A showering giant right atrial thrombus following COVID. An interesting Case report and review of literature.

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Abstract

Abstract Since the COVID-19 outbreak in late 2018, growing evidence supported the association between COVID-19 infection & hypercoagulability. We report an interesting case of a right atrial thrombus in a young female who sustained COVID-19 infection few months before this diagnosis, as a result she required an open-heart surgery to extract the thrombus. Introduction Mobile atrial thrombi are rare to occur with few reported cases in literature, since COVID has masked the face of the universe with a completely new disease entity with multiple systemic affection, has also been strongly linked with prothrombotic state, However, only very few counted cases of atrial thrombi have been linked to COVID-19 infection.

A showering giant right atrial thrombus following COVID. An interesting Case report and review of literature.

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No conflict of interest

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APPROVAL LETTER

MEDICAL RESEARCH CENTER

HMC, DOHA-QATAR

Dr. Dina F. A. Alwaheidi
Date: 21 February 2022

Medical Resident, Medical Education

Hamad Medical Corporation

Doha-Qatar

Project No.	**MRC-04-22-128**
Study Title	**A showering giant right atrial thrombus following COVID. An interesting Case report and review of literature.**
Reference is made to the above case report, submitted for review and approval by the Medical Research Center at HMC and summarized below:	
Total no. of Cases	1
Hospitals/Facilities Approved	Heart Hospital (HH)
Authors list	Dr. A/Wahid Mahmoud A.A. Al Mulla, Dr. Dina F. A. Alwaheidi, Dr. Samim Azizi, Dr. Laith Fawzat Abdelkareem Tbishat, Dr. Mohd Ibrahim A l Elkahlout

The Medical Research Center has granted permission for this case report to be published on condition that no patient-identifiable data (including patient name and photograph) are contained within the manuscript.

A copy of the published report should be submitted to the Medical Research Center for our records.

Yours Sincerely,
The Medical Research Center Team

Medical Research Center

Medical Research Centre Hamad Medical Corporation Doha - Qatar Hamad

Date: 21 February 2022

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Informed consent \ Patient agreed to share her history & related images of her case for research publications

Abstract

Since the COVID-19 outbreak in late 2018, growing evidence supported the association between COVID-19 infection & hypercoagulability.

We report an interesting case of a right atrial thrombus in a young female who sustained COVID-19 infection few months before this diagnosis, as a result she required an open-heart surgery to extract the thrombus.

Introduction

Mobile atrial thrombi are rare to occur with few reported cases in literature, since COVID has

masked the face of the universe with a completely new disease entity with multiple systemic affection, has also been strongly linked with prothrombotic state, However, only very few counted cases of atrial thrombi have been linked to COVID-19 infection.

CASE REPORT

28-year-old lady was admitted complaining of shortness of breath at rest associated with palpitations & chest discomfort.

She is not known to have any chronic illnesses & not on any medications.

Few months before her admission, she sustained COVID-19 infection, since that time she mentioned she started to complain of new onset shortness of breath on moderate exertion.

Her surgical history was significant for liposuction surgery she did 1 month before.

On examination, she was mildly tachypneic with respiratory rate of 20, Heart rate was 100, BP was 90\60 O2 saturation 94%, venous blood gas showed low Pco2.

ECG showed a sinus tachycardia and blood investigations were significant for hypochromic microcytic anemia, Hgb 10.2 and a high D-dimer test.

Since her probability of having Pulmonary embolism as primary diagnosis was high, CT pulmonary angiogram was done which confirmed the diagnosis of large thrombus noted in the right and left main pulmonary arteries extending to the lobar and segmental branches of the bilateral lower lobes, right middle lobe segments with a patchy wedge-shaped pulmonary infarction at the right lower & middle lobes. Fig (1)

Interestingly, CT scan showed a large filling defect in the right atrium suggestive of an organized thrombus about 20X25mm. Fig (2)

Transthoracic echocardiography showed a moderately dilated right ventricle

With reduced function, in addition, Mild to moderate tricuspid valve regurgitation with increased pulmonary artery pressure which was 44 mm.hg. There is highly mobile, heterogeneous, high echo density mass in the right atrium attached to right atrial free wall, measuring around 3X2 cm. Fig (3)

This finding of an atrial thrombus complicated the picture & the approach.

Clinically our patient was hemodynamically stable so we opto to go for the anticoagulation option first as she did not prefer the surgical option first.

Patient was Kept on heparin infusion & follow up echos' showed persistence of the thrombus in the atrium with no decrease in dimensions.

Meanwhile, all her workup for connective tissue disorders including anti-phospholipid was negative.

Patient was kept on anti-coagulation & close observation for 3 weeks with no resolution of her intracardiac or pulmonary thrombi despite her symptom's improvement.

In the view the mass size, location & mobility patient was re-consented for surgical intervention via median sternotomy & she accepted.

A sternotomy with cardiopulmonary bypass was performed and intraoperative observations revealed a well organized thrombus of 30X40mm which was removed completely followed by pulmonary artery exposure start from the main trunk to the right main artery reaching the right superior pulmonary artery to clear away all the thrombus followed by opening the left pulmonary artery & extracting the thrombus attached to the wall .

Fig (4).

Her postoperative course was smooth, she was extubated on Day zero, discharged 4 days after her operation on warfarin.

Upon follow up, she was doing well with no complains.

Discussion

Cardiovascular involvement of COVID-19 infection is related to the hypercoagulable milieu created with this disease pathology.

This hypercoagulable state which can persist even after a couple of months even after the clearance of COVID, which raise the concern of the indication & also the duration of anti-coagulation treatment.

In the French multicenter cohort analysis Among 1240 patients about 8.3% patients had PE confirmed by CT scan, they have concluded that risk factors for PE in COVID patients included independent clinical & biological findings related to COVID-19 inflammation rather than the known risks for thrombo-embolism in sick patients (1)

Although most of the cases reported thromboembolic manifestations of COVID-19 occurring mostly at the acute phase of the disease due to the surge of the cytokine storm that triggers the coagulation cascade (2) ; especially to those who develop severe illness requiring ICU care & mechanical ventilation. Recent reports have shown that PE can develop in even very minor disease manifestations which can be underestimated as most of these minor illnesses usually don't require evaluation with CT (3).

Moreover, the postulated risks for developing thromboembolism were found to persist even after the acute phase, in similar report to ours, a patient was reported to develop pulmonary embolism 4 weeks after being treated for COVID19 (4).

One more case of saddle pulmonary embolism associated with atrial thrombus in transit on a patent foramen was reported to occur after 28 days from a fully recovered COVID pneumonia (5).

The growing evidence suggesting that COVID-19 infection related thromboembolic manifestations; especially with more reported prevalence of pulmonary embolism in such cases, in fact is related to local thrombotic environment mediated by the endothelium & the platelets to form the thrombi. This was suggested by the authors of a paper who introduced the term COVID-19-associated hemostasis abnormality (CAHA) depicted in lungs (6).

Another interesting article which reviewed the cardiovascular burden related to COVID-19 infection, have suggested that Coagulation is triggered by the activation of cascade of proteins that include coagulation factors, thrombin and fibrinogen forming microthrombi that can affect any part of the heart (7). In the same paper they referred to an autopsy study revealed that deep vein thrombosis is present in 7 of 12 patients who died of COVID-19 and in whom venous thromboembolism was not suspected prior to death.

Referring to our patient, we believe this COVID-19-associated hemostasis abnormality (CAHA) started in the heart rather than the lung then progressed to involve both pulmonary arteries before being detected. A very much less reported scenario, suggesting that the local damage that happens after COVID infection, predisposes the affected individuals into a lifelong increased risk for thromboembolism.

Our patient was treated with anticoagulants for more than 3 weeks with no resolution of her thrombi, so finally decision was to go for surgical thrombectomy. Intraoperatively, thrombi were quite adherent to the atrial wall as well as the pulmonary arteries supporting the evidence

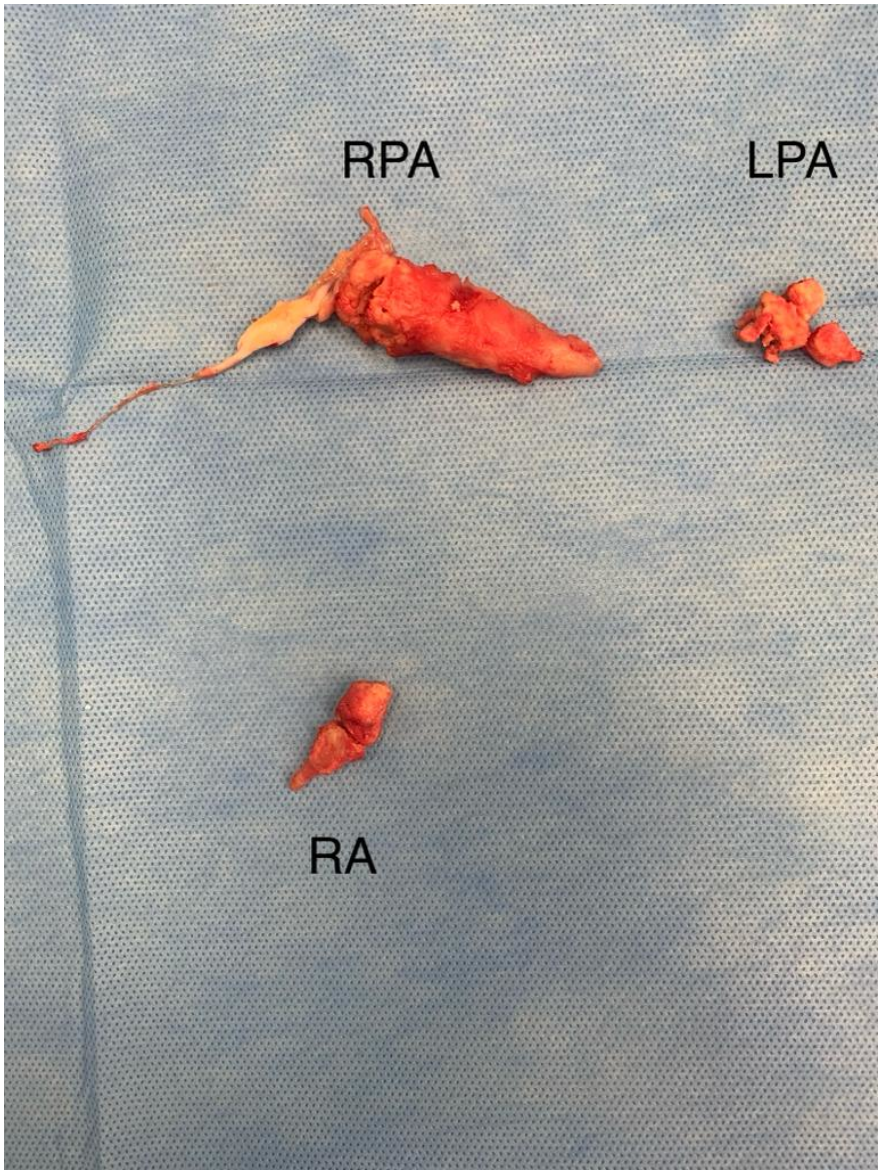
of a clear in situ evolution of such thrombi intracardially for a long period of time, which made it persist despite anticoagulation.

The decision to keep a low threshold for surgical thrombectomy in such low-risk case can be a good option especially it provided the patient with almost full clearance from all thrombi which were adherent & stubborn to anticoagulants with a very successful post-operative course till date.

The American Heart Association (AHA) and European Society of Cardiology (ESC) suggest surgical pulmonary embolectomy is advised in hemodynamic instability or failed \ Contraindicated to fibrinolytic therapy, Clot-in-transit, Large patent foramen ovale, or Moderate-to-severe right ventricular dysfunction (8). On the other finding of an atrial thrombus our patient had; consensus is less clear (9). After a through & careful consideration of the low risk profile of our patient in addition to the pulmonary embolism she had, we believe that surgical option was inevitable & carried a favorable outcome & prognosis.

as of our knowledge, to date, there is no report of such remote occurrence of an atrial thrombus associated with pulmonary embolism in a structurally normal heart in a healthy young patient long after COVID infection.

Fig(1) Fig(2)



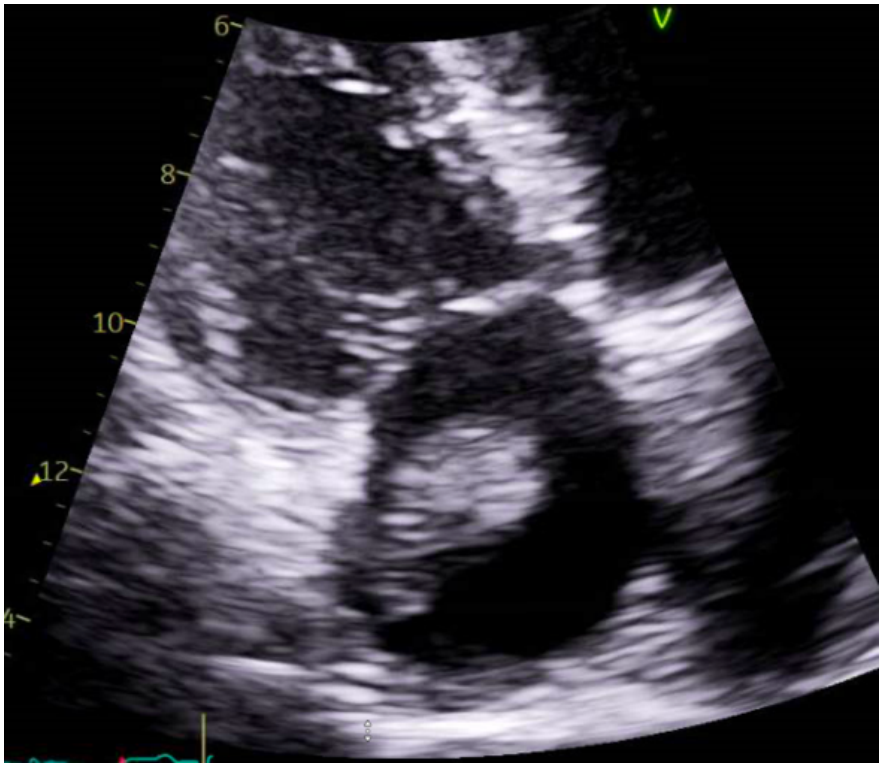


Fig (3) Fig (4)

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