TWO-DIMENSIONAL ECHOCARDIOGRAPHIC DETECTION OF BIVENTRICULAR THROMBI

B L Chia, P H Chew, C S Soo

ABSTRACT

A 42-year-old man presented with acute myocardial infarction. The ECG on admission to hospital showed "Q wave" inferior myocardial infarction and "non-Q wave" anterior infarction. Subsequently, he was readmitted to hospital on many different occasions for cardiac failure. About 15 months after the patient was first seen, two-dimensional echocardiogram (2D echo) showed dilatation of all 4 cardiac chambers and severe global hypokinesia of the left ventricle. In addition, a large echo dense mass was seen at the apex of the left ventricle and 2 smaller echo dense masses were present at the right ventricular apex. The echocardiographic characteristics of these 3 masses strongly suggest that they represent mural thrombi.

Two-dimensional echocardiographic detection of biventricular thrombi has rarely been described in the past. This case together with the previously reported case by Friedman and Buda suggest that 2D echo may be a valuable test for the diagnosis of biventricular thrombi.

Keywords: *echo detection of biventricular thrombi*

SINGAPORE MED J 1995; Vol 36: 110-111

INTRODUCTION

Two-dimensional echocardiographic detection of biventricular thrombi has been very rarely reported in the literature[1]. We describe a patient with previous anterior and inferior infarction of the left ventricle and infarction of the right ventricle, who showed biventricular thrombi on two-dimensional echocardiographic examination.

CASE REPORT

A 42-year-old man was diagnosed as having acute myocardial infarction on the basis of clinical symptoms and electrocardiographic changes. The ECG on admission to hospital showed "Q wave" inferior myocardial infarction. In addition, there was poor R wave progression and deeply inverted T waves in leads V1 to V6 indicating "non-Q wave" anterior infarction. The fasting blood cholesterol and triglyceride levels were both elevated at 290 mg% and 212 mg% respectively. The HDL cholesterol was not estimated. The patient was clinically well and was discharged from the hospital in a stable condition with metoprolol, isosorbide dinitrate and aspirin. However, he was readmitted to hospital 3 months later in severe congestive heart failure. Chest X-ray showed cardiomegaly.

Two-dimensional echocardiogram (2D echo) was then performed. It showed a grossly dilated left ventricle with extremely poor myocardial function. No thrombus was seen. Diuretic therapy was started with considerable improvement. However, after discharge from the hospital, the heart failure became progressively worse. During the next 6 months, he was readmitted to hospital on 4 different occasions. Nine months after the patient was first seen, a repeat 2D echo showed dilatation of all 4 cardiac chambers and severe global hypokinesia of the left ventricle. In addition, a thrombus was seen in the apex of the left ventricle. Because of this finding, the patient was anti-coagulated with heparin and warfarin. At this time, captopril was also started because of the deteriorating heart failure. Six months later, another 2D echo was performed. As previously, there was dilatation of both the ventricles and atria. However, in addition, a large echo dense mass was seen at the apex of the left ventricle and 2 smaller echo dense masses were present at the right ventricular apex (Fig 1). The echocardiographic characteristics of these 3 masses, their location and their association with a dilated left ventricle and right ventricle respectively, all strongly suggest that they most likely represent mural thrombi. The patient subsequently expired. Before his death, a repeat ECG showed low voltages of all the ventricular complexes which most likely reflected the severe left ventricular dysfunction. In addition, Q waves were seen in the right-sided chest leads indicating previous right ventricular infarction.

DISCUSSION

Left ventricular mural thrombi are found in about 60% of patients with dilated cardiomyopathy and in approximately 50% of patients with left ventricular aneurysm at post-mortem examination[2]. Two-dimensional echocardiography has been confirmed to be a very valuable tool in the detection of left ventricular thrombi[3]. Classically such thrombi appear in the 2D echo examination as dense intracavitary echoes which are typically situated at the apex of the left ventricle. The apical 4 chamber view has been found to be most useful.

In recent years, two-dimensional echocardiographic studies in acute myocardial infarction have also been described. Visser et al reported that using this investigation, approximately 30% of patients with acute "Q wave" anterior myocardial infarction will show thrombi in the left ventricle[4]. In their study, those patients who showed left ventricular thrombi had a higher peak value of the isoenzyme of creatinine kinase (CK-MB) and more

Department of Medicine
National University Hospital
Lower Kent Ridge Road
Singapore 0511

B L Chia, MBBS, FRACP, FACC
Professor

Sarawak General Hospital
Kuching
Sarawak

P H Chew, MBBS, MRCP, FCCP
Senior Consultant and State Physician

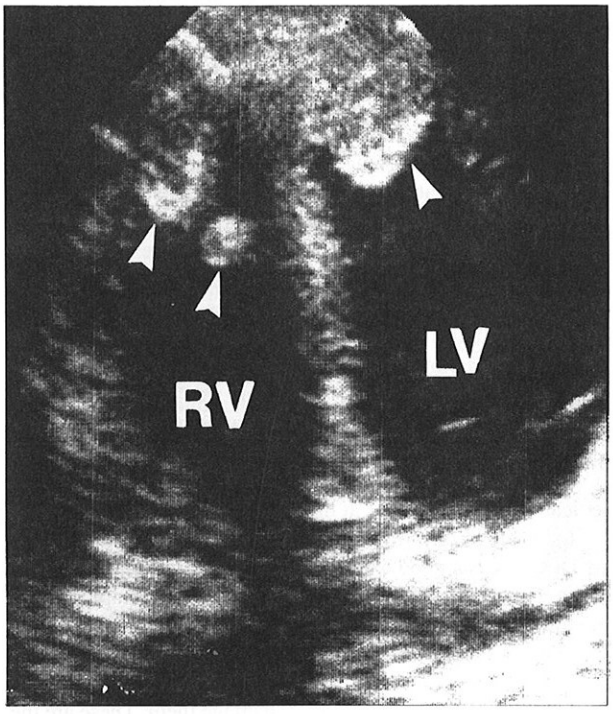
Department of Medicine
University of Malaya
59100 Kuala Lumpur
Malaysia

C S Soo, MBBS, MRCP
Lecturer

Correspondence to: Prof B L Chia

frequently had segmental dyskinesia compared to patients who showed no evidence of thrombi. In a necropsy study in 1978, Isner and Roberts reported a right ventricular thrombus in 15 (6%) of 237 patients who presented with infarction of the left ventricle[5]. Recently, 2D echo detection of right ventricular mural thrombi has also been reported[6]. Stowers and co-workers described a patient with acute myocardial infarction presenting with multiple pulmonary emboli[7]. Right ventricular thrombus was detected using 2D echo examination.

Fig 1 – Two-dimensional echocardiography using the apical 4 chamber view (off axis). Arrow in the left ventricle (LV) indicates a large apical thrombus. Arrows in the right ventricle (RV) indicate 2 smaller apical thrombi.



Although the echocardiographic features of mural thrombus in the left ventricle as well as in the right ventricle have both been well documented in the literature, 2-D echo detection of biventricular thrombi has been very rarely described in the past. In 1986, Friedman and Buda reported the first case of biventricular thrombi in a 33-year-old man who presented with an acute anterior myocardial infarction[1]. Two-dimensional echocardiographic evaluation showed a single thrombus each in the apical region of both the left and the right ventricle. A repeat study 8 weeks after anticoagulation was started showed persistence of the biventricular thrombi. In our patient, an apical left ventricular thrombus was initially detected on 2D echo examination. Despite therapeutic anticoagulation, a repeat study 6 months later showed biventricular thrombi – a large single thrombus in the left ventricular apex and 2 smaller thrombi in the apex of the right ventricle.

CONCLUSION

Two-dimensional echocardiography is an established technique for the diagnosis of thrombi in both the left ventricle as well as the right ventricle. This case and the report of Friedman and Buda[1] suggest that 2D echo may also be a valuable tool for the diagnosis of biventricular thrombi.

References

1. Friedman HZ, Buda AJ. Biventricular thrombus formation in association with acute myocardial infarction: Diagnosis by two-dimensional echocardiography. J Clin Ultrasound 1986; 14:315-8.
2. Reeder GS, Tajik AJ, Seward JB. Left ventricular mural thrombus (Two-dimensional echocardiographic diagnosis). Mayo Clin Proc 1981; 56:82-6.
3. Stratton JR, Lighty GW Jr, Pearlman AS, Ritchie JL. Detection of left ventricular thrombus by two-dimensional echocardiography: Sensitivity, specificity, and causes of uncertainty. Circulation 1982; 66: 156-66.
4. Visser CA, Kan G, Meltzer RS, Lie KI, Durrer D. Embolic potential of left ventricular thrombus after myocardial infarction: A two-dimensional echocardiographic study of 119 patients. J Am Coll Cardiol 1985; 5:1276-81.
5. Isner JM, Roberts WS. Right ventricular infarction complicating left ventricular infarction secondary to coronary heart disease. Am J Cardiol 1978; 42:885-9.
6. Kronik G. The European cooperative study on the clinical significance of right heart thrombi. Eur Heart J 1989; 10:1046-59.
7. Stowers SA, Leiboff RH, Wasserman AG, Katz RJ, Bren GB, Hsu I. Right ventricular thrombus formation in association with acute myocardial infarction: diagnosis by two-dimensional echocardiography. Am J Cardiol 1983; 52:912-3.