

Cardiac Tamponade during Transesophageal Echocardiography in the Patient of Circumferential Aortic Dissection

A 43-year-old woman, whose physical findings were consistent with Marfan's syndrome, presented with acute chest pain. Transthoracic two-dimensional echocardiography demonstrated dilated ascending aorta with a circular shape intimal flap at the root level. Subsequently, the patient required transesophageal echocardiography (TEE), but during esophageal intubation, the patient developed acute pericardial tamponade which resulted in death in spite of cardiopulmonary resuscitation. Although some investigators recommend TEE as the first choice of diagnostic method of aortic dissection, hemodynamic stability is very important during TEE study. Therefore aggressive sedation may be required in the case of circumferential dissection of the ascending aorta to prevent the increases of the blood pressure and the heart rate which suggested an extensive tear of the aortic intima during TEE procedure.

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INTRODUCTION

During the past few years, transesophageal echocardiography (TEE) has become an important diagnostic tool in clinical cardiology. TEE has been known as a safe, sensitive and specific method for the diagnosis of aortic dissection (1). In the European multicenter trial (2), the sensitivity and specificity of TEE were 99% and 98% respectively. Daniel et al. demonstrated that the rate of complications associated with TEE was low; significant complication rate was 0.18% (18/10,218 TEEs) and mortality rate was 0.0098% (1/10,419 TEEs) (3). The cause of death was esophageal bleeding due to an invasive tumor and the causes of significant complication were bronchospasm, hypoxia, ventricular tachycardia, atrial fibrillation, third-degree atrioventricular block, angina pectoris, and pharyngeal bleeding. We would like to report an unusual mortality due to cardiac tamponade during the TEE procedure in the patient of circumferential aortic dissection.

CASE REPORT

A 43-year-old woman presented to the emergency room because of acute onset chest tightness with radiating pain to the back and syncope. She had no significant past cardiac or pulmonary disease but for a brief episode of syncope about two years ago. Family

history was unremarkable. She had a slender body habitus, height 167 cm and weight 51 kg, arachnodactyly and an elongated arm span. Physical examinations revealed different blood pressures between the right and left arm (right arm 60/40 mmHg, left arm 130/80 mmHg), diminished pulses in the right arm and an irregularly shaped pupil of the left eye. Auscultation revealed a grade II/IV diastolic blowing murmur heard at the left sternal border and a systolic bruit was noted over the mid abdomen. A chest roentgenogram showed a significantly widened mediastinum compared to previous film. The electrocardiogram showed normal sinus rhythm and a complete right bundle branch block with nonspecific ST segment and T wave changes.

She was examined by transthoracic two-dimensional echocardiography. The patient was not in distress. Blood pressure was 60/40 mmHg in the right arm and 120/80 mmHg in the left arm and the heart rate was 88/min. The parasternal long axis view showed markedly dilatation of ascending aorta to 60 mm in diameter with an intimal flap (Fig. 1) and severe aortic regurgitation. The parasternal short axis view revealed a large and very mobile intimal flap in a circular shape within the aortic root (Fig. 2). The entry site was separated widely at 4 o'clock direction during diastole. Descending thoracic aorta was dilated up to 30 mm in diameter with a suspicious intimal flap in the parasternal long axis view (Fig. 1). To obtain further information about the extent of dissection and the involvement of major branch vessels,

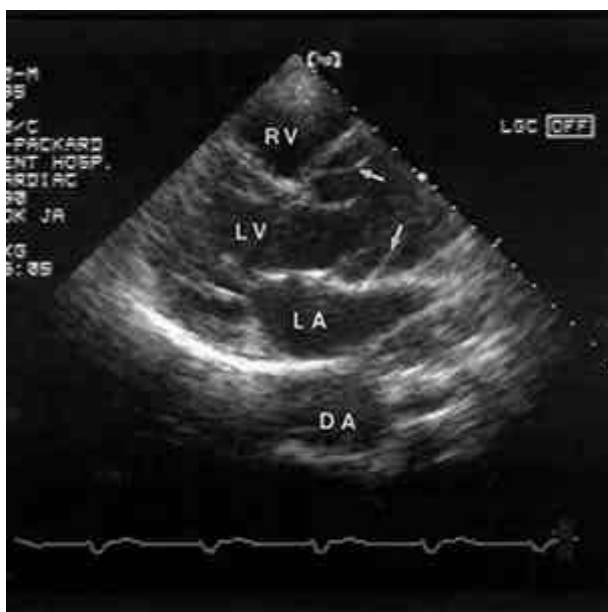


Fig. 1. Transthoracic echocardiography revealing aorta aneurysm involving the aortic root with intimal flap (arrows) and dilated descending thoracic aorta in the parasternal long axis view. DA=descending thoracic aorta; LA=left atrium; LV=left ventricle; RV=right ventricle.

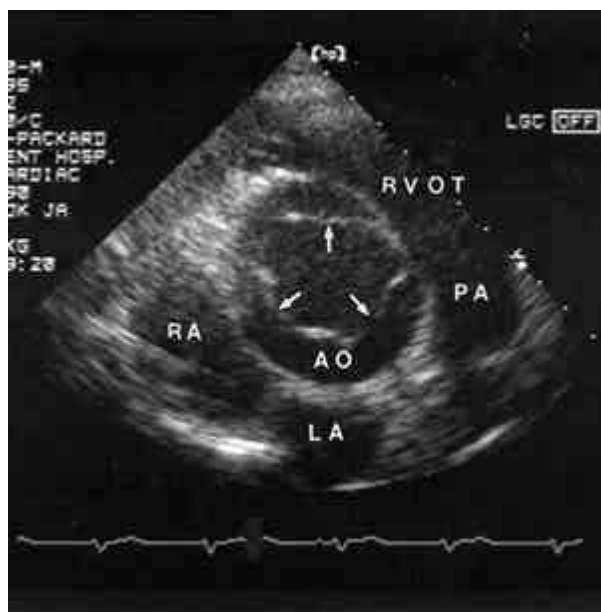


Fig. 2. Transthoracic echocardiography revealing aneurysmal dilatation with a circular shaped intimal flap (arrows) at the aortic root (AO) level in the parasternal short axis view. LA=left atrium; PA=pulmonary artery; RA=right atrium; RVOT=right ventricular outflow tract

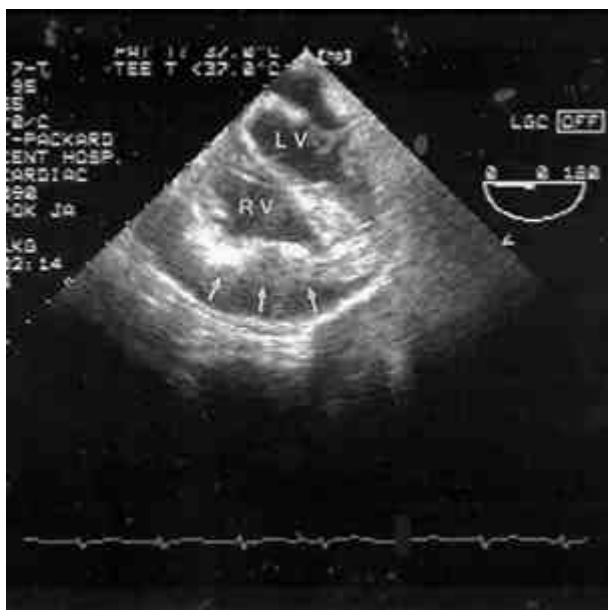


Fig. 3. Transesophageal echocardiography that was consecutively performed after transthoracic echocardiography, revealing newly developed pericardial effusion (arrows) around the left ventricle and the right ventricle as compared with Fig. 1. The electrocardiogram shows sinus tachycardia the heart rate 118/min. Abbreviations as in Fig. 1.

emergency TEE was performed consecutively. Intravenous sedation with diazepam 10 mg and local pharyngeal anesthesia with benocaine 5 ml were done. A TEE probe (Hewlett Packard model 21362A) with a 5.0-MHz transducer was advanced into the esophagus without difficulty. TEE image (Fig. 3) demonstrated acute progressive pericardial effusion which was not present during transthoracic echocardiography. The electrocardiogram showed sinus tachycardia. The heart rate was 118/min. Within 20 seconds of probe insertion, the patient became apnea and cardiopulmonary resuscitation was performed.

In spite of appropriate cardiopulmonary resuscitation, she expired. Autopsy was not performed because of the refusal of patient's family. Development of pericardial effusion with resultant cardiac tamponade due to rupture of circumferential aortic dissection during TEE was the presumed cause of death.

DISCUSSION

Prompt diagnosis and treatment are necessary for acute aortic dissection to reduce the risk of death. TEE can be performed safely to make a diagnosis of aortic dissection. Although aortogram, computed tomography, magnetic resonance imaging and transthoracic echocardiogram have been widely used as diagnostic methods of suspected aortic dissection, TEE was regarded as the first

choice of method by some authors (1). The major advantage of TEE is the ability to image almost the entire thoracic aorta with no acoustic windows impedance. TEE is a safe, sensitive and specific method for the diagnosis of aortic dissection, requires a short examination time, does not require intravenous contrast materials and is cost-effective (1, 2). The rate of complications associated with TEE is low and death associated with TEE is very rare (3). Therefore TEE has been widely used in emergency rooms and intensive care units without significant complications.

However, Silvey et al. reported a 26-year-old male patient who was suspected of having Marfan's syndrome and had aortic dissection DeBakey type I with 70 mm aortic root diameter (4). The aorta was ruptured during a TEE procedure, resulting in cardiac tamponade and death. In our case a 43-year-old woman with circumferential aortic dissection died during TEE. She had clinical stigmata of Marfan's syndrome. She had a large and very mobile circular shape intimal flap in the proximal aorta and the entry site was separated widely during diastole. These findings suggested extensive detachment and tear of the proximal aortic intima. The death may be caused by spontaneous rupture of the aorta than TEE induced complications. The risk of TEE procedure may be comparable to routine gastroscopy. However, TEE studies may increase risk because TEE examinations are carried out in patients with more severe cardiac disease. Geibel et al. reported that during TEE examination heart rate was increased 8 beats per minute in 70% of patients and systolic blood pressure was increased from 125 mmHg to 141 mmHg in 77% of the examined patients (5). A circumferential aortic dissection is very rare but is associated with a very large horizontal tear (6, 7). Therefore the modest hemodynamic effect of TEE may easily trigger rupture of the aorta with resultant cardiac tamponade and death especially in the circumferential aortic dissection. During TEE examination, sedation was done moderately with diazepam. However, circumferential aortic dissection as in this case

may require general anesthesia, endotracheal intubation and mechanical ventilation.

This report is of interest, because only a rare case of death could be associated with TEE. In this case we suggest that deep sedation may be required especially in circumferential dissection of the ascending aorta to prevent the increases of the blood pressure and the heart rate during the TEE procedure.

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