OVERESTIMATION OF SEVERITY OF MITRAL STENOSIS DURING CARDIAC CATHETERIZATION DUE TO A LARGE LEFT ATRIAL THROMBUS

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ABSTRACT

We report a case of mitral stenosis with a large left atrial thrombus which was obstructing pulmonary venous inflow where the conventional use of the pulmonary capillary wedge pressure as an approximation of the left atrial pressure during diagnostic cardiac catheterisation led to the over-estimation of the severity of mitral stenosis.

Keywords: *mitral stenosis, cardiac catheterization, left atrial thrombus.*

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INTRODUCTION

During cardiac catheterization, the orifice area of the mitral valve is conventionally calculated using the Gorlin equation[1]. By using the pulmonary capillary wedge pressure as an approximation of the left atrial pressure, the transmitral diastolic pressure gradient is obtained by simultaneous recording of the wedge and left ventricular pressures. However, any significant level of obstruction between the wedge and left atrial position may invalidate the approximation, and lead to errors in mitral valve area calculation.

CASE REPORT

A 66-year-old woman was investigated for recurrent pulmonary edema and syncope. Clinical examination showed signs of significant mitral stenosis, including right ventricular hypertrophy and atrial fibrillation. Echocardiography suggested severe mitral stenosis. The mitral valve area was 0.85 sq cm by planimetry (Fig 1), and 0.90 sq cm using continuous wave Doppler techniques (averaged from 10 cardiac cycles)[2,3]. The most prominent feature however was the presence of a very large left atrial thrombus that appeared to obstruct the pulmonary veins (Fig 2). No mitral regurgitation was present. Left and right heart catheterization demonstrated a mean right atrial pressure of 0 mmHg, right ventricular pressure of 56/-2 mmHg, pulmonary artery pressure of 48/26 mmHg (mean 37 mmHg) and mean pulmonary capillary wedge pressure of 19mmHg. The mean wedge-left ventricular gradient was 17 mmHg. With

Fig 1 - Parasternal short axis view of the stenotic mitral valve orifice showing area planimetered.

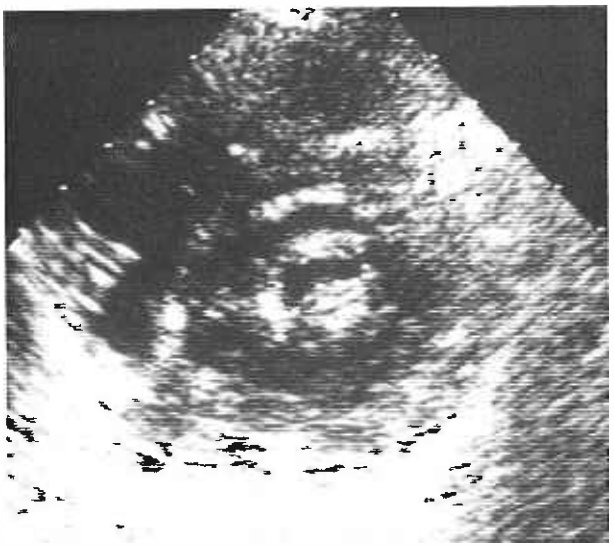

Fig 2 - Apical four chamber view showing large left atrial thrombus within a dilated left atrium.

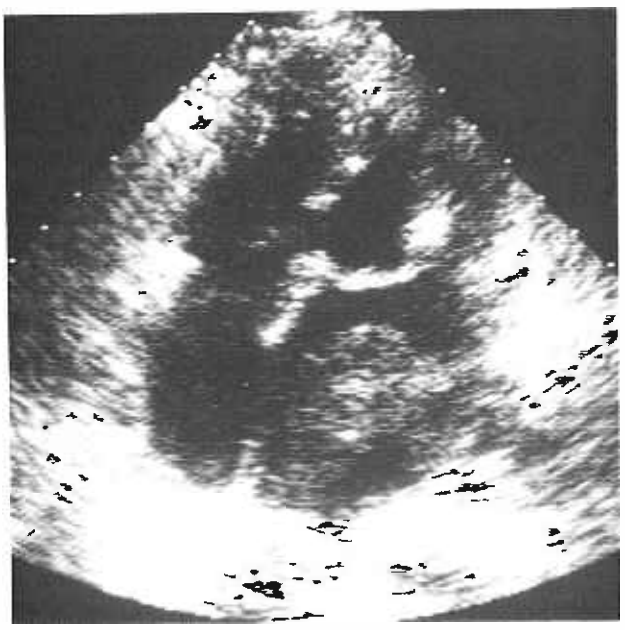

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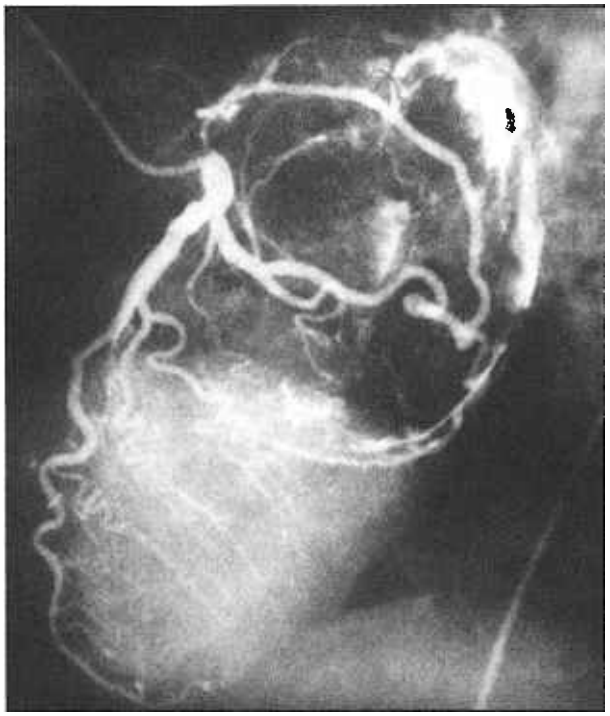
Fig 3 - Left coronary arteriogram showing neovascularization of the chronic left atrial thrombus.



a cardiac output of 2.34 liters/minute measured using the Fick method, the calculated mitral valve area was 0.47 sq cm, about half the values obtained non-invasively. Selective coronary arteriography revealed normal coronary arteries. The left coronary artery supplied the left atrial thrombus with multiple new vessels that drained eventually into the left atrium or vascular lakes within the thrombus (Fig 3)[4]. At operation, the left atrial thrombus occupied almost the entire left atrium, virtually occluding the pulmonary venous orifices. The mitral valve area was 0.95 sq cm confirming the accuracy of the non-invasive measurements as opposed to that from catheterization[5]. Mitral valve replacement and atrial thrombectomy were successfully performed.

DISCUSSION

Our patient illustrated a possible pitfall of using the pulmonary capillary wedge pressure to approximate the left atrial pressure in obtaining a transmitral gradient during cardiac catheterization. Obstruction of the pulmonary venous orifices, in this case by a thrombus, created another level of stenosis, leading to overestimation of the "transmitral" gradient and underestimation of the calculated mitral valve area. Moreover, direct measurement of the left atrial pressure by transseptal puncture may be undesirable when a large left atrial thrombus is present. In this circumstance, the Doppler-derived pressure half-time method is safer and more accurate for the determination of the mitral valve orifice area.

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