

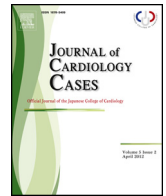


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Case Report

A case of biventricular thrombi in a patient with dilated cardiomyopathy: Utility of multimodality imaging for diagnosis and management of treatment strategy

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ABSTRACT

A 54-year-old man was transferred to our hospital due to congestive heart failure and left ventricular thrombi. Transthoracic echocardiography (TTE) showed mobile “ball-like” not only left ventricular but also right ventricular thrombi associated with severe impaired left and right ventricular function. Contrast-enhanced computed tomography (CT) and cardiac magnetic resonance imaging (MRI) also detected biventricular apical thrombi complicated with right renal infarction. Coronary angiography showed non-significant stenosis. Due to the mobility of thrombi and complication of systemic infarction, the surgical transatrial video-assisted removal of biventricular thrombi was performed and postoperative course has been uneventful over a period of 6 months. Endomyocardial biopsy performed during an operation showed no specific findings such as endomyocarditis, indicating the diagnosis of dilated cardiomyopathy (DCM). This is a rare case of DCM complicated with biventricular apical thrombi detected clearly by multimodality imaging such as TTE, contrast-enhanced CT and cardiac MRI, and surgical removal was performed successfully.

<Learning objective: The incidence of biventricular thrombi is rare and has been reported to be associated with coagulation abnormality and severe ventricular dysfunction. The detection of ventricular thrombi using echocardiography is sometimes difficult, and treatment strategy often becomes a major topic of debate. The usefulness of multimodality imaging for the detection of ventricular thrombi leads to accurate diagnosis and provides helpful information regarding the selection of appropriate treatment.>

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Introduction

Left ventricular thrombus is a well reported and frequent complication associated with significantly impaired left ventricular function such as myocardial infarction with left ventricular aneurysm, myocarditis, takotsubo- and dilated cardiomyopathy

(DCM) [1]. However, the complication of biventricular thrombi is rare and only few cases have been previously reported [2–5].

Here, we report a middle-aged male patient presenting with congestive heart failure (CHF) and diagnosed with DCM, in whom biventricular apical thrombi were detected using multimodality imaging and surgically removed successfully.

Case report

A 54-year-old man, who had been receiving chronic steroid therapy for organized pneumonia, was transferred to our hospital

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due to CHF and left ventricular thrombi. Transthoracic echocardiography (TTE) showed mobile “ball-like” not only left ventricular but also right ventricular thrombi associated with severe impaired left and right ventricular function (Fig. 1A–F). Left ventricular ejection fraction measured by modified Simpson’s method was 15% and right ventricular systolic function, assessed by the measurement of tricuspid annular plane systolic excursion (TAPSE) and right ventricular fractional area change (RVFAC), was also impaired. Contrast-enhanced computed tomography (CT) and cardiac magnetic resonance imaging (MRI) also detected biventricular apical thrombi complicated with right renal infarction (Figs. 2A–D and 3A and B). Blood tests showed a white blood cell count of $8500/\text{mm}^3$ (neutrophil 84.0%, eosinophil 0.4%), C-reactive protein of 1.13 mg/dl, creatine kinase of 117 U/L with MB fraction of 4 U/L, brain natriuretic peptide of 1062.1 pg/ml, and D-dimer of $5.5 \mu\text{g}/\text{dl}$. Protein C and S activity and antigen levels were normal, and antiphospholipid antibody and human immunodeficiency virus (HIV) antibody tests were negative. Coronary angiography showed non-significant stenosis. Due to the size and mobility of thrombi and complication of renal infarction, the surgical transatrial video-assisted removal of biventricular thrombi was performed on the following day. Endomyocardial biopsy at right ventricle performed during an operation showed no specific findings such as endomyocarditis, indicating the diagnosis of DCM. During the early postoperative period, the patient received continuous intravenous infusion of heparin 15000–20,000 unit/day, and we started oral vitamin K antagonist therapy [initial dose

of warfarin sodium 3 mg/day and following dose of 3–4 mg/day with the target prothrombin international normalized ratio (PT-INR) at 2.0–3.0] on the 10th postoperative day. On the 16th postoperative day, sufficient effect of warfarin (PT-INR 2.70) was observed, and finally the dose of warfarin at the time of discharge was 3.25 mg/day and PT-INR was 2.45. Transient elevation of D-dimer after surgery (peak D-dimer $7.3 \mu\text{g}/\text{dl}$) slowly decreased and normalized ($<0.5 \mu\text{g}/\text{dl}$) after 2 months. We also administered optimal medications for CHF (losartan potassium: 25 mg/day, carvedilol: initial dose of 1.25 mg/day and increased dose of 5 mg/day at the time of discharge, azosemide: initial dose of 60 mg/day and 30 mg/day at the time of discharge, spironolactone: 25 mg/day, digoxin: 0.125 mg/day), and postoperative course has been uneventful over a period of 6 months.

Discussion

The occurrence of biventricular thrombi is a rare, but serious condition which may increase the risk of both pulmonary and systemic embolization. Only few cases have been previously reported, and it has been described in association with a prothrombotic state, autoimmune disease (HIV infection, etc.), and severe ventricular dysfunction [2–5]. In the present case, the patient had been receiving chronic steroid therapy for organized pneumonia, which might affect hypercoagulability with thrombotic events in association with significantly impaired left and right ventricular function.

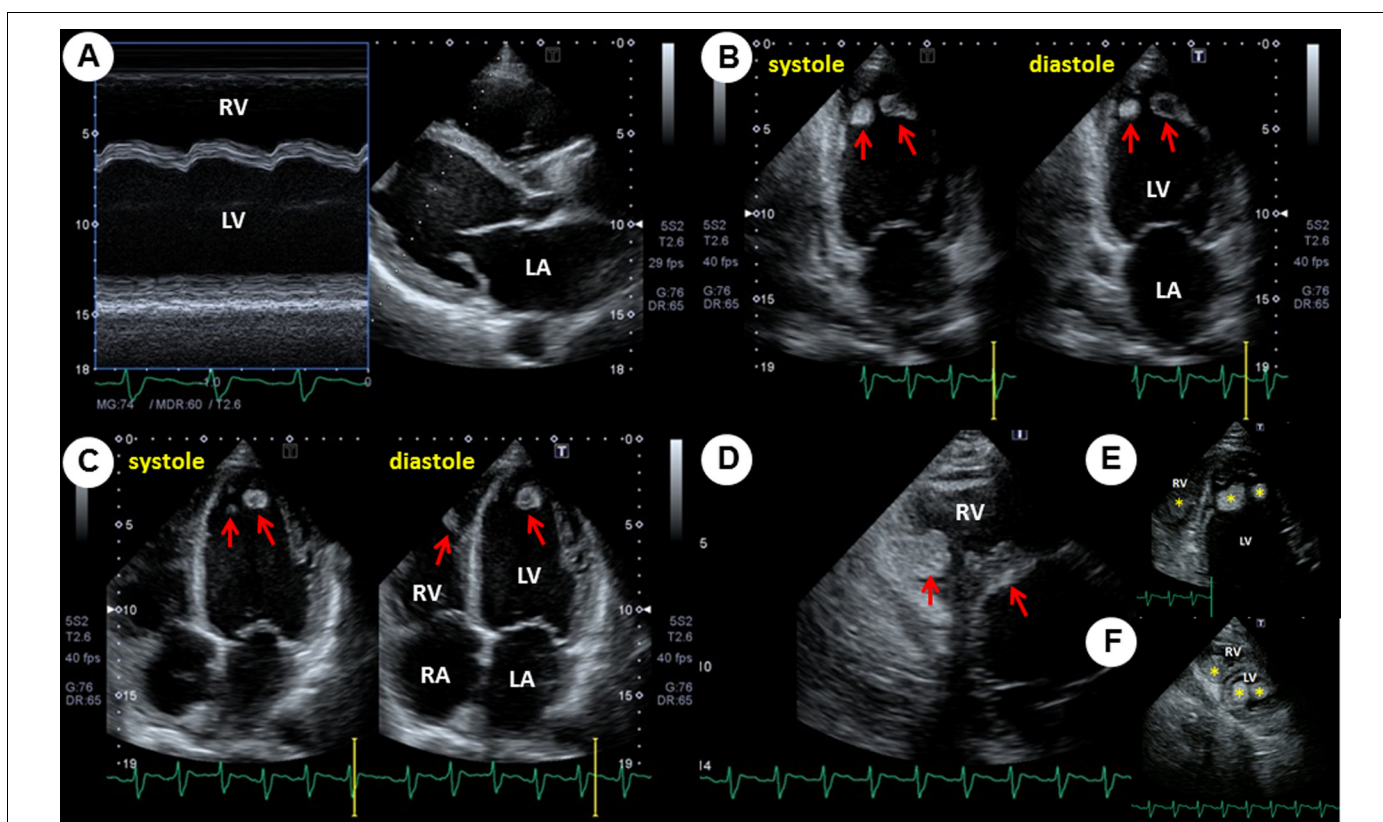


Fig. 1.

Transthoracic echocardiography (TTE) images. (A) Parasternal long-axis view at ventricular level showing left ventricular dilatation (left ventricular internal dimension in diastole: 67 mm, left ventricular internal dimension in systole: 58 mm) and diffuse severe dysfunction with no segmental asynergy (left ventricular ejection fraction measured by modified Simpson’s method: 15%). (B) Apical two-chamber view at systolic and diastolic phase showing mobile left ventricular thrombi. Size of thrombus at lateral side was 25 mm × 14 mm and the other was 21 mm × 17 mm (arrows). (C) Apical four-chamber view at systolic and diastolic phase showing biventricular thrombi (arrows). Tricuspid annular plane systolic excursion was 16.1 mm and right ventricular fractional area change was 12%, indicating severe impaired right ventricular systolic function. (D) Parasternal short-axis view at papillary muscle level showing right ventricular thrombi (arrows). (E) Magnification of apical four-chamber view at apex level showing biventricular thrombi (asterisks). (F) Parasternal short-axis view at apex level showing biventricular thrombi (asterisks). Size of right ventricular thrombus was 28 mm × 21 mm. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

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