Atrial Fibrillation and Early Clinical Outcomes After Mitral Valve Surgery in Patients with Rheumatic vs. Non-Rheumatic Mitral...

Article *in* Heart Views · October 2012

DOI: 10.4103/1995-705X.105730 · Source: PubMed

5 authors, including:

Sadeq Ali-Hasan-Al-Saegh

63 PUBLICATIONS **83** CITATIONS

SEE PROFILE

Seyed Mohammad Yousof Mostafavi Pour Mans...

McGill University

14 PUBLICATIONS **31** CITATIONS

SEE PROFILE

Original Article

Atrial Fibrillation and Early Clinical Outcomes After Mitral Valve Surgery in Patients with Rheumatic vs. Non-Rheumatic Mitral Stenosis

S. J. Mirhosseini, Sadegh Ali Hassan Sayegh, Mehdi Hadadzadeh, Nafiseh Naderi[1], S. M. Y. Mostafavi Pour Manshadi[1]

Department of Cardiac Surgery, Yazd Cardiovascular Researches Center, Afshar Hospital, Shahid Sadoughi University of Medical Sciences, [1]Department of Medicine, Ali ben Abitaleb Medical College, Islamic Azad University, Yazd, Iran

ABSTRACT

Background: Atrial fibrillation (AF) is the most common arrhythmia after open heart surgery that can lead to early morbidity and mortality following operation. Mitral stenosis (MS) is a structural abnormality of the mitral valve apparatus that can be resulted from previous rheumatic fever or non-rheumatic fever such as congenital mitral stenosis, malignant carcinoid disease etc. This study was designed to test the hypothesis that type of mitral stenosis can affect the incidence, duration and frequency of AF post mitral valve replacement.

Materials and Methods: We selected fifty patients with rheumatic mitral stenosis and 50 patients with non-rheumatic mitral stenosis who were candidates for mitral valve replacement (MVR) surgery. Pre-operative tests such as CRP, ESR, CBC, UA, ANA, APL (IgM, IgG), ANCA, RF were performed on participants' samples and the type of mitral stenosis, rheumatic or non-rheumatic, was determined clinically. Early post-operative complications such as infection, bleeding, vomiting, renal and respiratory dysfunction etc., were recorded. All patients underwent holter monitoring after being out of ICU to the time of discharge.

Results: The mean age of patients was 48.56 ± 17.64 years. 57 cases (57%) were male, and 43 cases (43%) were female. Post-operative AF occurred in 14 cases (14%); 3 cases (6%) in non-rheumatic mitral stenosis group, and 11 cases (22%) in the rheumatic mitral stenosis group. There was a significant relationship between the incidence of AF and type of mitral stenosis (P = 0.02). Renal dysfunction after MVR was higher in rheumatic MS group than in non-rheumatic MS group (P = 0.026). There was no relationship between the type of mitral stenosis (rheumatic or non-rheumatic) and early mortality after mitral valve replacement (P = 0.8).

Conclusion: We concluded that the type of mitral stenosis affect post-operative outcomes, especially the incidence of atrial fibrillation and some complications after mitral valve replacement.

Key words: Atrial fibrillation, mitral stenosis, mitral valve replacement, valvular heart disease

How to cite this article: Mirhosseini SJ, Ali-Hassan-Sayegh S, Hadadzadeh M, Naderi N, Mostafavi Pour Manshadi SMY. Atrial fibrillation and early clinical outcomes after mitral valve surgery in patients with rheumatic vs. non-rheumatic mitral stenosis. Heart Views 2012;13:136-8.

INTRODUCTION

Atrial fibrillation (AF) is the most common arrhythmia after open heart surgery that can lead to early morbidity and mortality following operation. Predisposing factors of post-operative AF include: Age, male sex, BMI >30, atrial dilatation, long-term aortic cross clamp, post-operative pericarditis, pre-operative leukocytosis, and increase in plasma level of inflammatory markers.[1,2] Post-operative atrial fibrillation (POAF) may increase heart failure, stroke, pulmonary edema, kidney and respiratory disorders, longer stay in ICU and hospital, as well as increase in therapy costs.[3,4]

Address for correspondence: Dr. Seyed Jalil Mirhosseini, Department of Cardiac Surgery, Afshar Cardiovascular Hospital, Yazd, Iran.
E-mail: jalilmh1@yahoo.com

Access this article online

Quick Response Code:

Website: www.heartviews.org

DOI: 10.4103/1995-705X.105730

Valvular heart diseases (VHD) account for 10-20% of all cardiac surgical procedures in the world. Inflammatory response of the immune system is one of the most important pathogenesis of VHD.[5,6] Mitral stenosis (MS) is a structural abnormality of the mitral valve apparatus that can result from previous rheumatic fever. Non-rheumatic mitral stenosis may be due to congenital mitral stenosis, malignant carcinoid disease, etc.

This study was designed to compare the incidence of atrial fibrillation and early outcomes following mitral valve replacement in patients with rheumatic or non-rheumatic mitral stenosis, in Afshar Cardiovascular Center, Yazd, Iran.

MATERIALS AND METHODS

Our cross-sectional study was approved by ethics committee in our university. Patients who were candidates for mitral valve surgery were enrolled in the study which lasted from 15 November 2010 to 15 November 2011 (one year). After obtaining consent forms, the patients underwent mitral valve replacement. All of the operations were performed by one senior surgeon. Fifty patients suffered from rheumatic mitral stenosis who were candidates for mitral valve surgery were enrolled in this study. Pre-operative tests such as C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), complete blood count (CBC), urine analysis (UA), anti-nuclear antibody (ANA), anti-phospholipid (APL-IgM, IgG), anti-neutrophil cytoplasmic antibody (ANCA-c, p), rheumatoid factor (RF) were performed on participants' samples. The type of mitral stenosis, rheumatic or non-rheumatic was determined clinically.

The demographic variables and early post-operative complications such as infection, bleeding, vomiting, renal and respiratory dysfunction, ICU and hospital stay were recorded. All patients underwent holter monitoring after being out of ICU at the time of discharge. Our data were analyzed by SPSS 15 software. We used ANOVA, Chi-square, and Fisher exact test for quantitative and qualitative variables.

RESULTS

Fifty-seven cases (57%) were male and 43 cases (43%) were female. Of all the participants, AF was observed in 14 patients (14%); 9 of whom were male and 5 were female. There was no significant relationship between sex and AF after surgery ($P = 0.84$). POAF occurred in 14 cases (14%); 3 cases (6%) related to non-rheumatic mitral stenosis group, and 11 cases (22%) related to the rheumatic mitral stenosis group [Table 1]. There was a significant relationship between incidence of AF and type of mitral stenosis ($P = 0.02$).

The mean duration of AF was 1135 ± 1060 min, which in the non-rheumatic MS group was 890 ± 1084 min and in the rheumatic MS group was 1170 ± 1056 min ($P = 0.62$). Moreover, the duration of AF which totally was 2.7 ± 1.9 days; in the rheumatic MS group, it was 2.33 ± 1.8 days and in the non-rheumatic MS group, it was 2.86 ± 2.01 days ($P = 0.51$). This data shows that duration and frequency of recurrence of AF have no significant relationship with rheumatic or non-rheumatic MS.

Early complications after operation were compared between two groups in Table 1. According to Table 1, post-MVR bleeding was lower in rheumatic MS than in non-rheumatic MS ($P = 0.56$). Renal dysfunction after MVR was higher in rheumatic MS than in non-rheumatic MS ($P = 0.02$). ICU stay in non-rheumatic MS group was 3.6 ± 1.80 days, while for another group was 3.4 ± 1.26 days. Also, hospital stay duration was 6.5 ± 2.2 days for the non-rheumatic MS group in comparison to the rheumatic MS group that was 8.84 ± 2.06 days. Therefore, rheumatic MS can increase hospitalization stay but cannot prolong ICU stay compared to non-rheumatic MS. Early mortality occurred in 2 cases (2%) in hospital after the operation; 1 case (1%) in the rheumatic MS group and 1 case (1%) in the non-rheumatic MS group. There was no relationship between type of mitral stenosis (rheumatic or non-rheumatic) and early mortality after mitral valve replacement.

DISCUSSION

Atrial fibrillation (AF) is the most common arrhythmia following open heart surgery and is the most important

Table 1: Post-operative atrial fibrilation and early complications after operation in both groups

Variables	Rheumatic MS	Non-Rheumatic MS	*P* value
Incidence of POAF [*n* (%)]	11 (11)	3 (3)	0.02
Duration Of POAF (min)	1170±1056	890±1084	0.62
Frequency of recurrence AF	2.33±1.8	2.86±2.01	0.51
Bleeding [*n* (%)]	12 (21)	21 (42)	0.056
Sternal infection [*n* (%)]	2 (4)	7 (14)	0.08
GI dysfunction [*n* (%)]	6 (12)	2 (4)	0.14
Vomiting [*n* (%)]	6 (12)	3 (6)	0.29
Loss of appetite [*n* (%)]	5 (10)	3 (6)	0.46
Renal dysfunction [*n* (%)]	19 (38)	9 (18)	0.026
Respiratory dysfunction [*n* (%)]	23 (46)	22 (44)	1.00

Data presented as mean±standard deviation, MS: Mitral stenosis, POAF: Post-operative atrial fibrillation, AF: Atrial fibrillation, GI: Gastrointestinal

cause of morbidity and mortality in hospitalization stay. Its incidence is related to the patient's characteristics and type of surgical operation. Non-congenital and valvular heart disease patients who undergo open heart surgery usually do not have a history of inflammation. However, inflammatory conditions can occur in these patients such as rheumatoid arthritis, anti-phospholipid syndrome, lupus or connective tissue disease.[1-3]

The report of incidence of post-operative AF in the literature is 20-50% after cardiovascular surgery and occurs two or three days post-operatively.[3,4] Horskotte et al. reported that the underlying pathology for patients waiting for mitral valve replacement was 77% rheumatic in their study of 1051 patients.[7] Guiherme et al. reported that the most serious complication of patients with valvular heart disease was rheumatic fever in 30-45%.[8]

Our findings show that duration and frequency of recurrence of AF have no significant relationship with rheumatic or non-rheumatic MS, but there was a significant relationship between incidence of AF and type of mitral stenosis. In our study, post-MVR bleeding was lower in rheumatic MS than in non-rheumatic MS; however, there was no significant difference between two groups regarding bleeding. Renal dysfunction after MVR was higher in rheumatic MS than in non-rheumatic MS. Other complications after surgery such as gastrointestinal (GI) and respiratory dysfunction, nausea and vomiting, loss of appetite etc., have no significant differences in both groups.

A study conducted by Lindhardsen et al. indicated the rheumatoid arthritis increased the incidence of atrial fibrillation and stroke. They believed that the increasing incidence of atrial fibrillation in rheumatoid arthritis can suggest that atrial fibrillation is relevant in the cardiovascular risk assessment of patients with rheumatoid arthritis.[9] A study carried out by Ozaydin *et al*. reported that factors associated with the development of atrial fibrillation in patients with rheumatic mitral stenosis are included high sensitivity to C-reactive protein, N-terminal of brain natriuretic peptide precursor and left atrial diameter.[6] Akram et al. suggested that non-rheumatic mitral stenosis is more frequent than is assumed and is associated with risk factors for coronary artery disease.[10]

In our study, there was no relationship between type of mitral stenosis (rheumatic or non-rheumatic) and early mortality after mitral valve replacement. LaPar *et al*. suggested that patients undergoing surgical mitral valve replacement have low mortality. Major adverse event's rate was significantly due to post-operative atrial fibrillation.[11] Kim *et al*. reported that the long-term outcome of patients with symptomatic mitral stenosis after previous percutaneous mitral balloon valvotomy (PMV) was more favorable after mitral valve replacement than after repeated percutaneous mitral balloon valvotomy.[12]

We conclude from this study that the type of mitral stenosis (rheumatic or non-rheumatic MS) had effect on post-operative outcomes, especially incidence of atrial fibrillation and some complications after mitral valve replacement. We recommend that specifying the etiology of mitral stenosis can help cardiac surgeons and may prevent mortality and morbidity of patients undergoing mitral valve replacement.

In conclusion, the long-term outcome of patients with symptomatic MS after previous PMV was more favorable after MVR than after repeated PMV. These data suggest that MVR may be preferred mode of therapy in patients with unfavorable valve morphologic characteristics and no co-morbidities.

REFERENCES

1. Turk T, Vural H, Eris C, Ata Y, Yavuz S. Atrial fibrillation after off-pump coronary artery surgery: A prospective, matched study. J Int Med Res 2007;35:134-42.
2. Haghjoo M, Basiri H, Salek M, Sadr-Ameli MA, Kargar F, Raissi K, *et al*. Predictors of postoperative atrial fibrillation after coronary artery bypass graft surgery. Indian Pacing Electrophysiol J 2008;8:94-101.
3. Kalavrouziotis D, Buth KJ, Vyas T, Ali IS. Preoperative atrial fibrillation decreases event-free survival following cardiac surgery. Eur J Cardiothorac Surg 2009;36:293-9.
4. Banach M, Kourliouros A, Reinhart KM, Benussi S, Mikhailidis DP, Jahangiri M, *et al*. Postoperative atrial fibrillation-what do we really know? Curr Vasc Pharmacol 2010;8:553-72.
5. Oh S, Kim KB, Ahn H, Cho HJ, Choi YS. Remodeling of ion channel expression in patients with chronic atrial fibrillation and mitral valvular heart disease. Korean J Intern Med 2010;25:377-85.
6. Ozaydin M, Turker Y, Varol E, Alaca S, Erdogan D, Yilmaz N, *et al*. Factors associated with the development of atrial fibrillation in patients with rheumatic mitral stenosis. Int J Cardiovasc Imaging 2010;26:547-52.
7. Horstkotte D, Niehues R, Strauer BE. Pathomorphological aspects, aetiology and natural history of acquired mitral valve stenosis. Eur Heart J 1991;12:55-60.
8. Guilherme L, Ramasawmy R, Kalil J. Rheumatic fever and rheumatic heart disease: Genetics and pathogenesis. Scand J Immunol 2007;66:199-207.
9. Lindhardsen J, Ahlehoff O, Gislason GH, Madsen OR, Olesen JB, Svendsen JH, *et al*. Risk of atrial fibrillation and stroke in rheumatoid arthritis: Danish nationwide cohort study. BMJ 2012;344:e1257.
10. Akram MR, Chan T, McAuliffe S, Chenzbraun A. Non-rheumatic annular mitral stenosis: Prevalence and characteristics. Eur J Echocardiogr 2009;10:103-5.
11. LaPar DJ, Mulloy DP, Crosby IK, Lim DS, Kern JA, Kron IL, *et al*. Contemporary outcomes for surgical mitral valve repair: A benchmark for evaluating emerging mitral valve technology. J Thorac Cardiovasc Surg 2012;143:S12-6.
12. Kim JB, Ha JW, Kim JS, Shim WH, Kang SM, Ko YG, *et al*. Comparison of long-term outcome after mitral valve replacement or repeated balloon mitral valvotomy in patients with restenosis after previous balloon valvotomy. Am J Cardiol 2007;99:1571-4.

Source of Support: Nil, **Conflict of Interest:** None declared.