CASE REPORT

DOI: 10.4274/ijca.2023.03511
Int J Cardiovasc Acad 2023;9(3):78-81

Reversible Pulmonary Hypertension Associated with Myasthenia Gravis

Ahmet Taha Şahin, Yakup Alsancak, Öznur Keskin, Mehmet Akif Düzenli

Necmettin Erbakan University, Meram Faculty of Medicine, Department of Cardiology, Konya, Turkey

Abstract

Myasthenia gravis (MG) is an autoimmune disease that causes localized and generalized muscle weakness caused by antibodies targeting various components of the postsynaptic membrane. Respiratory muscle involvement as a feared complication of this disease can be life-threatening and cause respiratory failure requiring intubation and mechanical ventilation. The relationship between MG and pulmonary hypertension (PH) has been rarely seen in the literature, and here we present a case who presented with respiratory failure and started treatment with the diagnosis of PH and was diagnosed with MG in the follow-up.

Keywords: Myasthenia gravis, neuromuscular disease, pulmonary hypertension

INTRODUCTION

Myasthenia gravis (MG) is a chronic autoimmune disease in which weakness in the skeletal muscles is created by immune system antibodies that affect different components of the postsynaptic membrane and impair neuromuscular transmission.[1] Acetylcholine receptor antibodies are found in approximately 80% of patients with MG. Although this disease is more common among women under 40 years of age than in men of the same age group, it is predominant in male patients over 50 years of age.[2] Respiratory failure is a life-threatening complication of MG. However, its relationship with pulmonary hypertension (PH) remains unclear.[3] This report presents the case of a 35-year-old patient diagnosed with PH after presenting with chronic respiratory failure. The patient had been intubated during treatment for coronavirus disease-2019 (COVID-19) and received no significant benefits from pulmonary arterial hypertension (PAH)-specific treatment. The patient's symptoms were relieved after the treatment for MG.

CASE REPORT

A 35-year-old male patient with no comorbidities presented to our clinic with exertional dyspnea and fatigue. The patient's history revealed that he had experienced respiratory arrest 10 months prior to the diagnosis. This was followed by a two-week intubation period and subsequent inhaler treatments. No accompanying autoimmune comorbidities were observed. On physical examination, the respiratory component (P2) of the second heart sound was dominant with a 2/6 systolic murmur on the right parasternal border. The electrocardiogram was in sinus rhythm (Figure 1). The patient had never received cardiac therapy, and a chest X-ray was evaluated as normal (Figure 2). The patient's N-terminal pro-brain-type natriuretic peptide level was 221 pg/mL.

Transthoracic echocardiography (TTE) showed normal left ventricular function, enlarged right ventricular (RV) end-diastolic chamber sizes [RV: 39 mm, right atrial (RA): 36×47 mm], moderate to severe tricuspid regurgitation (peak systolic tricuspid regurgitation velocity: 3.8 mm), and borderline RV function

To cite this article: Şahin AT, Alsancak Y, Keskin Ö, Düzenli MA. Reversible Pulmonary Hypertension Associated with Myasthenia Gravis. Int J Cardiovasc Acad 2023;9(3):78-81

Address for Correspondence: MD Ahmet Taha Şahin, Necmettin Erbakan University, Meram Faculty of Medicine, Department of Cardiology, Konya, Turkey
E-mail: tahasahin94@gmail.com
ORCID ID: orcid.org/0000-0002-2928-1059

Received: 08.07.2023
Revised: 29.08.2023
Accepted: 02.09.2023
Published Online: 08.09.2023

(tricuspid annular plane systolic excursion: 18 mm and RV Sm: 12 cm/s). Using TTE, the diameter of the inferior vena cava was measured as 1.9 cm with a collapsibility of over 50%. Color flow Doppler imaging showed no suspicion of a left-to-right shunt. The patient's estimated systolic pulmonary artery pressure (PAP) (63 mmHg) was high. Transesophageal echocardiography confirmed the absence of a left-to-right shunt.

In examinations performed in the chest diseases clinic, computed tomography (CT) revealed the patient's thorax to be normal (Figure 3). Subsequent ventilation perfusion scintigraphy showed that the patient was at low risk of embolism (Figure 4). No uptake was observed in high-resolution CT (HRCT) imaging because of the persistence of dyspnea, and CT angiography did not detect pulmonary embolism (Figure 5). Pulmonary function tests revealed an FEV1/FVC of 81% and normal DLCO levels. In a 6-minute walking test, the patient was measured as moving 300 meters. His O_2 saturation was 92% before the

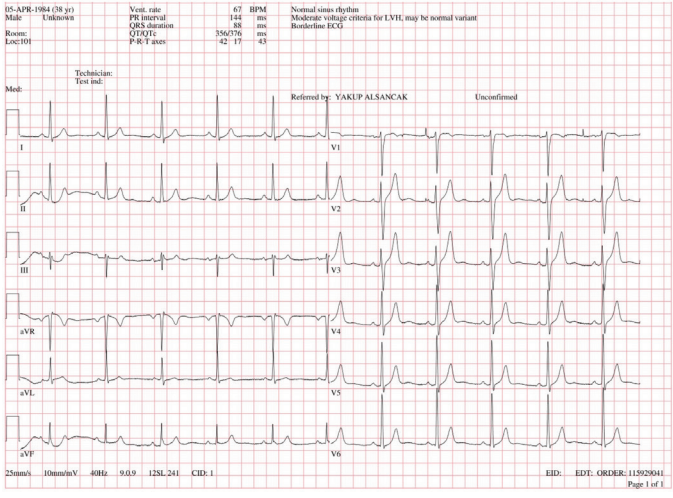

Figure 1: Electrocardiogram does not demonstrate any obvious pathology

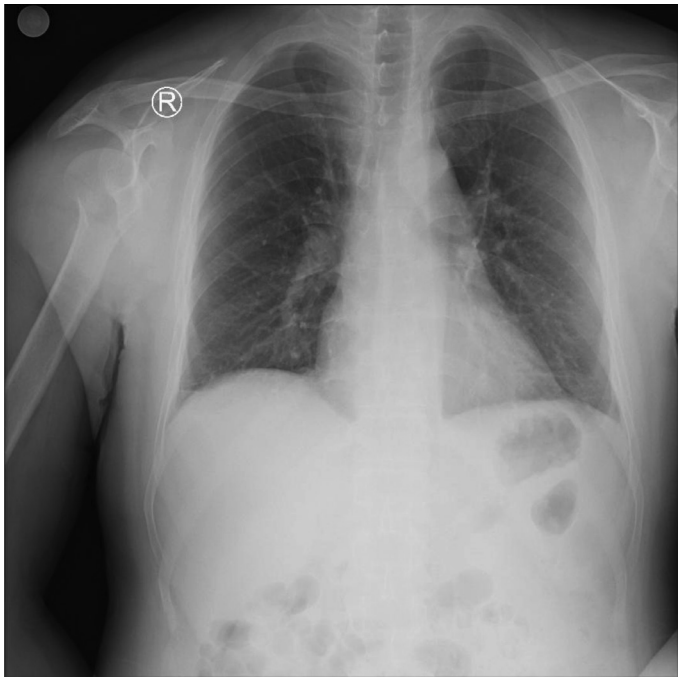

Figure 2: Chest X-ray was evaluated as normal

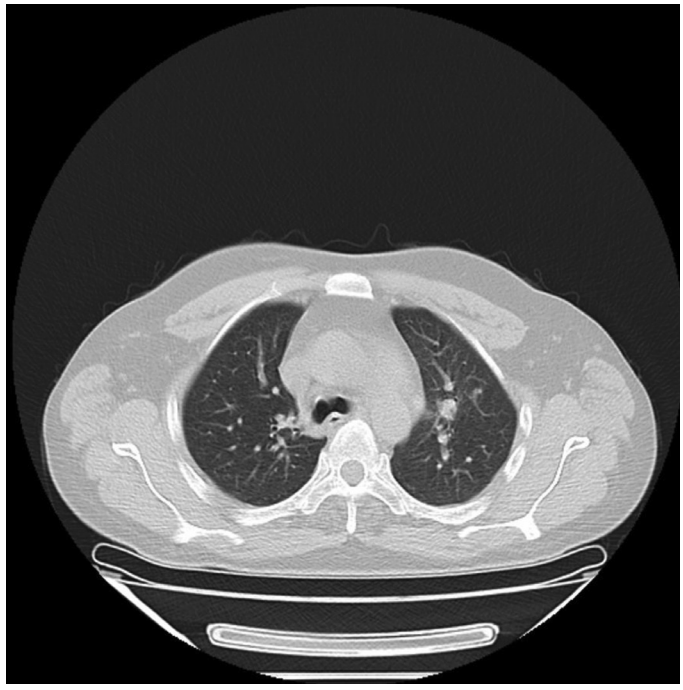

Figure 3: There was no significant pathological change in computed tomography

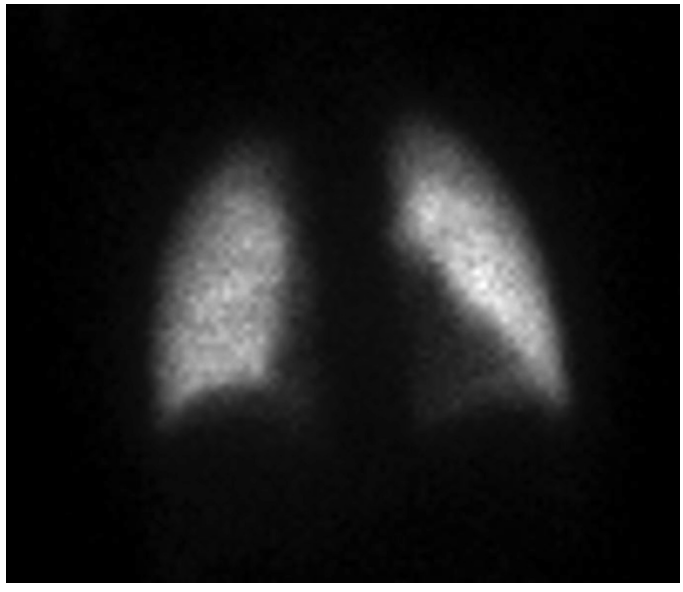

Figure 4: The scintigraphy shows a normal pulmonary perfusion

walking test and 86% after. During right heart catheterization, the patient's pulmonary vascular resistance was 3.7 wood units, RA pressure was 5 mmHg, cardiac output was 5.9 L/min, and pulmonary capillary wedge pressure was 9 mmHg. In repeated measurements, his average PAP was 47, 26, and 33 mmHg. The vasoreactivity test was negative. The left ventricular end diastolic pressure was 11 mmHg. A fluid loading test was also performed. The patient was found to be in the intermediate-risk group for primary PH and was treated with macitentan 10 mg 1*1. In a follow-up visit, clinical findings included persistence of a New York Heart Association Functional Capacity (NYHA FC) of 2-3, drooping eyelids, development of chronic fatigue, decremental response observed in a sequential nerve stimulation test performed in consultation with the neurology department, and detection of anti-acetylcholine receptors (0.71 nmol/L). A diagnosis of MG was made. It was noted that no MG crisis was observed while the patient was infected with COVID-19. Macitentan treatment was interrupted, and IV immunoglobulin and pyridostigmine were administered. In a follow-up one month later, his complaints had lessened and he had a NYHA FC of 1. The estimated sPAP value in the patient 's control TTE was 30 mmHg. Informed consent was obtained from the patient.

DISCUSSION

Awareness of primary PH has increased in recent years. PH has various causes and can manifest with complaints including dyspnea, exercise intolerance, and chest pain. It is observed in approximately 1% of the population; this rate is slightly higher in patients over 65 years of age. The prognosis is worse in patients with severe RV dysfunction.[4]

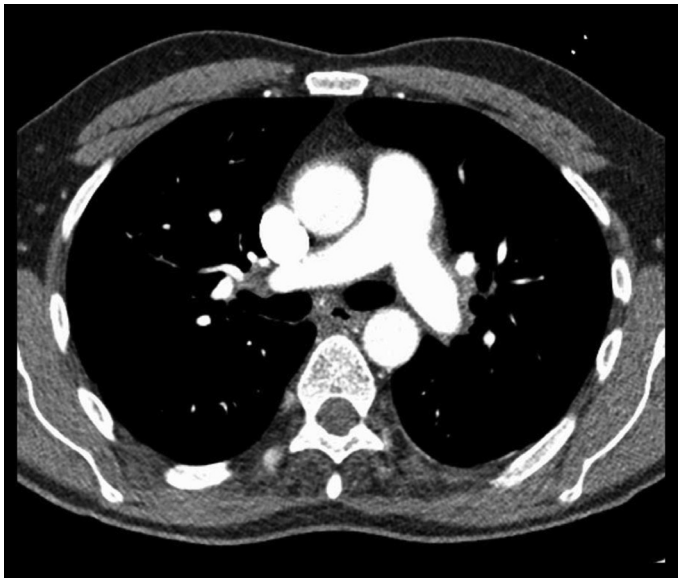

Figure 5: CT angiography did not detect pulmonary embolism

CT: Computed tomography

Chronic neuromuscular diseases, such as MG, polymyelitis, and Guillain-Barré syndrome, can lead to respiratory failure by causing neuromuscular paralysis in the acute or chronic phase.[5] Specifically, MG can cause a restrictive pattern of respiratory failure with diaphragmatic involvement, notably in the later stages of the disease.[6] However, although MG is known to cause right heart failure and PH, it is not frequently encountered.[7]

MG can cause PH by affecting the thoracic muscles and diaphragm, leading to deterioration in lung compliance. It is possible that an intense immune response to COVID-19 activates MG. For these reasons, MG is among the causes of group 3 or group 5 PH. However, this also means that there is no specific treatment recommendation for PAH.

The patient in the case presented here arrived at our clinic with complaints of chronic dyspnea and exercise intolerance after COVID-19 infection. After detecting elevated PAP in the initial examination, transoesophageal echocardiography, spirometry measurements, HRCT, and ventilation-perfusion scintigraphy were used to exclude other possible causes. Performing these examinations is important to eliminate congenital heart diseases that may be involved in the etiology of PH, pulmonary fibrosis, and lung parenchymal diseases that can occur after pneumonia.

Treatment of PH did not relieve the patient's symptoms, and MG was diagnosed after the onset of additional findings. A diagnosis of MG is often made late because the symptoms of the disease can be non-specific. To treat MG, the patient was administered IV immunoglobulin and pyridostigmine, and his symptoms regressed; PAP values were also observed to decrease in follow-up appointments. This case is similar to that published by Oguzhan et al.[8] in which reversible PH was detected after MG treatment. because of the relaxation of the lung muscles after immunoglobulin and pyridostigmine, the patient's PAP decreased and the need for PH treatment was eliminated.

Reversible PH can also be seen, especially in autoimmune thyroid diseases.[9] Therefore, close follow-up of PAP values is important, although it is rarely associated with autoimmune diseases. The increase in MG findings after the initiation of macitentan as a PAH-specific treatment in our patient also suggested an MG attack secondary to the drug. In these patients, the use of the soluble guanylate cyclase stimulator riociguat instead of endothelin receptor antagonists may be a more appropriate option. It was thought that it may have a nitric oxide- mediated benefit. There is not enough evidence for this. Further studies are required.

In our case, we presented our patient who started PAH-specific treatment with the diagnosis of PH, but was diagnosed with MG after the symptoms did not resolve and there were

additional findings. In our patient, PAP values regressed after IV immunoglobulin and pridostigmine treatment, giving us the opportunity to see a rare case in the literature for reversible PH, also suggesting that there may be an increase in MG findings due to macitentan.

Ethics

Informed Consent: Informed consent was obtained from the patient.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Y.A., Concept: A.T.Ş., Design: A.T.Ş., Data Collection or Processing: Ö.K., Analysis or Interpretation: A.T.Ş., Y.A., M.A.D., Literature Search: A.T.Ş., Y.A., Ö.K., Writing: A.T.Ş.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Gilhus NE, Verschuuren JJ. Myasthenia gravis: subgroup classification and therapeutic strategies. Lancet Neurol 2015;14:1023-36.
2. Albazli K, Kaminski HJ, Howard JF Jr. Complement Inhibitor Therapy for Myasthenia Gravis. Front Immunol 2020;11:917.
3. Santy L, Janssens W, Buyse B. A late diagnosis of myasthenia gravis at the respiratory practice: back to basics. Breathe (Sheff) 2022;18:210167.
4. Hemnes AR, Brittain EL. Autonomic Nervous System in Pulmonary Arterial Hypertension: Time to Rest and Digest. Circulation 2018;137:925-7.
5. Chisholm JC Jr, Gilson A. Rare cardiopulmonary complications of chronically decompensated myasthenia gravis. J Natl Med Assoc 1980;72:997-8.
6. Tsai C, Howard JF Jr, Mehrabyan A. A Case of MuSK Myasthenia Gravis Presenting With Persistent Respiratory Insufficiency. J Clin Neuromuscul Dis 2021;23:39-42.
7. Trillenberg P, Katalinic A, Thern J, Graf T. The risk of worsening of myasthenia by cardiovascular medication as reflected by reporting frequency. Eur J Neurol 2021;28:2965-70.
8. Oguzhan A, Kosar F, Alan S, Varol E, Goksel S. A Rare Complication of Myasthenia Gravis: Pulmonary Hypertension. 1998;5:71-2.
9. Ismail HM. Reversible pulmonary hypertension and isolated right-sided heart failure associated with hyperthyroidism. J Gen Intern Med 2007;22:148-50.