16] Our patient was presented with a sinus of Valsalva aneurysm, which requires immediate intervention.

It should be noted that adequate history-taking and physical examinations play a crucial role in differentiating possible diagnoses. In this regard, our patient had a marfanoid general appearance with no family history. Further history-taking such as abrupt changes in facial features, hand and feet size, history of snoring, examination of lens, and tongue raised suspicions of acromegaly. As previously mentioned, acromegaly is mostly due to GH-secreting adenomas. Furthermore, these adenomas may cause a mass effect-related endocrine abruption. These mass effects are mostly seen in patients with macro-adenoma.[17] It should be noted that our patient was diagnosed with micro-adenoma and in further analyses, no mass effect-related endocrine disturbance was detected. In addition, based on the recent

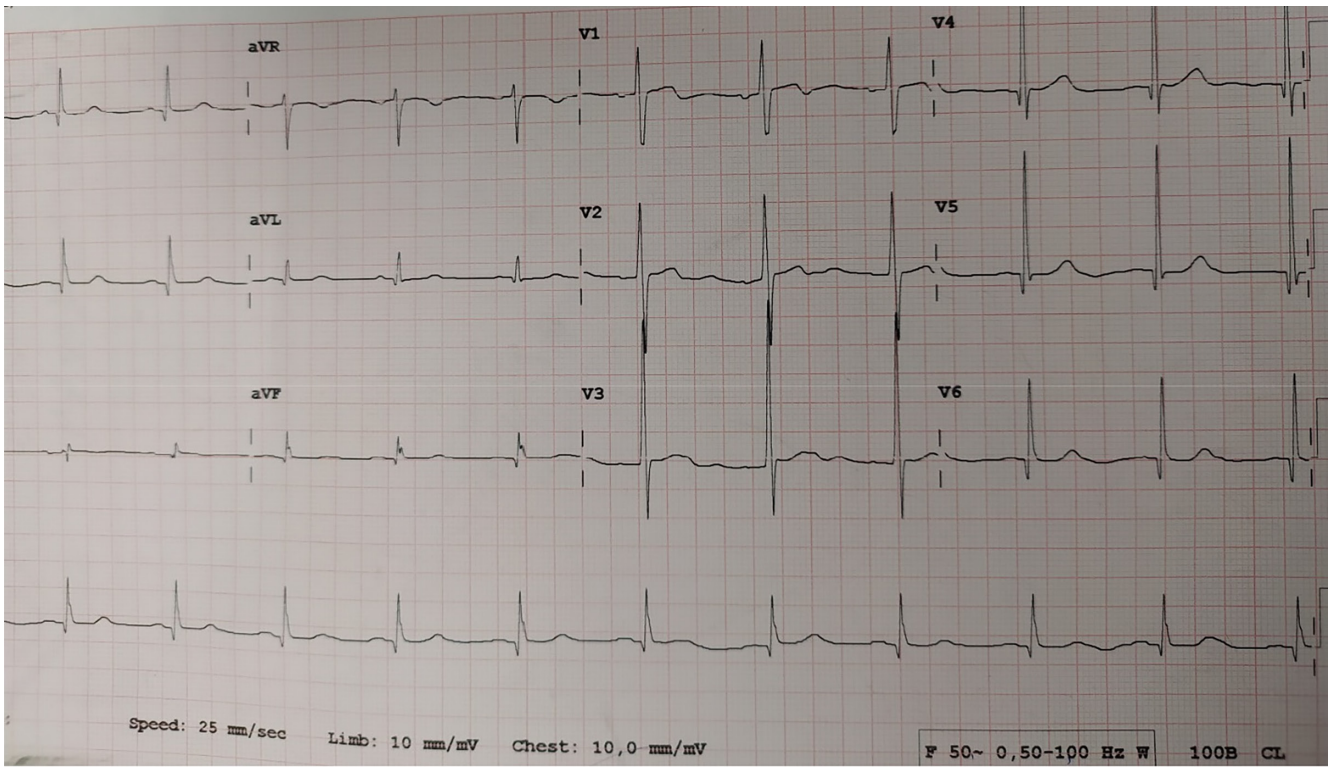

FIGURE 2 The ECG of patient indicating normal sinus rhythm, normal QRS axis, and tall R wave in V3-5 with no significant ST-T change.

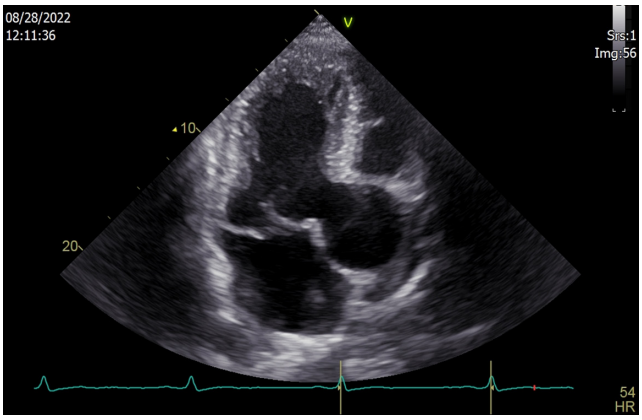

FIGURE 3 The echocardiogram revealed the aortic regurgitant jet and prolapsing mitral valve leaflet.

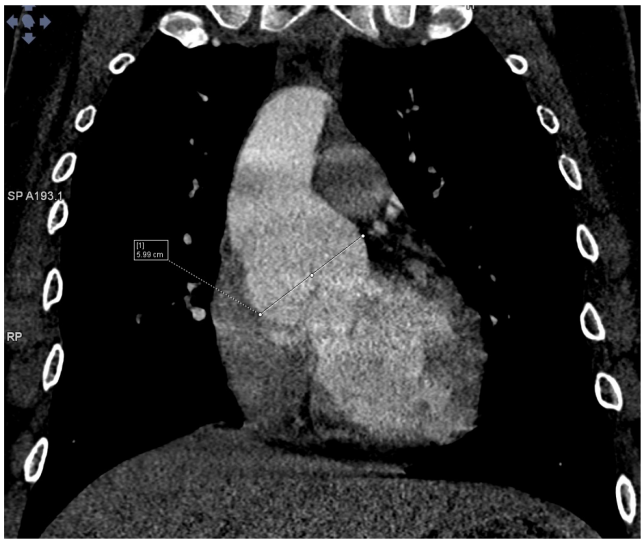

FIGURE 4 Coronal oblique CT angiography reconstruction shows Dilation of Sinus of Valsalva with effacement in Sinu-tubular ridge.

guideline, studies suggest the administration of somatostatin receptor ligands and other medical therapies three to 6 months before the surgery. This not only improves the overall condition of patients with acromegaly but also reduces the risk of anesthesia and surgery through decreasing levels of GH.[18,19] Also, some studies suggested that this pre-surgery medical treatment may reduce the pituitary adenoma tumor size, leading to easier surgical excision.[20] In this regard, our patient received medical treatment for 6 months before the trans-sphenoidal surgery.

4 | CONCLUSION

The current case report described a case of undiagnosed acromegaly presented with aneurysmal dilation of the sinus of Valsalva with severe aortic and mitral regurgitation. Due to the high prevalence of cardiovascular

TABLE 2 Further laboratory work-ups during the hospitalization.

Test	Result	Unit	Reference value
PTH	39.7	pg/mL	15–69.3
Cortisol	9.4	pg/dL	2.9–17.3
Prolactin	18.3	ng/mL	3.46–19.4
ACTH	17	pg/dL	7.2–63.3
IGF-1	532	ng/mL	94–237
GH basal	3.44	ng/mL	<10
GH (60) after glucose	3.29	ng/mL	<1
GH (120) after glucose	1.95	ng/mL	<1
FSH	2.46	mIU/mL	1.5–12.4
LH	2.45	mIU/mL	0.57–12.1
Free testosterone	3.33	pg/mL	0.31–28.1

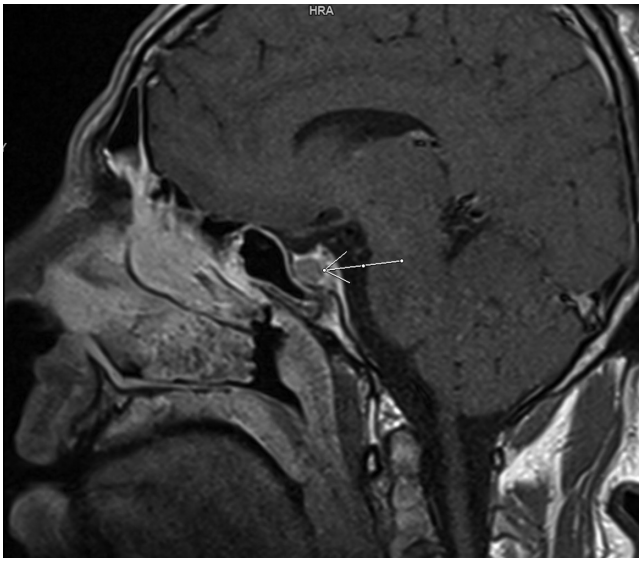

FIGURE 5 Sagittal view of the nodule involving pituitary gland with homogenous enhancement in delay post contrast images.

complications in patients with acromegaly, a high clinical suspicion in susceptible patients and timely diagnosis prevents further morbidity and mortality. In addition, in patients presenting with aortic ectasia and myxomatous valve diseases at young ages, possible underlying acromegaly should be in mind.

AUTHOR CONTRIBUTIONS

Hoda Gharoyahangar: Data curation; investigation; project administration. **Sepideh Taghavi:** Conceptualization; data curation. **Zahra Ghaemmaghami:** Investigation. **Parham Rabiei:** Formal analysis. **Azadeh Afzalnia:** Data curation; formal analysis.

CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author (HG).

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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