Frequency of Atrial Fibrillation in Patients Having Mitral Valve Repair or Replacement for Pure Mitral Regurgitation Secondary to Mitral Valve Prolapse

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Relatively little attention has been paid to the frequency of atrial fibrillation (AF) in patients with mitral regurgitation (MR) secondary to mitral valve prolapse (MVP). We reviewed clinical, electrocardiographic, echocardiographic, hemodynamic, and angiographic findings in 246 patients aged 21 to 84 years (mean 61) (66% men) who had mitral valve repair or replacement for MR secondary to MVP. Immediately before the mitral operation by electrocardiogram, only 37 patients (15%) had AF and the other 209 patients were in sinus rhythm. Of the latter, 32 had had a history of AF that had reverted to sinus rhythm spontaneously or with antiarrhythmic therapy. Thus, a total of 69 patients (28%) had AF at some time. In conclusion, the frequency of AF in patients with MR secondary to MVP and sick enough to warrant a mitral valve operation have a relatively low frequency of AF (persistent in 15%, paroxysmal in another 13%), percentages considerably lower than that seen in patients with mitral stenosis just before a mitral commissurotomy or replacement. **(Am J Cardiol 2006;97:1039–1044)**

Since its initial description in 1963, numerous articles on various aspects of mitral valve prolapse (MVP) have appeared.[1] Indeed, from 1966 to 2000, a total of 3,772 articles on MVP were cited on a Medline search. Although many articles mentioned atrial fibrillation (AF), few have focused on its frequency. This report focuses on the frequency of AF in a large group of patients having either mitral valve repair or replacement for mitral regurgitation (MR) secondary to MVP. The hypothesis was that the frequency of AF preoperatively would be relatively small despite the frequency of relatively large atrial cavities.

Methods

From March 1993 to January 2005, a total of 274 patients had mitral valve repair or replacement for pure, i.e., no element of mitral stenosis, MR secondary to MVP at Baylor University Medical Center. All of these operatively excised valves or portions of the valves were examined by 1 of us (WCR), and the etiology of the MR was determined by gross (and often histologic) examination of the operatively excised valve tissue plus examination of the medical record.[2] Of the 274 patients, 28 were eliminated from the present study because of a previous cardiac operation (10 patients), having a pacemaker (5 patients), having a procedure performed simultaneously on the aortic valve (1 patient), or because the clinical chart was unavailable for review (12 patients). The remaining 246 patients were included in the present study. The mitral operation in these patients was their first cardiac operation; all were >20 years of age, none had tricuspid valve replacement, or a procedure performed on the aortic valve.

The electrocardiogram immediately before the mitral operation was reviewed in all 246 patients. Hemodynamic data from cardiac catheterization was available in 143 patients (58%); coronary angiographic data were also available in 217 patients (88%); and echocardiographic data were available in 94 patients (38%).

Statistical analysis was completed using GB-STAT version 10.0 (Dynamic Microsystems Inc., 2004). Variables are expressed as means, with corresponding ranges or frequencies, with corresponding percentages. Means and frequencies were compared with Student's *t* tests. The patients were divided and compared by preoperative rhythm, age, sex, and whether mitral repair or replacement was done. A p value <0.05 was considered statistically significant.

Results

The major findings in the 246 patients are listed in Table 1. The patients were divided into 2 groups: (1) those in whom the electrocardiogram immediately before the mitral valve operation disclosed sinus rhythm (n = 209; 85%); and (2) those in whom the electrocardiogram immediately preoperatively

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Table 1
Preoperative clinical findings in 246 patients with and without pre-op atrial fibrillation by electrocardiogram immediately before mitral valve operation for mitral regurgitation secondary to mitral valve prolapse

Variable	Atrial Fibrillation		p Value
	No (n = 209) (85%)	Yes (n = 37) (15%)	
Age (years): range (mean)	21–81 (59)	34–84 (69)	<0.0001
White	191 (91%)	37 (100%)	<0.06
Men:women	143 (68%):66 (32%)	20 (54%):17 (46%)	0.10
Echocardiographic dimensions (mm) (mean)			
Left atrium	29–65 (50)	41–76 (54)	0.16
Left ventricular peak systole	13–48 (36)	17–50 (38)	0.53
Left ventricular end diastole	18–79 (60)	39–61 (56)	0.22
Pressures (mm Hg) (range) (mean)			
Pulmonary artery peak systole	17–87 (39)	41–76 (44)	0.12
Pulmonary artery mean	10–62 (25)	10–50 (29)	0.15
Left ventricular peak systole	68–198 (125)	89–190 (124)	0.92
Left ventricular end-diastole	3–36 (19)	9–39 (19)	0.99
Pulmonary artery wedge mean	3–43 (17)	5–31 (20)	<0.08
Right ventricular peak systole	12–83 (39)	20–71 (43)	0.14
Right ventricular end-diastole	2–24 (11)	4–25 (12)	0.52
Right atrial mean	1–35 (7)	1–20 (10)	<0.004
Aorta (peak systole)	68–200 (126)	87–199 (126)	0.90/0.67
(end diastole)	39–98 (70)	50–99 (71)	
Other hemodynamic			
Cardiac index (L/min/m^2)	1.4–5.4 (2.7)	1.5–4.1 (2.3)	<0.06
Ejection fraction (%)	30–75 (58)	25–70 (51)	0.0003
Body mass index (kg/m^2)(mean)	26	24	<0.006
≤25	109 (52%)	24 (65%)	0.15
26–30	77 (37%)	12 (32%)	0.56
>30	23 (11%)	1 (3%)	0.13
Systemic hypertension	106 (51%)	20 (54%)	0.74
Mean New York Heart Association functional class (mean)	2.4	2.9	<0.002
I	38 (18%)	3 (8%)	
II	74 (35%)	6 (16%)	<0.002
III	76 (36%)	20 (54%)	
IV	21 (11%)	8 (22%)	<0.002
Number of major coronary arteries narrowed >50% in diameter:	(n = 182)	(n = 35)	
0	139 (77%)	24 (69%)	0.31
1	20 (11%)	3 (9%)	
2	11 (6%)	0 (0%)	
3	8 (4%)	5 (13%)	0.31
Left main	4 (2%)	3 (9%)	
Coronary bypass	42 (20%)	10 (27%)	0.34

disclosed AF (n = 37; 15%). Of the 11 major variables analyzed in the 2 groups, 5 showed significant differences. In contrast to the sinus rhythm group, preoperatively, the AF patients were significantly older (69 vs 59 years), had a lower mean body mass index (24 vs 26 kg/m^2), had a higher New York Heart Association functional class (2.9 vs. 2.4), a higher mean right atrial pressure (10 vs 7 mm Hg), and lower mean ejection fraction (51% vs 58%).

Of the 209 patients with sinus rhythm by electrocardiogram immediately before the mitral valve operation, 32 (15%) had had previous episodes of AF that had either converted to sinus rhythm spontaneously or with use of antiarrhythmic drugs or electrical cardioversion. Thus, of the total 246 patients, 69 (28%) had had ≥1 episode of AF (persistent in 37 and paroxysmal in 32). Comparison of the various variables depicted in Table 1 between the 37 patients with persistent AF and the 32 patients with paroxysmal AF disclosed only 1 significant difference: the persistent group had a lower frequency of a history of systemic hypertension than the paroxysmal AF group (20 [54%] vs 23 [72%]; p = 0.01).

Comparison of 12 variables in the men versus the women are presented in Table 2. In contrast to the women, the men had significantly larger left ventricular cavities, lower left ventricular and aortic peak systolic pressures, lower ejection fractions, higher body mass indexes, more angiographic coronary arterial narrowing, and a higher frequency of simultaneous coronary arterial bypass grafting (at the time of the mitral operation).

Comparison of 13 variables in the 157 patients having mitral valve repair versus the 89 patients having mitral valve replacement are listed in Table 3; only 1 significant difference was found—the replacement group had a higher frequency of AF.