Late systolic waves have been noted in apexcardiograms recorded from subjects with idiopathic hypertrophic subaortic stenosis, primary myocardial disease and coronary artery disease. This report describes similar abnormalities of the apical impulse noted in two patients with midsystolic clicks, late systolic murmurs and documented prolapse of mitral valve leaflets.

This latter diagnosis was based on left ventriculography. Furthermore, convex deformities of the left ventricular cavity were noted during systole in these subjects. Selective coronary arteriograms were normal in both patients and coexisting hypertrophic subaortic stenosis was ruled out by continuous cavity and transvalvular pressure measurement during isoproterenol administration and catheter provoked premature ventricular contractions.

Figure 1 shows simultaneously recorded phonocardiograms, apexcardiograms and lead II of the electrocardiogram from two women with prolapsed mitral valve leaflets.

In the left panel a midsystolic apical retraction is inscribed concurrently with the second of two midsystolic clicks. A late systolic "bulge" can be seen during recording of a late systolic murmur. The right panel demonstrates a smaller midsystolic apex retraction followed by a prominent late systolic wave. These two abnormalities occur in conjunction with simultaneous recording of a midsystolic click and high amplitude late systolic murmur on the phonocardiogram. Similar apexcardiographic midsystolic retractions and late systolic "bulges" have been noted in 20 other subjects with prolapsed mitral valve leaflets.

Various mechanisms can be advanced to explain the apexcardiographic abnormalities in these patients with prolapsed mitral valve leaflets: 1) maximal projection of the prolapsed valve structure into the left atrium in conjunction with the midsystolic click, 2) systolic abnormalities of the inferior wall myocardium related to posterior chordal laxity and mitral valve prolapse, or 3) late systolic anterior apical motion consequent to mitral insufficiency and left atrial expansion. Double peaked apexcardiograms, resembling those seen in patients with obstructive cardiomyopathy, have also been recorded in these patients.

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structive cardiomyopathy, have been noted before in patients with midsystolic clicks and late systolic murmurs. However, careful clinical assessment is mandatory before assigning a diagnosis of "idiopathic" mitral valve prolapse to subjects with such auscultatory-apexcardiographic abnormalities. Mitral valve ballooning has been associated with hypertrophic subaortic stenosis and has been demonstrated in patients with midsystolic clicks, late systolic murmurs and coexisting severe obstructive coronary artery disease. It is noteworthy that all three entities are known to result in chest pain, syncope and arrhythmias.

Prolapse of the mitral valve leaflet should be considered in the differential diagnosis of any patient with a midsystolic click, late systolic murmur and apexcardiographic evidence of a midsystolic retraction and late systolic wave.

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REFERENCES

Fellowship in Preventive Cardiology

The Laboratory of Physiological Hygiene of the University of Minnesota offers a 1 to 3 year fellowship in the field of preventive cardiology. These fellowships are concerned with the diagnosis, measurement and treatment of risk characteristics for the major cardiovascular diseases and sudden death.

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