

Right Atrial Mass in a Patient With COVID-19 Pneumonia: a case report

Fahmi Othman¹, Abdul Rehman Abid¹, Sabir Abdulkarim¹, Mohamad Khatib¹, Abdulqadir Nashwan¹, Maryam Alkuwari¹, Abdulwahid AlMulla¹, and Awad Alqahtani¹

¹Hamad Medical Corporation

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Abstract

Lipomatous hypertrophy of the interatrial septum (LHIAS) is a benign cardiac tumor. Differential diagnosis of LHIAS consists of atrial masses such as myxomas or lipomas. Herein, we report a 66-year-old male, admitted as a case of severe COVID-19 and was found to have a LHIAS extending to the crista terminalis.

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Fahmi Othman¹, Abdul Rehman Abid¹, Sabir Abdulkarim¹, Mohamad Y. Khatib², Abdulqadir J. Nashwan⁴, Maryam Alkuwari³, Abdulwahid AlMulla¹, Awad Alqahtani¹

¹Department of Cardiology and Cardiovascular Surgery, Heart Hospital, Hamad Medical Corporation, ² Critical Care and Pulmonary Medicine, Hamad Medical Corporation, ³Department of Radiology, Hamad Medical Corporation, ⁴Departement of Nursing Education and Research, Hamad Medical Corporation, Doha, Qatar.

Corresponding author:

Mr. Abdulqadir J. Nashwan

anashwan@hamad.qa

Tel: (+974) 40240487

Mob: (+974) 66473549

P.O.Box 3050 Doha, Qatar

ABSTRACT

Lipomatous hypertrophy of the interatrial septum (LHIAS) is a benign cardiac tumor. Differential diagnosis of LHIAS consists of atrial masses such as myxomas or lipomas. Herein, we report a 66-year-old male, admitted as a case of severe COVID-19 and was found to have a LHIAS extending to the crista terminalis.

Keywords: Lipomatous hypertrophy; interatrial septal hypertrophy; COVID-19; Atrial mass; benign cardiac tumor.

Key Clinical Message:

Lipomatous hypertrophy of the interatrial septum can have an atypical appearance by transthoracic echocardiography. The authors emphasize on the importance of the multimodality imaging approach to reach the appropriate diagnosis in such cases.

BACKGROUND

Lipomatous hypertrophy of the interatrial septum (LHIAS) is a well-described benign cardiac tumor. LHIAS is a quite frequent finding seen by echocardiography. It is estimated to be presented in up to 8% of the general population. (1)

LHIAS is typically diagnosed by Transthoracic echocardiography (TTE). However, in some cases, it may have an atypical appearance by TTE, especially when the echo images are suboptimal.

Differential diagnosis consists of atrial masses such as myxomas or lipomas.(2)

Interatrial septum thickness of 6 mm in the general population and 7mm in the elderly are considered normal.(3) Lipomatosis has been defined as a thickness greater than 15 mm.(4) Adipose tissue can also accumulate in sub epicardium, crista terminalis, endocardium, and the mediastinum.

CASE PRESENTATION

This is a case of a 66-year-old man with a previous history of hypertension, diabetes, chronic kidney disease, and psoriasis. He presented to the communicable disease center (CDC) with a three-day history of fever, cough, and shortness of breath. On admission, his vital signs were as follows: blood pressure:115/52mmHg, heart rate: 75 b/min, respiratory rate: 20 b/min, and oxygen saturation (O₂sat): 93% on room air. His body mass index (BMI) was 29 kg/m². Physical examination was remarkable for bilateral chest crackles with normal cardiovascular examination.

His electrocardiogram (ECG) revealed a sinus rhythm with right bundle branch block (RBBB) and left axis deviation. Chest x-ray showed patchy peripheral ground-glass opacities in both lungs and soft consolidations in the right middle lobe. Polymerase chain reaction (PCR) was performed on a nasopharyngeal swab and returned positive for SARS-CoV-2. In addition, blood tests showed WBC of $5.9 \times 10^3/\mu\text{L}$, hemoglobin of 10 gm/dL(N{13-17 gm/dL}), C-reactive protein (CRP) of 146 mg/L [N < 6 mg/L]), ferritin of 2619 ug/L [N < 553 ug/L]), creatinine of 190 umol/L (N{62-106 umol/L), and D Dimer of 2.3 mg/L FEU [N < 0.5 mg/L FEU]).

He was started on oxygen therapy at 2 liters per minute via nasal cannula, but shortly after admission, he became severely hypoxic, and then, he was transferred to the medical intensive care unit (MICU) and kept on continuous positive airway pressure (CPAP) to maintain oxygen saturation of 95%.

Transthoracic echocardiography (TTE) was performed, which revealed normal biventricular size and function with no significant valvular disease. Mild pulmonary hypertension with an estimated systolic pulmonary artery pressure of 48mmHg was noted. The study showed echo dense mass located on the right atrial (RA) roof, best seen in four-chamber view. There was another echo-lucent mass in the RA and protruding into the tricuspid valve annulus, best seen in the RV inflow view, as shown in (Figure 1). A prior TTE report that had been performed in another center one month ago revealed no interatrial mass.

Because of acute COVID-19 pneumonia and elevated D-dimer, the RA mass was considered and treated as a thrombus. He was started on a therapeutic dose of intravenous heparin and warfarin; thus, the INR was maintained in the therapeutic range between 2 to 3. Repeated echo did not show any significant differences. For a better assessment of the RA mass, Transesophageal echocardiography (TEE) was planned, but was not performed due to acute respiratory distress with low oxygen saturation. Instead, 12 days later, upon clinical recovery a cardiac magnetic resonance imaging (CMR) was performed.

The images were obtained on a 1.5 Tesla scanner (Philips Ingenia), and findings from the multiple stacks of cine four-chamber views confirmed the presence of a structure on the posterior wall of the RA that extends onto the thickened interatrial septum (Figure 2). This smooth structure moved during systole and diastole and was identified as crista terminalis, which was rather prominent. T1 and T2 weighted images on the axial plane of this structure had a similar signal intensity to the subcutaneous fat revealing it as predominantly fatty deposition. T1 weighted images with fat saturation sequences (Figure 3) demonstrated the suppression of fatty signals consistent with LHIAS of the thickened interatrial septum associated with fatty deposition

in the crista terminalis. On post gadolinium, early and late acquisition, there were no uptake or features to suggest the presence of thrombus or any other cardiac tumors (Figure 4).

CMR concluded that the prominent RA mass was lipomatosis hypertrophy of the interatrial septum, which extends to the crista terminalis with no evidence of any thrombus. Hence the anticoagulation was discontinued, and patient was discharged home in very good condition.

DISCUSSION

Lipomatous hypertrophy of the interatrial septum (LHIAS) is usually incidental and typically diagnosed by a transthoracic echocardiogram (TTE) by appreciating the classic dumbbell-shaped morphology within the interatrial septum.(5) However, an atypical appearance on TTE might happen; therefore, multimodality imaging is required to confirm the diagnosis of LHIAS.

LHIAS typically spares the fossa ovalis while respecting the atrial septum boundaries.(6) TTE has low sensitivity in diagnosing LHIAS due to limited resolution, especially when the image quality is suboptimal. A transesophageal echocardiogram can be used to easily make the diagnosis for LHIAS, which best appears ‘in the bicaval view’ as “globular thickening of the interatrial septum”.

What made matters worse was that this mass was incidentally discovered in this patient with COVID-19 pneumonia. As has been published in several studies, accelerated thrombosis was frequently reported in patients admitted with COVID-19. Therefore, in our case, due to severe Covid-19 symptoms with elevated D-dimer, the mass was treated as an intracardiac thrombus; initially, heparin and warfarin, then subsequently with warfarin only using a target INR between 2-3.

Due to the patient’s acute respiratory distress, he was not suitable for any intervention. Therefore, the decision was made not to proceed with TEE to prevent further respiratory deterioration.

Typically, the borders of cardiac tumors are determined by CMR. It also offers a superior tissue characterization. LHIAS follow the same signal intensity of subcutaneous fat (7). Sparing the fossa ovalis and extension of greater than 2cm in transverse diameter are unique to LHIAS that differentiates it from lipomas. Typical findings include uniform high signal intensity on T1 and T2 weighted images with signal suppression on fat-saturated images.(8) They appear hyperintense also on SSFP cine sequences, with no gadolinium contrast enhancement neither on the first-pass perfusion nor in the delayed phase.(9) Other differential here with fatty content would be malignant masses, which demonstrates infiltration of anatomic structures, poor definition of borders, inhomogeneous tissue appearance post gadolinium, and associated pericardial or pleural effusion.(10) Thus localization, morphology, and signal intensity tissue characterization on the CMR helps differentiate between etiologies of tumors in the heart.

CONCLUSION

This case highlights the importance of understanding RA anatomy, as well as the limitations of TTE, especially in patients with suboptimal image quality. It has also confirmed the importance of the multimodality imaging approach to reach the appropriate diagnosis in such cases.

Abbreviations

COVID-19: Coronavirus disease

PCR: Polymerase chain reaction

CMR: Cardiac Magnetic Resonance Imaging

LHIAS: Lipomatous hypertrophy of the interatrial septum

TTE: Transthoracic echocardiography

CPAP: Continuous Positive Airway Pressure

Declarations

Ethics approval and consent to participate

The article describes a case report. Therefore, no additional permission from our Ethics Committee was required.

Consent for publication

The consent for publication was obtained.

Availability of data and material

All data generated or analyzed during this study are included in this published article.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

FO, ARA, SA, MYK, AJN, MA, AAM, AAQ: Data Collection, Literature Search, Manuscript Preparation

All authors read and approved the final manuscript

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