Mitral valve prolapse: harbinger of death or variant of normal?

It is 21 years since Barlow and colleagues recognised prolapse of the posterior leaflet of the mitral valve during angiography and related this to the auscultatory phenomena of the late systolic click and murmur.[1] Two years earlier in 1961 Reid, also from South Africa, had first proposed that the features were of mitral rather than pericardial origin as had previously been thought.[2]

The pathogenesis of mitral valve prolapse has been fully described and related to the clinical features.[3-6] A floppy mitral valve, Barlow's billowing leaflet, is common in some of the connective tissue diseases, particularly Marfan's syndrome; family studies have suggested that it is often hereditary; an association has been found with slender body build and the straight back syndrome; and the myxomatous transformation which is usually found in the redundant leaflet has been described as a possible forme fruste of the Marfan syndrome but is most frequent in middle aged or elderly people[7] as a degenerative or wear and tear phenomenon.

The development of echocardiography gave further confirmation of the mechanism of the auscultatory phenomena, aiding clinical recognition of the condition. Mitral valve prolapse became a popular diagnosis and was often recognised in patients without abnormal clinical features. Mitral valve prolapse is now sought by echocardiography whenever an explanation is required for symptoms of possible cardiac origin, having gradually become associated with atypical chest pain,[8] palpitations caused by both supraventricular[9] and ventricular arrhythmias,[10] syncope,[11] dyspnoea,[11 12] neurotic symptoms,[8] and with what used to be called Da Costa's or "effort syndrome."[13] Mitral valve prolapse has also been cited as one of the most frequent determinants of infective endocarditis[14 15] and of progressive mitral regurgitation needing replacement of the mitral valve.[16-18] Platelet embolism may lead to transient ischaemic attacks[19] or visual disturbance.[20] A distinctive electrocardiographic pattern of inferolateral T wave inversion,[21] which is inconstant, has been associated with abnormal left ventricular shape and performance[22]; angina-like pain in the presence of angiographically normal coronary arteries; ventricular ectopic activity; and sudden death sometimes attributed to a "partial cardiomyopathy."[23 24]

This formidable list of the complications of mitral valve prolapse suggests that it is a serious condition, and in a recent study from Manchester of 182 patients the authors concluded that the long term prognosis was not as good as had been generally believed.[8] By contrast, a retrospective analysis of the fate of patients with late systolic clicks or murmurs or both recorded phonocardiographically up to 30 years earlier led Leatham and Brigden to emphasise the generally benign prognosis of the condition and to describe the explosion of echocardiographic diagnoses as the "mitral prolapse fiasco."[25] Indeed, studies based on echocardiographic criteria have given estimates of the incidence of mitral valve prolapse varying from 5% to more than 15% of the population.[26 27] Reports in journals have mushroomed with epidemiological papers on incidence based on echocardiographic criteria and clinical papers about complications based on the patients who had them.

In a recent study from Framingham the prevalence of echocardiographic mitral valve prolapse was ascertained in this well documented population.[28-30] No fewer than 2287 of the original Framingham cohort together with 2973 of their children and the spouses of those children were studied by M mode echocardiography, with two dimensional confirmation of the findings in over 90%. Echocardiographic mitral valve prolapse was detected in 5% of the total 4967 people with technically adequate echocardiograms. Women showed a decline in prevalence from 17% in their 20s to 1% in their 80s. This decline in frequency in women was most noteworthy from middle to older age and contrasted with the prevalence in men, which remained between 2% and 4% from the 20s to the 90s. Mitral valve prolapse was identified in 30% of women aged 20-30 who weighed less than 50 kg but, though those with mitral valve prolapse were leaner than those without, none had overt evidence of a connective tissue disorder.

Correlation of mitral valve prolapse diagnosed in this way with abnormal physical signs was low, and most of these people were apparently normal. The combination of a systolic click and murmur was present in only five people out of 208 with echocardiographic mitral valve prolapse. Symptoms of typical or atypical chest pain, shortness of breath, and syncope were no more common in the 208 people with echocardiographic mitral valve prolapse than in those without. Nor were abnormal electrocardiograms any more common and the results of treadmill exercise testing were no different in those with and those without mitral

valve prolapse. Left ventricular systolic and diastolic function was similar in the two groups, but the internal dimension of the left ventricle at the end of diastole was slightly greater in those with mitral valve prolapse than in those without it. Some 30% of the first 100 people identified as having mitral valve prolapse had at least one relative with mitral valve prolapse, and the familial occurrence was greater in young women.

The Framingham study has shown that few patients with echocardiographic mitral valve prolapse show its clinical features, and that only about half of the people with systolic clicks have echocardiographic mitral valve prolapse. These findings contrast with the published clinical series, which have consisted almost wholly of patients ascertained on account either of symptoms or of complications, and most of these have had clicks and murmurs. Patients with abnormal clinical findings are much more likely to come to the attention of cardiologists than those without, and possibly also the presence of symptoms and signs may make the patients more at risk of serious disease.

The observation that echocardiographic mitral leaflet prolapse is most common in thin young women is in direct contrast with the usual clinical associations of a floppy valve. It strongly suggests that clinically silent echo prolapse in young women has nothing to do with the floppy valve or the complication of chordal lengthening or rupture needing mitral valve replacement, which are commonest in elderly men.[16-18] Until we know more it seems prudent to regard patients with auscultatory and echocardiographic features of floppy mitral valve as possible candidates for complications and to protect them against endocarditis, but to regard "echo only" mitral valve prolapse as a variant of normal—a phenomenon as transient as youth and incompatible with increasing age and girth. Follow up of the population detected in the Framingham study is important, but we predict that they will do well.

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Length of stay and health outcome

As part of a general search for ways of making more efficient use of scarce hospital resources length of stay has long been a candidate for scrutiny. In 1974 the length of stay in hospital for repair of an inguinal hernia averaged 7·3 days in England and Wales. By 1980 the figure had fallen to 5·8 days with a range among regional health authorities of 4·2 to 6·6 days.[1 2] In the United States, perhaps because most insurers now have to pay for each day in hospital, the lengths of stay for hernia repair have been lower still—5·8 days in 1974 and 5·0 in 1980.[3 4]

Clearly average length of stay itself conceals considerable variation among patients and hospitals and regions, and, moreover, it is rarely entirely clear whether the patients to which the data refer are comparable. Indeed, the age standardised rate of repair of hernia in the United States is twice as high as in England and Wales, raising the question whether part of the remaining difference is attributable to the American patients being fitter when the surgery is performed.[5]

In the United States cost containment is an overriding objective for government and health care planners, and accordingly length of stay statistics have been a central concern of bodies such as the Professional Standards Review Organisations. In part this is because in the search for savings length of stay is an easy target—unlike for instance use of diagnostic services which cannot be so readily questioned. Moreover, length of stay is easily and routinely measured and can be related to individual inpatients. For those concerned to compare, evaluate, and monitor, however, figures for length of stay may fall too easily out of routine health statistics publications. Their widespread use for administration and control may beg more questions than they can answer.

A recent case study from the Office of Technology Assessment of the United States Congress has provided insights into the depths of our collective ignorance.[6] The starting point of *Variations in Hospital Length of Stay: Their Relationship to Health Outcomes* was the persistence of long hospital stays in the north east of the United States relative to short stays in the west. These differences remained after adjustment for the age, sex, and race of the two populations. The authors suggested that the differences might be due to a greater severity of hospital cases in the north east or to regional differences in clinical practice. Most important, they wanted to know what effects on health outcome these variations in length of stay might have.

The study concluded initially that systematic regional differences in length of stay were not determined by crude indices of case mix. In other words no evidence was found that the longer stays could be justified by more serious cases.