Echocardiographic Characteristics of Cardiac thrombus in Patients With Mycoplasma pneumoniae infection

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March 1, 2021

Abstract

Right ventricular thrombus in Mycoplasma pneumoniae pneumonia (MPP) patient is rare. Herein we reported 4 cases of right ventricular thrombus. All of them were diagnosed of severe mycoplasma pneumonia, with increased D-dimer. There was no abnormality in the atrial and ventricular diameters with a normal cardiac function during the course of the illness. Every thrombus was closely attached to the tricuspid chordae. Except one thrombus surgically removed, the remaining thrombi dissolved during the follow-ups.

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Abstract

Right ventricular thrombus in Mycoplasma pneumoniae pneumonia (MPP) patient is rare. Herein we reported 5 cases of right ventricular thrombus. All of them were diagnosed of severe mycoplasma pneumonia, with increased D-dimer. There was no abnormality in the atrial and ventricular diameters with a normal cardiac function during the course of the illness. Every thrombus was closely attached to the tricuspid chordae. Except one thrombus surgically removed, the remaining thrombi dissolved during the follow-ups.

key words: Mycoplasma pneumoniae pneumonia, echocardiography, ventricular thrombus

INTRODUCTION

Mycoplasma pneumoniae (MP) is a common pathogen of community-acquired pneumonia (CAP) in children[1]. In recent years, the incidence rate of Mycoplasma pneumoniae pneumonia (MPP) has been increasing, suggesting an epidemic trend.

Severe cases and those cases refractory to treatments have increased[2,3]. In addition to pulmonary inflammation, some children with refractory MPP may have two or more non- pulmonary complications. In recent years, MPP complications with lower extremity thrombosis have been reported[4]. There is only three cases of right ventricular thrombosis reported in literature [5-6]. Our current study reports 5 cases of severe mycoplasma pneumonia complicated with right ventricular thrombosis diagnosed in our hospital. It further analyzes the characteristics of echocardiography in detail. We hope this report will be helpful in the future recognition and diagnosis of right ventricular thrombus in MMP.

CASE PRESENTATIONS: All these cases were male, age of 6-9 years, hospitalized in our hospital from January 2016 to December 2019. Their initial diagnoses were mycoplasma pneumonia, later developed a complication of right ventricular thrombosis. Their initial symptom was fever, 39.5-40.5, with dry cough. Three of the 5 cases were found locally to have right ventricular space occupying lesions and came to our hospital for further diagnosis and treatment. In the remaining 2 cases, the ventricular space occupying lesions were first found during hospitalization in our hospital. The patients provided informed consent for the publication of this report.

The general information of all patients is shown in Table 1. Their serum cold agglutination test results were elevated to [?] 1:320. D-dimer was significantly elevated, 4.03-9.06 mg/L (normal 0-0.24 mg/L). Chest CTs showed variable degrees of pulmonary infiltration and pleural effusion. All the cardiac space occupying lesions were first detected by echocardiography. (Figure 1-4) (video 1-2)

Table 1 general date of each case

Case No	sex	age(Y)	temperature	CAT	D-dimer	Antinuclear antibody
1	M	9	40.5	1:1280	5.74	+
2	M	6	40.5	1:640	4.00	+
3	M	6	39.5	1:320	1.03	+
3	M	8	40.0	1:320	5.03	+
4	M	7	40.0	1:320	9.06	+

CAT: cold agglutination test

All patients had no congenital or acquired heart disease with normal sizes of the cardiac chambers and normal left and right ventricular functions during the clinical course. The left ventricular ejection fractions were 62-72%. Right ventricular area changes were 43-47%, In all the cases, the thrombus was located in the middle of the right ventricle, adjacent to the tricuspid chordae tendineae. The thrombus seemed to be surrounded by a net-pocket like structure, formed by the surrounding tissue. Thrombus movement is somewhat limited by multiple attachments, different from the swing movement attaching to a single pedicle, typically seen in myxoma. Morphologically, the thrombus and its attachment to the surrounding tissue can be imagined quite like a neuron and its dendrites. Most of the thrombus has a slightly stronger med-echogenicity, except one case in which it was heteroechoic and hypoechoic. All the thrombi were spherical, with irregular edges and non-compliant. The thrombus is non-capsulated and has no flow within the thrombus. The thrombus in each of the 5 cases were nearly 10-20 mm. No lower limb thrombosis was found in the ultrasound studies of any of the 5 patients. See Table 2 for the echocardiogram results.

Table 2 ultrasonic data of patients

Case No	Time from fever to discovery of thrombus (days)	thrombus location	thrombus size(mm)	activity	adheres
1	9	RV	18.2×9.3	swing	Yes

Case No	Time from fever to discovery of thrombus (days)	thrombus location	thrombus size(mm)	activity	adheres
2	11	RV	11.1×8.5	swing	Yes
3	26	RV	16.6×10.6	swing	Yes
4	10	RV	10.8×11.4	swing	Yes
5	12	RV	12.2×9.5	swing	Yes

LVEF: left ventricular ejection fraction, RVFAC: right ventricular fractional area change

Follow ups: one patient underwent surgical removal of the thrombus which was mobile and adherent to the tendon of tricuspid valve anterior papillary muscle. Pathologically it showed patchy hemorrhagic necrosis without a normal tissue structure. The thrombus in all the remaining cases resolved with medical treatment in 22-89 days, median 53 days.

Discussion: Pediatric MP infection is usually mild and self-limiting. However, it may cause serious complications in some children in addition to the respiratory symptoms. There are growing reports of venous thrombosis or arterial embolism as the result of a MP infection[7-10]. MP infection can lead to hypercoagulable state, vascular endothelial damage, and even compromise the hepatic function affecting the synthesis of coagulation factors and thrombin. These multifactorial abnormalities can cause lower extremity venous thrombosis, pulmonary and cerebral embolism, etc. MP intracardiac thrombosis is rarely reported [6, 11]. Intracardiac thrombosis can be dangerous, as its detachment can cause major organ embolism or infarction, with serious consequences including disability and death [12-14]. Echocardiogram confirming or further suspecting an intracardiac thrombus will lead to further assessment and better treatment.

We found a case report of intraventricular thrombus associated with mycoplasma pneumonia [11]. The patient was a 9-year-old boy. On the 10th day of symptom onset, an MRI found a space occupying in the right ventricle which was surgically removed. Pathological findings were new fibrin thrombus with scarce white blood cells. The thrombus location, its illustrated and described characters, were similar to those of our current cases. In our 4 cases, intracardiac space occupying lesions were first revealed by echocardiography. The characteristic of the space occupying lesion together with the diagnosis of mycoplasma pneumonia and significantly elevated D-dimer lead to the diagnosis or high suspicion of a thrombus. Although incidence of mycoplasma pneumonia complicated with intracardiac thrombosis is very low, nevertheless, such a thrombus is dangerous for potential pulmonary embolism. Therefore, it is particularly important to have an echocardiogram examination in patients with mycoplasma pneumonia and significantly increased coagulation laboratory results. In our study, the thrombus occurred between 9-11 days after the onset of the fever. For those had higher D-dimer, we suggest an echocardiogram study 1-2 weeks after the onset of febrile illness to confirm or rule out a thrombosis. Except 1 case with thrombectomy, the thrombus in all the remaining cases is dissolved with medical treatment. Our cases suggest a good prognosis with early detection of the thrombus and prompt treatment. Otherwise, the large thrombus is a great risk for pulmonary embolism. In conclusion, MPP complicated with ventricular thrombosis is very rare. Therefore, when patients with MPP have abnormal coagulation lab results, imaging study should be done to rule out or confirm the thrombosis. Echocardiography plays an important role in the diagnosis with its location, size, number, shape, activity and its relationship with the surrounding tissues of the space occupying lesions. It also offers repeated follow ups.

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