

Original article:

Study of evaluation of incidence & risk factors of post-operative atrial fibrillation requiring intervention in mitral valve surgery

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Abstract:

Introduction: New onset postoperative atrial fibrillation (POAF) is the most common complication following cardiac surgery, with an incidence ranging from 10% to 30% in modern surgical series¹⁻⁴. While a strong association with advancing patient age has been demonstrated with POAF⁵, a rising elderly population undergoing cardiac operation warrants a greater understanding of the impact of POAF on valve, and mitral valve replacement operations.

Methodology: This study was carried out in Medanta Heart Institute of Medanta – The Medicity hospital in Icu 2.

Medanta -The Medicity is total 1500 bedded tertiary care center in Gurgaon catering to patients from North and Eastern India in addition to international patients. The Cardiac surgery unit has 44 bedded ICU and post-operative wards. The hospital is NABH and JCI accredited and has standard protocols in place of patient flow.

Results : In our enrolled hospital study, 40.9% (38cases) of study subjects were males and 59.1%(55 cases) were females. All were having NSR per-operatively to enroll in the study as per inclusion criteria of the study.

NYHA class II, III, IV were 15.1%(14cases), 77.4%(72cases), 7.5%(7 cases) respectively. There was no case of NYHA class I. Mitral valve repair was performed in 47.6%(30cases) and replacement in 52.4%(63cases). Repair was performed through trans-septal approach for better exposure and replacement was done through standard left atriotomy and caval cannulation through the right atrial appendage.

Conclusion: From this study we may conclude, Postoperative Atrial Fibrillation is common complication after mitral valve surgery for mitral regurgitation in patients with no prior history of atrial fibrillation and The major risk factors emerging from the study are hypertension, DM, dyslipidemia and obesity.

Introduction:

New onset postoperative atrial fibrillation (POAF) is the most common complication following cardiac surgery, with an incidence ranging from 10% to 30% in modern surgical series¹⁻⁴. While a strong association with advancing patient age has been demonstrated with POAF⁵, a rising elderly population undergoing cardiac operation warrants a greater understanding of the impact of POAF on valve, and mitral valve replacement operations. The POAF patients had a higher incidence of mortality, hospital readmission, longer intensive care unit (ICU) and postoperative length of stay.

However, the magnitude of POAF on length of stay, resource utilization, and readmission rates remains an area of clinical interest. The purpose of this study is to examine the risk-adjusted impact of POAF in measures of

incidence, mortality, hospital resources. However the incidence and determinants of AF after mitral valve surgery are poorly defined or several reasons. First postoperative AF has mainly evaluated after coronary artery bypass surgery(CABG), and few patients undergoing mitral valve surgery (for mitral stenosis or MR) were included.⁶ Second, these studies included mostly post-valve replacement patients, and in an era of mitral valve repair dominance, the incidence of postoperative AF remains undefined. Third, early postoperative AF after mitral valve surgery is seldom reported. Consequently, the relation between early postoperative AF and late recurrence is unknown, and the impact of postoperative AF on outcomes is not defined. The lack of data on the incidence, predictors, and long term clinical implications of AF after MR surgery hinders management of preventive strategies.

Methodology:

This study was carried out in Medanta Heart Institute of Medanta – The Medicity hospital in Icu 2.

Medanta -The Medicity is total 1500 bedded tertiary care center in Gurgaon catering to patients from North and Eastern India in addition to international patients. The Cardiac surgery unit has 44 bedded ICU and post-operative wards. The hospital is NABH and JCI accredited and has standard protocols in place of patient flow.

Patients with mitral valve complaints were admitted for a preoperative work up 2 days prior to surgery. The preoperative work up includes dental clearance, basic laboratory investigations, all cultures, 2-D Echocardiography and preanesthetic checkup (PAC). After getting PAC clearance patients were posted in one of the seven operating room. After successful surgery patients were shifted to ICU-2 in which patients physiological parameters observed for 48 hours and after removal of Endotracheal (ET) tube and ICD tubes they were shifted in ICU-1 for one day observation. If all parameters would be stable then all these patients were shifted to wards for three to four more days. The epicardial pacing wires were removed on fifth post-operative day if patients do not have arrhythmias.

Patients:

INCLUSION CRITERIA

1. Patients with mitral valve diseased (Severe-moderate mitral stenosis, severe-moderate mitral regurgitation) undergoing clinically indicated open heart surgery.
2. Patients with mitral valve diseased with preoperative baseline normal sinus rhythm and postoperative Atrial Fibrillation as:

Sustained AF:

The incidence of new onset, recurrent, or self-reverting episode of sustained atrial fibrillation needing intervention in the form of drugs ,DC shock etc.

EXCLUSION CRITERIA

1. Patients undergoing balloon mitral valvotomy (BMV).
2. Patients with history of any preoperative arrhythmia or if not in normal sinus rhythm.
3. Patients having an episode of intra-operative arrhythmia.

Results

In our enrolled hospital study, 40.9% (38cases) of study subjects were males and 59.1%(55 cases) were females. All were having NSR per-operatively to enroll in the study as per inclusion criteria of the study.

NYHA class II, III, IV were 15.1%(14cases), 77.4%(72cases) ,7.5%(7 cases) respectively. There was no case of

NYHA class I.

Mitral valve repair was performed in 47.6%(30cases) and replacement in 52.4%(63cases). Repair was performed through trans-septal approach for better exposure and replacement was done through standard left atriotomy and caval cannulation through the right atrial appendage.

Among the risk factors contributed for the post-operative new onset atrial fibrillation, Hypertension 41.9%(39cases) has highest percentage followed by Diabetes Mellitus 26.9%(25 cases) and Dyslipidemia 24.7%(23 cases). Other important risk factors with incidence more than 10% were obesity 17.2%, hypothyroidism 15.1% and prior stroke 10.8%. The rest of the factors did not contribute much.

In the study, preservation of total chordae of mitral valve apparatus was seen in 30.1%(28cases).

Further 7.5%(7cases) were seen as having severe inotropic support and 38.7% (36 cases) having moderate inotropic support. 65.6%(61 cases) were on beta-blockers to control the heart rate and 17.2%(16 cases) were on calcium channel blockers. 58.1%(54 cases) were on the amiodarone for arrhythmia and 36.6%(34 cases) were on digoxin. Cardioversion to revert back to normal sinus rhythm was done in 5.4%(5 cases) and permanent pacemaker implantation in 2.2%(2 cases).

Discussion:

Atrial fibrillation is most frequent complication after cardiac surgery². Previous investigators reported increased morbidity and mortality related to POAF³. Moreover, POAF was associated with significant increases in duration and the overall costs of hospitalization. Mathews et al⁵ reported that the overall incidence of POAF was 27% in 2,417 patients undergoing CABG surgery with or without concurrent valve surgery. In a study by the Department of Veterans Affairs¹¹ similar results were reported. Mitral valve repair or replacement significantly increased the risk of AF (odds ratio = 2.88 and 2.33, respectively).

In our study, the highest incidence was observed for beta-blockers 65.6%(61 cases), amiodarone 58.1%(54 cases), digoxin 36.6%(34 cases), calcium channel blockers 17.2%(16 cases) cardioversion 5.4%(5 cases), PPI 2.2%(2 cases). With multivariate logistic regression analysis, the present result suggest that the age, left atrial size > 40 mm, female sex, significantly increased the likelihood of developing POAF.

Independent predictors of POAF was advanced age. Similar findings have been reported by others. Aranki et al⁷ report an 18% incidence of POAF in patients aged <60 years versus 52% for those aged >80 years. The probability of developing POAF increases by about 25% for every 5-year increase in age¹⁵ with the plateau after 80 years⁸.

An increased left atrial diameter and a lower LVEF were significantly associated with an increased risk of POAF as suggested previously⁹. In our study minimum LVEF was 25% and LA size was 4. Chronic atrial dilation caused by valvular disease or left ventricular dysfunction is associated with anatomic changes, mainly foci of thrombosis, which may lead to “electric remodeling”.

Almassi et al⁶ showed that the use of inotropic agents for more than 30 minutes after the termination of CPB was associated with a higher incidence of arrhythmia; the risk of POAF exceeded 50% in patients with cardiogenic shock undergoing surgical revascularization. In our study duration of maximum inotropic support was 22 days and CPB time was 240 min.

Aranki et al⁷ reported a duration of hospitalization in patients with POAF an average of 3 to 4 days longer.

In our study mean ICU day was 7.3 days, and in hospital 14.3 days.

Conclusion:

From this study we may conclude , Postoperative Atrial Fibrillation is common complication after mitral valve surgery for mitral regurgitation in patients with no prior history of atrial fibrillation and The major risk factors emerging from the study are hypertension, DM, dyslipidemia and obesity.

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