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Case Report

Acromegaly, an Exceptional Cause of High-Grade Heart Blocks

A. Maliki Alaoui[1], H. El Jadi[2, 3*], M. H. Cherradi[1], I. Meziane[1], Z. Lahlafi[1, 4]

[1]Cardiology Department, Oued Eddahab Military Hospital, Agadir, Morocco
[2]Endocrinology Department, Oued Eddahab Military Hospital, Agadir, Morocco
[3]Faculty of Medicine of Marrakech, Cadi Ayyad University, Morocco
[4]Faculty of Medicine of Casablanca, Hassan II University, Morocco

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***Corresponding Author:** H. El Jadi
Endocrinology Department, Oued Eddahab Military Hospital, Agadir, Morocco

Abstract

Acromegaly is a rare disorder resulting from the excessive secretion of growth hormone (GH) and causing a specific form of cardiomyopathy. Until now, it has been widely recognized that individuals with acromegaly face an elevated risk of arrhythmias. However, high-grade atrioventricular blocks are a very rare complication of acromegaly. We report the clinical observation of a 75 years old acromegalic male presenting with high-grade atrioventricular block requiring permanent stimulation with a pacemaker.

Keywords: Acromegaly, Cardiomyopathy, Arhythmia, High-grade atrioventricular blocks, Somatostatin.

INTRODUCTION

Acromegaly is a rare hormonal disorder due to hypersecretion of growth hormone (GH) by a benign pituitary tumor. It is associated with a dysmorphic syndrome (skeleton and soft tissues) and multivisceral involvement (visceromegaly). Cardiac damage is a constant feature of this rare disease and is the leading cause of death in acromegaly.

The specific cardiac involvement of acromegaly is characterized by myocardial hypertrophy associated with diastolic dysfunction.

A significant increase of Intraventricular conduction defects and arrhythmias has been described in acromegaly. However, high-grade atrioventricular blocks are less common.

CASE REPORT

We report the clinical observation of a 75 years old acromegalic male (Figure 1) with a history of hypertension and dyslipidemia, ongoing obstructive sleep apnea and exertional chest tightness. He was admitted to the Otorhinolaryngology department to undergo tracheotomy for an upper airway obstruction. The pre-anesthesia evaluation found a Mobitz II Atrioventricular block. In view of the impact of the obstructive syndrome, a tracheotomy was performed, but a shift to severe bradycardia then a transient ventricular pause occurred. The patient was transferred to the electrophysiology and rhythmology department for further assessment.

On admission, the patient was confused. Vital signs were as follows: temperature 37; blood pressure 156/62 mmHg; heart rate 56 bpm; respiratory rate 22 bpm and oxygen saturation of 95% on 6l/min oxygen. Cardiac auscultation revealed normal S1 and S2 without additional heart sounds. There was no murmur at rest or provocative maneuvers; the rest of the examination was unremarkable.

Electrocardiogram at admission showed a bradycardia at 47 bpm related to a 2/1 Mobitz II Atrioventricular block, a right bundle branch block with QRS duration at 138ms, a left anterior fascicular bloc and an isolated premature ventricular beat (Figure 2). Chest radiograph was normal. The echocardiographic evaluation demonstrated a concentric left ventricular hypertrophy, and a slightly dilated left atrium, an ejection fraction of left ventricular at 60%, a normal right ventricle measurement and function.

Figure 1: Pictures of a 75 years old with acromegaly.

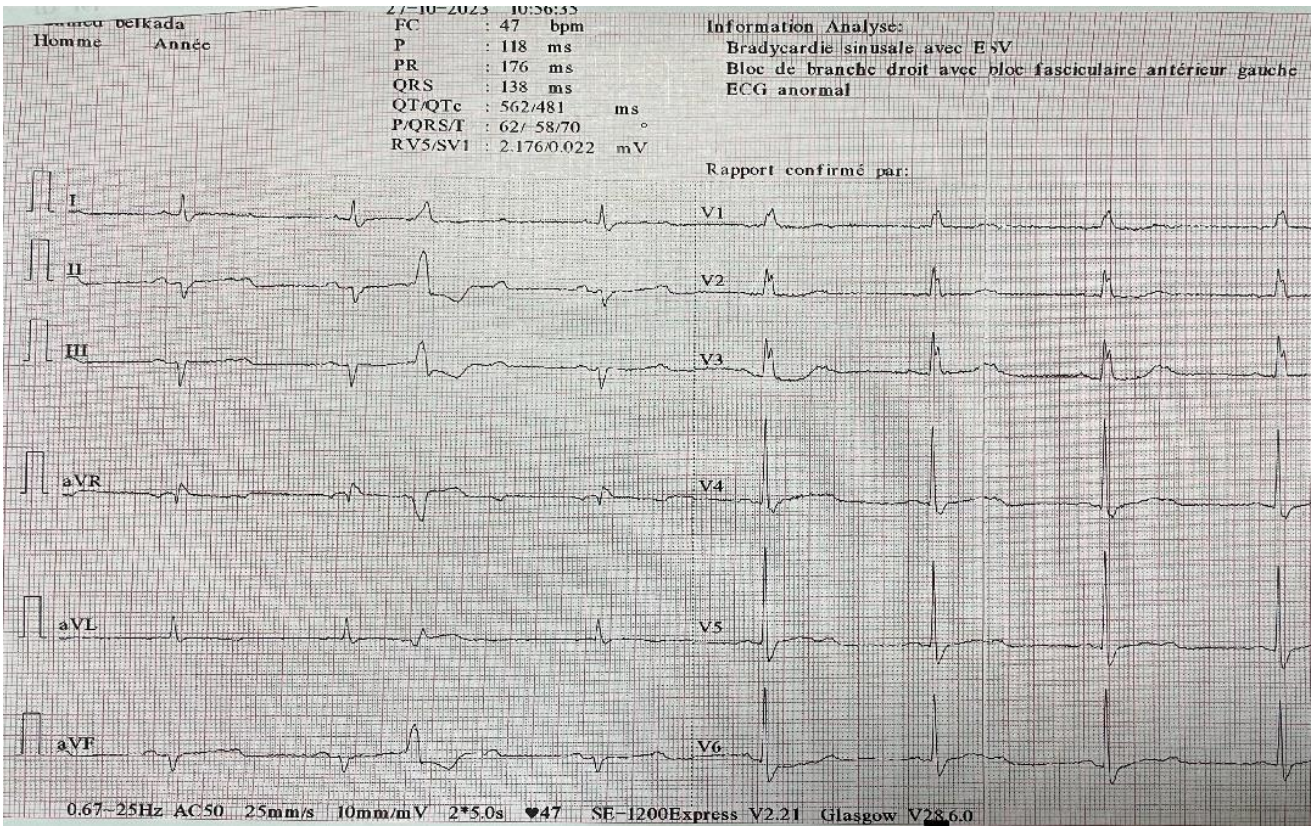

Figure 2: Electrocardiograph showing rhythm abnormalities of the patient

Electrophysiological study revealed prolonged HV interval indicating the need for pacemaker implantation (Figure 3). The patient has been implanted with a dual-chamber pacemaker then discharged from hospital (Figure 4).

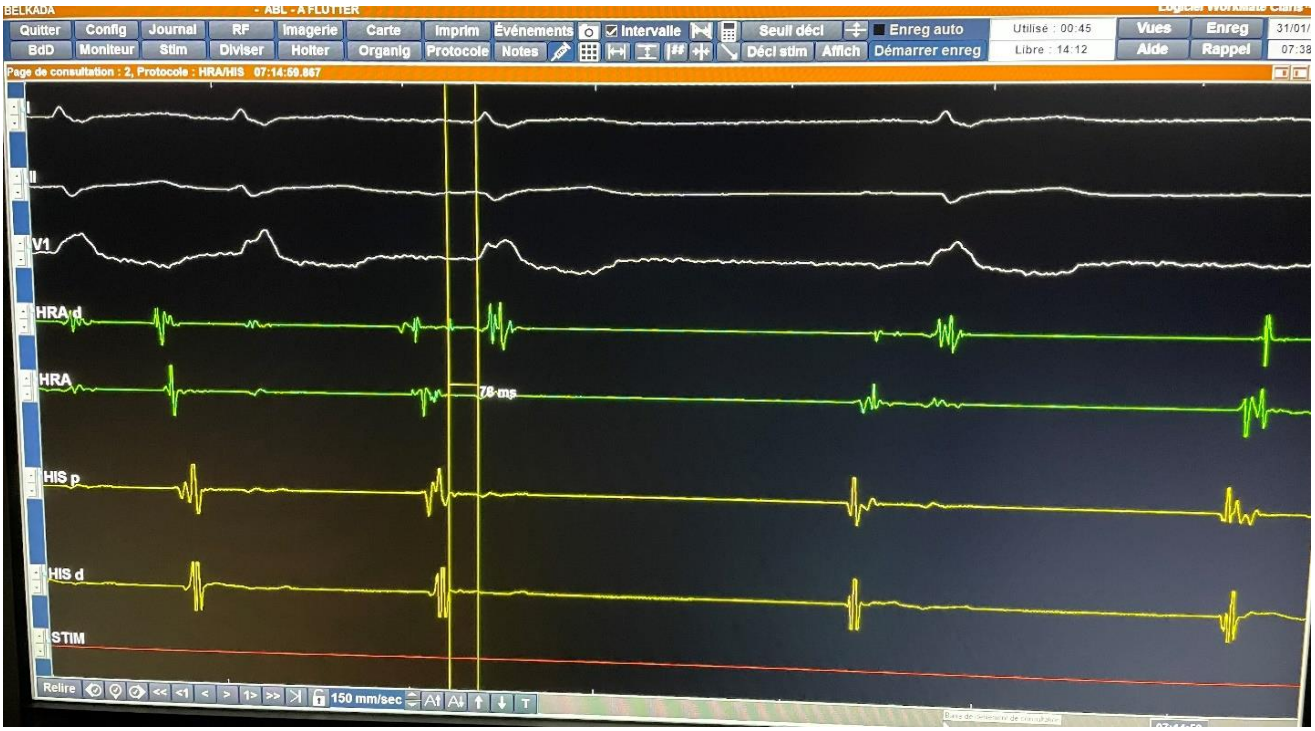

Figure 3: Electrophysiological study revealing prolonged HV interval

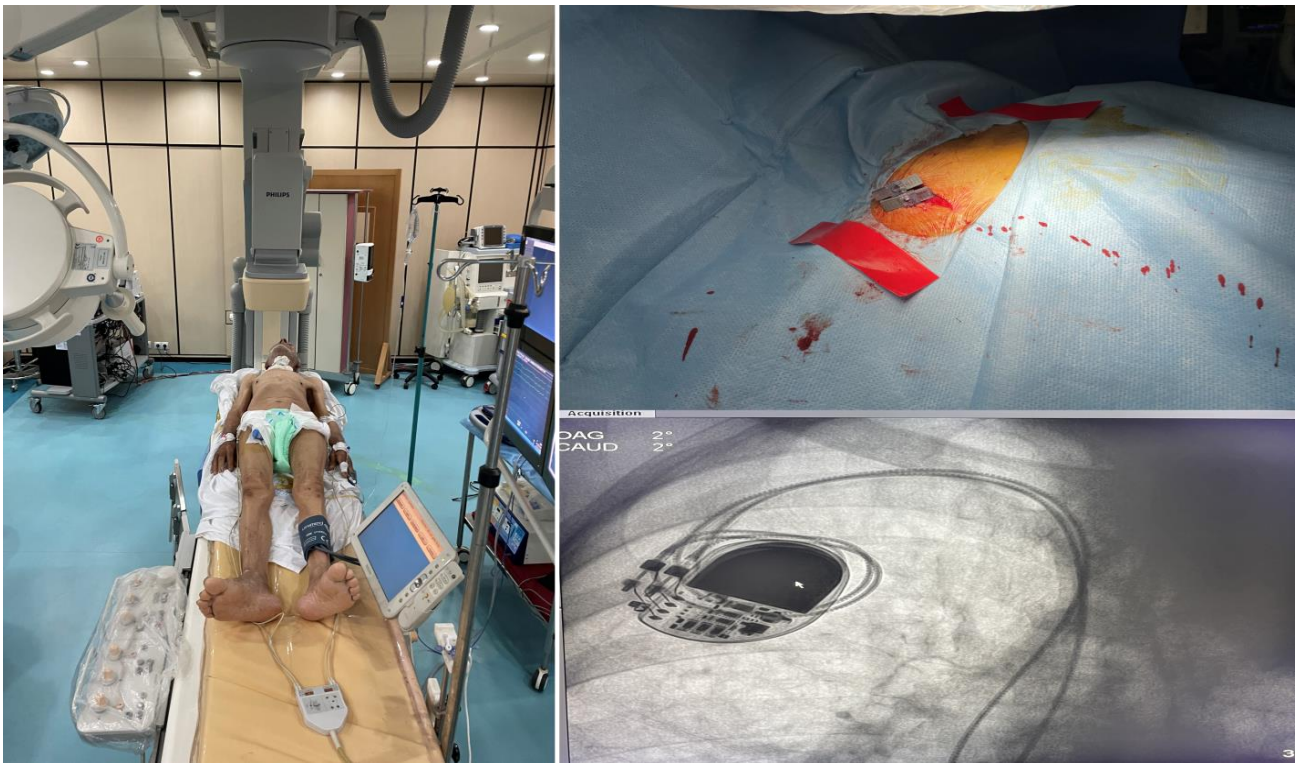

Figure 4: Pacemaker implantation procedure

DISCUSSION

Acromegaly is a chronic disease characterized by an excess of growth hormone (GH) and insulin-like growth factor 1 (IGF-1). It is associated with various systemic complications, including cardiovascular disease.

Hypertension occurs in around 20% to 30% of patients. Its pathogenesis is mainly linked to an increase in plasma volume as a result of the action of GH and IGF-1 in the kidney, which promotes sodium retention, but abnormalities in the vessels also play a part in the pathogenesis. Left ventricular hypertrophy and diastolic dysfunction have been frequently reported and are mostly benign and of no clinical consequence. Recent

cardiac MRI studies have described a much lower frequency of myocardial hypertrophy than ultrasound-based assessments [1].

Progression to systolic dysfunction with congestive heart failure is now very rare. The risk of coronary heart disease does not appear to be increased. Cardiac valve abnormalities associated with acromegaly may be related to fibrotic changes and appear to persist after effective treatment of acromegaly. Advances in the treatment of acromegaly in recent decades have significantly reduced the cardiovascular burden of the disease, with cardiovascular disease now the leading cause of death [2].

Cardiac arrhythmias and sudden cardiac death are major contributors to increased mortality in acromegaly. Elevated beat-to-beat QT variability and late potentials correlate with ventricular tachyarrhythmias [3-5].

Intraventricular conduction defects and arrhythmias are common, and while high-grade atrioventricular blocks are less frequent, prevalence varies (7–40%) due to study size, control group differences, monitoring techniques, and significant arrhythmia definitions [6-8].

In a research series conducted by Kahaly *et al*., [9], a group of 32 acromegalic patients was compared to a control group of 50 individuals without cardiac disease. In the baseline 12-lead ECG assessments, all patients were in sinus rhythm (SR); however, three patients presented with left anterior fascicular block (LAFB), two with first-degree atrioventricular block, and two with ventricular premature beats (VPBs). During stress testing, 12 acromegalic patients developed VPBs and sustained ventricular premature beats. Additionally, two patients were unable to complete a maximal test due to an increased occurrence of complex VPBs (Low grade IIIIVb) during exercise

Mafei *et al*., documented the case of an 82-year-old woman with acromegaly who urgently needed pacing for third-degree atrioventricular (AV) block, despite some confounding factors in this case including recent codeine consumption and mild hypothyroidism [10]. In a separate instance, Tan *et al*., detailed the experience of a 57-year-old man admitted for syncope attributed to third-degree AV heart block shortly after an acromegaly diagnosis. The patient was subsequently treated with permanent pacing [11].

There is evidence of the impact of treatment of acromegaly on cardiac conduction tissue. Treatment with somatostatin analogs can reduce clinically significant arrhythmias in some cases by reducing heart rate, PVBs, and QT interval [12].

Ghirlanda G. and colleagues conducted an in vivo assessment of somatostatin's impact on electrophysiology in a cohort of six patients who underwent a comprehensive electrophysiological study both before and after administration. The study encompassed various rhythm disturbances, such as paroxysmal supraventricular tachycardia, sick sinus syndrome, Wolf-Parkinson White syndrome, and ventricular tachycardia. Noteworthy outcomes of somatostatin administration included the extension of atrioventricular nodal refractory time and a decrease in heart rate. These effects were completely counteracted by the administration of atropine [13-20].

CONCLUSION

Regarded for a long time as the primary contributors to mortality in individuals with acromegaly, recent evidence suggests that acromegalic patients experiencing cardiovascular complications now exhibit a mortality rate comparable to the general population. Interestingly, cancer has emerged as the predominant cause of death in this patient group

Interstitial fibrosis and cardiac hypertrophy associated with acromegaly could promote arrhythmias and conduction abnormalities of which high-grade heart block is an exceptional manifestation. Treatments of acromegaly reduce the incidence of cardiovascular complications and have a positive impact on rhythm disturbances.

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