Echocardiographic findings of floating thrombus in left atrium

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SUMMARY We describe the M-mode and two-dimensional echocardiographic findings of a floating thrombus in the left atrium. Though the features resembled those of pedunculated left atrial myxoma, two-dimensional echocardiography was helpful in differentiating between thrombus and myxoma in the left atrium.

As is well known, thromboembolism is one of the most severe complications of mitral stenosis. Echocardiography has been used as a non-invasive tool for detecting thrombi in the left atrium.¹⁻³ To our knowledge, however, there has been only one brief report on the M-mode echocardiographic findings of a floating thrombus.⁴ In this report, the M-mode and two-dimensional echocardiographic findings of a floating thrombus are presented in detail.

Case report

A 42-year-old man with mitral stenosis was referred to us on 8 July 1978 for echocardiographic evaluation. He experienced successive episodes of thromboembolism of the femoral artery, superior mesenteric artery, and cerebral artery during the previous few months. The patient was in atrial fibrillation and had been treated with digitalis. Physical examination, chest x-ray film, and phonocardiography showed that he had moderately severe mitral stenosis. A tumour plop sound was not detected by phonocardiography.

M-MODE ECHOCARDIOGRAPHIC FINDINGS

The echoes of a floating thrombus, which was confirmed by surgical operation as described below, were detected posterior to the anterior mitral leaflet during diastole in some cardiac cycles. The area behind the mitral valve was relatively free of echoes during systole and the initial phase of diastole. The appearance of these echoes was not always regular in timing, but their disappearance was rapid at every end-diastole (Fig. 1). The echoes of a floating thrombus behind the anterior

mitral leaflet appeared as band-like echoes; this thrombus also produced a fuzzy appearance in the body of the left atrium. Mural thrombus could not be detected in the left atrium echocardiographically. These echocardiographic findings partially resembled those of pedunculated left atrial myxoma, but with floating thrombus there seems to be no regularity in the appearance of the echoes or synchronisation with cardiac cycles.

TWO-DIMENSIONAL ECHOCARDIOGRAPHIC FINDINGS

Two-dimensional echocardiograms of the long cardiac axis are presented in Fig. 2. All four polaroid films were obtained at end-diastole. The echoes of a floating thrombus were in the body of the left atrium and posterior to the mitral valve, and were variable in size and position in each cycle. The echogenic tissues seemed to be floating freely within the left atrial cavity and sometimes disappeared from the long cardiac axis. These findings suggested that the thrombus was not attached to the left atrial wall or to the mitral valve. The largest thrombus echoes were 3.5×1.5 cm.

CINEANGIOGRAPHIC AND SURGICAL FINDINGS

Pulmonary artery injection of contrast medium was performed, with follow-through to the left atrium. A small mass could be visualised floating in the left atrium.

At operation (13 July 1978), a thrombus measuring $3.7 \times 1.6 \times 1.5$ cm was found in the left atrium, unattached to any part of the wall or to the mitral valve. There was no mural thrombus in the body and appendage of the left atrium. The mitral leaflets

were moderately thickened and fused, the mitral orifice measuring 2.0 cm in diameter. The thrombus was removed from the left atrium and mitral commissurotomy was performed.

Discussion

Thrombus in the left atrium is sometimes found in patients with mitral stenosis. Though echocardiography has been used for detecting thrombi, they are difficult to visualise with standard techniques because most are small and occur in the left atrial appendage.³ Occasionally, a large thrombus may be layered and adherent to the posterior left atrial wall, and produce fuzzy echoes or a band of linear echoes, which are difficult to differentiate from the signals emanating from the left atrial posterior wall.⁴

On the other hand, echocardiographic findings of

a floating thrombus within the left atrial cavity may be characteristic, as shown in this case. The echoes of the floating thrombus were detected as band-like echoes posterior to the mitral valve and as fuzzy echoes in the body of the left atrium by M-mode echocardiography. In addition, most of these echoes behind the mitral valve appeared at diastole and disappeared rapidly at end-diastole, as do the echoes of a pedunculated left atrial myxoma.⁵ These findings were considered to be characteristic of the random motions of a floating thrombus in the left atrium, not synchronised with cardiac cycles.

Using two-dimensional echocardiography, it is easily possible to confirm the free movement of a floating thrombus within the left atrial cavity, and to estimate the variation in size and position which are not coincident with the cardiac cycles. These findings partially resemble those of left atrial myxoma.⁶ Though the motions of echoes of pedunculated left atrial myxoma may be regular and associated with cardiac cycles, there was no regularity in motions in the case of a floating thrombus. Two-dimensional echocardiography was useful in differentiating the motions of such abnormal echoes in the left atrium.

Fig. 1 The band-like echoes of a floating thrombus were detected posterior to the anterior mitral valve during diastole in some cardiac cycles. Their appearance was not always regular in timing, and these echoes disappeared rapidly at end-diastole. IVS, interventricular septum; AMV, anterior mitral valve.

Fig. 2 Two-dimensional echocardiograms of the long cardiac axis are shown. All four polaroid films were obtained at end-diastole. Thrombus echoes (TH) were in the body of the left atrium and posterior to the mitral valve. Their sizes and positions were variable.

We present the M-mode and two-dimensional echocardiographic findings of a floating thrombus in the left atrium. Though echocardiographic detection of thrombi is usually difficult, it is relatively easy to visualise a thrombus if it is floating freely within the left atrial cavity, as was confirmed in this case. Furthermore, two-dimensional echocardiography is useful in detecting the motions of a floating thrombus.

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