MITRAL VALVE PROLAPSE IN DAR-ES-SALAAM, TANZANIA: CLINICAL AND ECHOCARDIOGRAPHIC PROFILE

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Abstract

Background: Mitral Valve Prolapse is a common, usually a benign disease. If recognized early, it has a good prognosis and saves the doctor and patients from embarrassing mismanagement.
Broad Objective: To determine the prevalence of Mitral Valve Prolapse among patients referred to our cardiac clinic with provisional diagnosis of Mitral Valve Prolapse.
Study Design: Descriptive and analytical hospital based study
Study Setting: Hindul Mandal Hospital, Dar es Salaam, Tanzania.
Measures of Outcome: Identifying the clinical features and characterizing echocardiographic features specific for diagnosing Mitral Valve Prolapse.
Subjects: Three hundred and forty patients with provisional diagnosis of mitral valve prolapse referred to a cardiac clinic at Hindu Mandal Hospital
Interventions: A detailed past and recent cardiac history, clinical examination as well as echocardiographic evaluation were performed.
Results: Among 340 patients with provisional diagnosis of mitral valve prolapse, 224 (65.9%) were confirmed to have mitral valve prolapse. The five common symptoms were chest pain, palpitations, shortness of breath, fatigue and dizziness. A subgroup of 25 patients with mitral valve prolapse who had mitral regurgitation had thicker and longer leaflets than those patients who had no mitral regurgitation (P<0.0001)
Conclusion: Mitral valve prolapse may present in the forms of anxiety attacks and mood swing. Such patients merit a careful cardiac evaluation and if there are positive auscultatory findings an echocardiogram is indicated.

Key words: Mitral valve Prolapse Echocardiography, Systolic click Left ventricular, Left atria

Introduction

The Pandoras's box of mitral value prolapse was opened by Reid in 1961.[1] Later Barlow et al[2] and Criley et al[3] recognized the clinicopathological significance of apical late systolic murmur and mid-systolic click. Since then, titles on mitral valve prolapse have varied from mitral valve prolapse syndrome to mitral valve prolapse disease.

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The prevalence of mitral valve prolapse in Africans has however not been looked into. Cohen et al [4] reported a prevalence rate of 14/1000 after examining 12,050 black school children.

Darsee et al [5] found it in 11 out of 107 asymptomatic house officers and medical students of Emory University Medical School. An incidence of 6-10% in non-Africans has been reported by various authors.[6] In spite of this dearth of information in the literature about the true incidence of mitral valve prolapse in non-Africans, there are very few reports of its occurrence in Africans. It is now well recognized that mitral valve prolapse is a common condition, which occurs in all age groups and is more frequent in women. The clinical features vary from chest pain, exertional dyspnoea, anxiety neurosis, palpitations to orthostasis. The aetiology of mitral valve prolapse remains obscure.

Pocock and Barlow[7] reported that in 62% of their 130 cases, no cause could be found. It has been described in association with Marfan's syndrome, ostium secundum Atrial Septal Defect, Hypertrophic cardiomyopathy and Ebstein's anomaly. Recent evidence suggests that autonomic dysfunction, a hyperadrenergic state, metabolic disturbances or combinations thereof, are a potential explanation for the constellation of symptoms, often associated with mitral valve prolapse.[8,9]

Although the course of this disease may be complicated by heart failure, arrhythmias, infective endocarditis, stroke, psychosis and sudden death, mitral valve prolapse is usually a benign disease. It probably occurs most frequently in persons without cardiac disease. This disease if early recognized has good prognosis and save the doctor and patients from embarrassing mismanagement. The objective of our study was to determine the prevalence of mitral valve prolapse among patients referred to our cardiac clinic with provisional diagnosis of mitral valve prolapse using clinical and echocardiography methods.

Methodology

Between May 1998 and May 2001, three hundred and forty consecutive patients were referred to our cardiac clinic with a provisional diagnosis of mitral valve prolapse for further evaluation. These patients were recruited from Hindul Mandal Hospital which is one of the big private hospitals in Dar-es-Salaam, situated at the centre of the city. All subjects had been symptomatic for at least two months and were currently having one or more symptoms on a weekly basis. Informed consent was obtained from the patients. All patients were evaluated by a cardiologist. For each patient a detailed past and recent cardiac history aimed at identifying symptoms of mitral valve prolapse (including fatigue, dizziness, syncope, dyspnoea, chest pain and palpitations) was obtained. Also they were asked about their occupation. During history taking behaviour pattern was analyzed and the following character attributes were looked for: emotional instability; aggressiveness, depressive tendency; hysterical component, extroversion and introversion.

All patients had a physical examination in order to identify skeletal abnormalities commonly associated with mitral valve prolapse such as, pectus excavatum or carinatum; a high arched oral palate, hyperetensibility of the joints and a straight back syndrome of kyphoscoliosis. A detailed cardiac physical examination was performed that included cardiac auscultation to detect the presence of apical mid or late systolic sounds and heart murmur in the supine, left lateral decubital, standing, sitting and squatting positions. None of the patient was on treatment at the time of cardiological examination.

Each patient had a chest x-ray, and full blood picture. A standard resting 12 lead ECG was done and interpreted for findings characteristic of mitral valve prolapse. Echocardiography was performed using HP1000 sonas, equipped with M-mode, 2-Dimensional Pulsed Doppler, Continuous Doppler and Colour-Flow Mapping. Results were stored on VHS videotape for further view. Studies were performed and reviewed in real time and stop-frame modes. The mitral valve was examined in the parasternal, apical and subcostal imaging planes. The diagnosis of mitral valve prolapse, was based on two-dimensional echocardiographic evaluation with supplemental two-dimensional echocardiographic guided M-Mode recordings and Doppler and Colour flow mapping.

Since there is a lack of agreement regarding the criteria for diagnosing mitral valve prolapse, a scale of graduated strictness of criteria was used to diagnose mitral valve abnormalities.[10,11] A diagnosis of "definite" mitral valve prolapse was made on the basis of echocardiographic documentation from two views (apical four chamber and parasternal long-axis) of mitral valve leaflet buckling below the level of the annular plane. Alternatively M-Mode evidence of prolapse (late systolic posterior motion of more than 2mm or holosystolic hammocking more than 3mm of one or both mitral valve leaflets) together with echocardiographic evidence on at least one view of flat closure or buckling and evidence of myxomatous degeneration of the mitral valve leaflets was considered sufficient to diagnose definite mitral valve prolapse. "Probable" mitral valve prolapse was defined as mitral valve buckling below the level of the annular plane on only one echocardiographic view with evidence of myxomatous degeneration of the mitral valve leaflets. The diagnosis of "possible" mitral valve prolapse was based on echocardiographic evidence of significant myxomatous degeneration together with flat closure of the mitral valve leaflets on one or more two dimensional echocardiographic views but insufficient buckling below the level of the annular plane to diagnose definite prolapse. Diagnosis of myxomatous degeneration of the mitral valve leaflets was based on echocardiographic evidence of thickening (in comparison to the posterior aortic wall) and redundant tissue of one or both leaflets.[11] The combined cardiac findings of definite, probable and possible mitral valve prolapse were designated as mitral valve abnormalities.

Among the patients with mitral valve prolapse a detailed measurement of the left atria size, left ventricular size and mitral leaflets length and thickness were done for the first 25 patients with mitral regurgitation. These measurements were later compared with the measurements of the first 25 patients who had mitral valve prolapse with no mitral regurgitation. Patients with rheumatic heart disease, cardiomyopathies, ischaemic heart disease as well as pregnant mothers were excluded from the study.

Patients were adequately informed of the nature of their illness and importance of regular medical follow up. They were reassured and advised to avoid known precipitating factors. Some were given medications:-beta blockade or verapamil and few anxiolytic agents.

Data Analysis

Questionnaire data were coded and analysed using EPI info version 6 software. Analysis of results included comparison between groups. Statistical analyses were performed calculating frequencies, standard deviation and chi-square test where appropriate. A 5% level of significance was adopted for the statistical test.

Results

A total of 340 patients were evaluated and 224(65.9%) patients had clinical findings compatible with mitral value prolapse and the echocardiographic findings confirmed the diagnosis. Among the 224 patients, there were 82(36.6) male patients and 142(63.4%) female patients. Their mean age was 19.5 years (range 9 years to 70 years).

Table 1 shows the distribution of symptoms among patients with mitral valve prolapse. Chest pain was a complaint in 204(91%) patients. The pain was often localized above or below the left breast and was less agonizing and radiating than the typical angina pectoris. Others described the chest pain as "sensation of lump in the throat" or sensation of cardiac oppression. The other common complaints were palpitations 202 (90%), inability to breathlessness 197(88%), fatigue or body weakness

197([88%), dizziness 179(80%), left arm pain 177(79%) and anxiety state or panic state 168(75%). In some of the patients, the symptoms were precipitated by stress, like examinations, disappointments or contradictions.

Table 2 shows the clinical signs observed in-patients with mitral valve prolapse. Among the 224 patients, 175 (78%) patients had a systolic click, 139 (62%) had mid or late systolic apical murmur and 118 (53%) patients had tachycardia. Hysterical behaviour was common exhibited by 40 (18%) patients. Among patients with mitral valve prolapse, 152 (68%) patients had ECG changes, ST-T were abnormalities (flattening or inversion) compatible with a diagnosis of mitral valve prolapse. Table 3 shows the comparison of the echocardiographic parameters of mitral valve prolapse patients with and without mitral regurgitation. Patients with mitral regurgitation had a significant thicker and longer leaflets. The prolapsed leaflets were much more displaced in those with mitral regurgitation than those with no mitral regurgitation.

Table 1. Distribution of Symptoms among Patients with Mitral Valve Prolapse (n=224)

Symptom	No. of Patients (%)
Chest pain	204 (91)
Palpitations	202 (90)
Shortness of breath	197 (88)
Fatigue	197 (88)
Dizziness	179 (80)
Arm pain	177 (79)
Anxiousness	168 (75)
Mood swing	166 (74)
Headache	139 (62)
Passing out spells	31 (14)
Others	27 (12)

NB: Patients may present various combinations of these symptoms

Table 2. Clinical Signs Observed in Patients with Mitral Valve Prolapse (n=224)

Sign	Frequency (%)
Systolic click	175 (78)
Mid or late systolic apical murmur	139 (62)
Tachycardia	118 (53)
Dyspnoea	69 (31)
Hysterical component	40 (18)
Emotional unstability	20 (9)
Pectus excavatum	16 (7)
Depressive tendency	16 (7)
Bradycardia	16 (7)
Pectus carinatum	9 (4)
Hyperextensibility	7 (3)
Cerebrovascular accident	4 (2)
High arched oral palate	4 (2)
Aggressiveness	2 (1)

NB: Patients may present various combinations of these signs

Table 3. Comparison of the Echocardiographic Parameters of mitral Valve Prolapse Patients with and without Mitral Regurgitation

Parameter	MVP With MR (N=25)	MVP Without MR (N=25)	P. Value
Max leaflet displacement (mm)	9 ± 2	5 ± 1	< 0.0001
Max leaflet thickness (mm)	9 ± 3	6 ± 3	< 0.0001
Anterior leaflet length (cm)	3.8 ± 0.5	2.4 ± 0.4	< 0.0001
Posterior leaflet length (cm)	1.9 ± 0.1	1.4 ± 0.2	< 0.0001
LVIDd (cm)	5.4 ± 0.6	4.4 ± 0.5	0.01
LA AP size (cm)	4.2 ± 0.8	3.1 ± 0.6	0.003
EF (%)	71 ± 4	71 ± 6	NS

MVP = Mitral Valve Prolapse
LVIDd = Left Ventricular Internal Diameter in Diastole
LA = Left Atrial Anteroposterior size
EF = Ejection Fraction

Discussion

Mitral valve prolapse (MVP) is the most common valvular abnormality in developed countries, affecting 2 to 6% of adults.[12,13] Among patients referred to our cardiac clinic with a provisional diagnosis of mitral valve prolapse, 65.9% had a correct diagnosis which was confirmed using echocardiography. This implies that a number of our clinicians are aware of this common valvular disease whose incidence is unknown in our sub-region. No attempt has been made to relate this disease either to the total hospital admissions or to the total cardiac patients for the period studied. It is suggested that further studies should be undertaken to ascertain the incidence of this disease in our sub-region. Although mitral valve prolapse has been reported to have many causes, most instances occur as a primary condition. Studies have shown that primary mitral valve prolapse is passed from affected mothers and fathers to children of both genders, indicating an autosomal dominant inheritance.[12,14] Family studies have demonstrated that mitral valve prolapse has an age of onset between 10 and 16 years, is more consistently expressed in women than in men and may become undetectable after middle age in some mildly affected women.[12] In our study, the age range was 9 years to 70 years, with a mean age of 19.5 years. We had more women than men and the male: female ration was 1:2. Previous studies have shown that under the age of 30 years, the M: F ration is 1:3 but at age of 70 years, both M: F ration are about equal.[12]

Mitral valve prolapse has been associated with constellation of symptoms and signs often dramatic and intriguing. The symptoms, chest pain, palpitations, breathlessness, fatigue, dizziness, anxiety, vertigo, paresthesia, sweating, presyncope and syncope, may occur without a satisfactory explanation. These symptoms are indistinguishable from panic attacks, thus mitral valve prolapse has been studied in patients with anxiety neurosis or panic disorder.A number of researchers have reported a higher than normal prevalence of mitral valve prolapse associated with panic disorder,ranging up to 50%.[15] Many studies suggest an abnormal catecholamine response to stress or abnormally high receptor sensitivity and/ or a generalized connective tissue abnormality causing panic

attacks to buckle the mitral valve in susceptible patients.[16,17] Our patients exhibited these symptoms in various combinations. The commonest five symptoms were: chest pain, palpitations, shortness of breath, fatigue and dizziness. Anxiety, panic attacks and neurotic behaviour are often considered to be components of the Mitral Valve Prolapse syndrome.[8,18] In our study, 75% of the patients had anxiety symptoms and mood swing. In our sub-region physicians should be aware of this close overlap, otherwise patients with mitral valve prolapse may languish in the few ill-equipped psychiatric hospitals or may even end up in the mushroom "alternative medicine houses" with their inherent shortcomings.

Mitral valve prolapse may present with one or multiple mid or late systolic clicks of non-ejection type. In some patients, the click is followed by a typical late systolic murmur which occasionally has a musical or honking quality. In our study, 78% of the patients had a systolic click and 62% had a mid or late systolic murmur. Family studies have also documented extracardiac features of primary mitral valve prolapse, including a tendency for low body weight, low blood pressure and thoracic bony abnormalities.[19] These thoracic bony abnormalities include pectus excavatum, mild scoliosis and a straight thoracic spine. In our study 16 (7%) patients had pectus excavatum and 9 (4%) patients had pectus carinatum.

In most patients studies, the mitral valve prolapse syndrome is associated with a benign prognosis.[20] The age-adjusted survival rate of both men and women with mitral valve prolapse is similar to that of individuals without this common clinical entity.[14] Complications occur most commonly in patients with a mitral systolic murmur, those with thickened redundant mitral valve leaflets and those with increased left ventricular or left atrial size, especially men older than 45 years.[18,21,22] In our study twenty five patients with mitral valve prolapse who had mitral regurgitation, had significantly thicker and longer leaflets than those who had no mitral regurgitation.($p<0.0001$).

The initial step in the management of most patients with mitral valve prolapse is reassurance support and patient education that the condition is generally benign. In many cases, however the cessation of stimulants such as caffeine, alcohol and cigarettes may be sufficient to control symptoms. A normal lifestyle and regular exercise is encouraged.[18,21,23] Patients with only a systolic click who have echocardiographic evidence of a higher risk profile for endocarditis, such as leaflet thickening, elongated chordae, left ventricular dilatation or left atrial enlargement should receive endocarditis prophylaxis.[24,25] Patients with Mitral valve prolapse and palpitations associated with mild tachyarhythmias and those with chest pain, anxiety or fatigue, often respond to therapy with beta-blockers, which decrease systolic stress on the ballooning mitral leaflet.[26] Nitrates, which reduce ventricular volume and thus increase the prolapse should be avoided in patients with "angina – like" chest pain.

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