

Incidence of atrial fibrillation in patients undergoing valve surgery

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Objective: To find the frequency of new onset of atrial fibrillation after different heart valves replacement surgery inpatient of either gender and various age groups.

Methodology: This cross sectional study was conducted in cardiac surgery unit of LRH, Peshawar from September 2017 to January 2018. The patients of 15 – 70 years age of both genders were included in the study on the basis of convenient sampling technique. The data were collected through a standard pro forma and was analyzed through SPSS version 22.

Results: Out of 80 patients, 37 (46.3%) were males and 43 (53.8%) females. Mean age was 37.11 ± 11.773 years. Frequency of new onset of post-operative atrial fibrillation was observed in 21 (26.3%) patients' out of these, 10 were male and 11 were female.

Conclusion: The frequency of post-op atrial fibrillation is not affected by patient genders, age and type of valve surgery.

Keywords: Atrial fibrillation, valvular replacement, incidence.

INTRODUCTION

Atrial fibrillation (AF) is the most common complication after cardiac surgery and incidence after valvular surgery is higher than isolated CABG.¹ Important risk factors are previous history of arrhythmias, cardiac surgery and postoperative arrhythmias (POAs), particularly AF, severe right coronary artery stenosis, atrioventricular nodal or sinus nodal artery disease and mitral valve disease (particularly rheumatic mitral stenosis).²⁻⁶ Most commonly involve valve in AF is mitral valve.⁷

Postoperative atrial fibrillation (POAF) can last for short time and may lead to some serious complications without treatment such as cardiac failure, stroke, peripheral thromboembolism and increase mortality.⁸ It has been reported that there is 3 – 5% risk for stroke with non valvular AF, while its percentage is high in valvular AF.⁹ Treatment such as cardioversion are used for POAF.¹⁰

Few studies are available to see the effect of POAF on long term survival in valvular surgery patients.¹¹ Previous studies are performed mainly to see incidence of AF after CABG surgery and few studies report POAF after mitral valve and double-valve surgery.¹² The prevalence of AF in Pakistan is 6.5%.¹³ We performed this study so that we can know the true incidence of AF after various valve surgeries.

METHODOLOGY

This descriptive cross sectional was conducted in the cardiac surgery unit (ICU and post-operation ward) of

LRH from September 2017 to January 2018 after institutional ethical committee approval and informed consent from all patient undergoing various valvular surgery.

Using WHO sample size formula the sample size was calculated as 80 using confidence interval of 95% with margin of error 5%. All patients of ages 15 – 70 years and both genders were included in the study. The patients with pre-operative AF and those undergone coronary artery bypass grafting (CABG), pulmonary valve replacement (PVR), Tricuspid valve replacement (TVR), chronic obstructive pulmonary disease (COPD) & patients with creatinine more than 1.5 mg/dl were excluded from the study.

The patients were observed on 24-hour telemetry RECORD and all the ECGs for AF for five days after surgery. POAF was defined as new-onset AF 2 – 4 days after surgery.

Statistical Analysis: Data were entered and analyzed in SPSS 22. Pearson chi-square test was used to assess new onset of AF relation with type of surgery.

RESULTS

Out of 80 patients, 37 (46.3%) were males and 43 (53.8%) were females. Mean age was 37.11 ± 11.7 years. Most patients had undergone mitral valve replacement surgery and many had several co-morbid conditions (Table 1).

Out of 14 patients with post-operative A Fib after MVR, 5 (35.7%) were males and 9 (32.1%) were females. Three patients who had post-aortic valve replacement 2

(18.2%) were males and one (16.7%) was female. AF after dual valve replacement (DVR) was observed in 4 patients, in which 3 (25.0%) were males and only 1 (11.1%) was female. Bioprosthetic valve were used in 04 (5%) patients. While bileaflet St Jude mechanical valves were used in rest of the patients.

Table 1: Baseline characteristics of patients.

Variable	Number	Percentage
Male sex	37	46.3
Diabetes mellitus	19	23.8
Hypertension	23	28.8
Smoking	12	15
Mitral stenosis (MS)	15	18.8
Mitral regurgitation (MR)	27	33.8
Aortic stenosis (AS)	13	16.3
Aortic regurgitation (AR)	4	5.0
MS+AS	8	10.0
MR+AR	10	12.5
MS+AR	2	2.5
MR+AS	1	1.3
Ejection fraction $\leq 50\%$	23	28.8
Smoking	10	12.5
Dyslipidemia	06	7.5
Previous Angioplasty	03	4
History of MI	26	32.5
Previous CVA	01	1.25
History of CABG	04	05
COPD	01	1.125
CCF	04	05

Table 2: Type of valve surgery and post-operative AF.

Type of valve	Total	AF	AF
	Number (%)	Number	(%)
MVR	42 (52.5%)	14	66.7%
AVR	17 (21.3%)	3	14.3%
DVR	21 (26.3%)	4	19%

Standard guideline directed medical therapy was used in all patients before and after surgery including aspirin,

ACE inhibitors, Beta Blockers, statins and clopidogrel. Warfarin was started for all mechanical prosthesis with INR adjustment as per AF presence. The association between type of heart valve replacement and new onset of POAF (Pearson chi-square = 2.301, df = 2, p-value 0.316) showed that new onset of AF was independent of type of valvular surgery.

DISCUSSION

This was the first study in our local population to know the exact frequency of POAF. In our study, AF was found in 26% patients. Maisel et al documented that new onset AF as high as 65%.¹⁴ Some studies reported AF up to 40% in patients undergoing CABG and 50% after valve replacements.¹⁴ The incidence of POAF is high in case of post CABG combine valve replacement surgery.¹⁵ After heart transplantation POAF was 24%.¹⁶ AF was present in 37.5% of post MVR patients.¹⁷

AF in age group of 30 – 40 years patients was 0 (0%), in age group of 41 – 50 years, 4 (9.09%) patients developed AF, 16 (36.36%) patients in age group of 51 – 60 years while 24 (54.54%) patients of age group 61 – 65 years age. The frequency of AF increases with advance age.¹⁸ A study from LRH Peshawar reported Post MVR surgery AF was developed which is independent of age and gender.¹⁷

Heart valve surgery in developed countries is 10-30% of all heart and vascular diseases.¹⁹ In our part of the world, the most frequent cause of valvular heart disease is still rheumatic. Incidence of AF after CABG is 17-33% while after valvular surgery is 38 – 64%.²⁰

POAF can be present for short time and may lead to some serious complications without treatment such as cardiac failure, stroke, peripheral thromboembolism and increase mortality.⁸ The risk factors for POAF are COPD, use of digoxin, cardiac venting and advance age.²¹

CONCLUSION

The development of AF after different heart valves replacements is not affected by gender and valve type. AF is independent of type of valve replacement surgery and gender distribution.

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REFERENCES

- Peretto G, Durante A, Limite LR, Cianflone D. Postoperative arrhythmias after cardiac surgery: incidence, risk factors, and therapeutic management. *Cardiol Res Pract* Volume, 2014. Article ID 615987, 15 pages <http://dx.doi.org/10.1155/2014/615987>.
- Asher CR, Miller DP, Grimm RA, Cosgrove DM, Chung MK. Analysis of risk factors for development of atrial fibrillation early after cardiac valvular surgery. *Am J Cardiol*. 1998; 82: 892-5.
- Mendes LA, Connelly GP, McKenney PA, Podrid PJ, Cupples LA, Shemin RJ, et al. Right coronary artery stenosis: an independent predictor of atrial fibrillation after coronary artery bypass surgery. *J Am Coll Cardiol*. 1995; 25: 198-202.
- Helgadottir S, Sigurdsson MI, Ingvarsdottir IL, Arnar DO, Gudbjartsson T. Atrial fibrillation following cardiac surgery: risk analysis and long-term survival. *J Cardiothorac Surg*. 2012; 7: 87-9.
- Leitch JW, Thomson D, Baird DK, Harris PJ. The importance of age as a predictor of atrial fibrillation and flutter after coronary artery bypass grafting. *J Thorac Cardiovasc Surg*. 1990; 100: 338-42.
- Kolvekar S, D'Souza A, Akhtar P, Reek C, Garratt C, Spyt T. Role of atrial ischaemia in development of atrial fibrillation following coronary artery bypass surgery. *Eur J Cardiothorac Surg*. 1997; 11: 70-5.
- Nair GM, Nery PB, Diwakaramenon S, Healey JS, Connolly SJ, Morillo CA. A systematic review of randomized trials comparing radiofrequency ablation with antiarrhythmic medications in patients with atrial fibrillation. *J Cardiovasc Electrophysiol*. 2009; 20: 138-44.
- Ogilvie IM, Newton N, Welner SA, Cowell W, Lip GY. Underuse of oral anticoagulants in atrial fibrillation: a systematic review. *Am J Med*. 2010; 123: 638-45.
- Nichol MB, Knight TK, Dow T, Wygant G, Borok G, Hauch O, et al. Quality of anticoagulation monitoring in nonvalvular atrial fibrillation patients: comparison of anticoagulation clinic versus usual care. *Ann Pharmacother*. 2008; 42: 62-70.
- Anselmi A, Possati G, Gaudino M. Postoperative inflammatory reaction and atrial fibrillation: simple correlation or causation. *Ann Thorac Cardiovasc Surg*. 2009; 88: 326-33.
- El-Chami MF, Kilgo P, Thourani V. New-onset atrial fibrillation predicts long-term mortality after coronary artery bypass graft. *J Am Coll Cardiol*. 2010; 55: 1370e6.
- Aranki SF, Shaw DP, Adams DH. Predictors of atrial fibrillation after coronary artery surgery: current trends and impact on hospital resources. *Circulation*, 1996; 94: 390-7.
- Hassan MU, Amin F, Iqbal A. Frequency of Atrial Fibrillation and Its Common Clinical Outcomes Among Patients. *Pak Heart J*. 2014; 47: 123-6.
- Maisel WH, Rawn JD, Stevenson WG. Atrial fibrillation after cardiac surgery. *Ann Intern Med*. 2001; 135: 1061-73.
- Creswell LL, Schuessler RB, Rosenbloom M, Cox JL. Hazards of postoperative atrial arrhythmias. *Ann Thorac Surg*. 1993; 56: 539-49.
- Pavri BB, O'Nunain SS, Newell JB, Ruskin JN, William G. Prevalence and prognostic significance of atrial arrhythmias after orthotopic cardiac transplantation. *J Am Coll Cardiol*. 1995; 25: 1673-80.
- Waseem N, Khan A, Malik A, Khan RA. Frequency of early atrial fibrillation in post mitral valve replacement surgery. *J Postgrad Med Inst*. 2016; 30: 1-4.
- Ul B, Gill A, Ramzan M, Abbas T, Zafar MZ, Javaid A. Frequency of atrial fibrillation in post operative coronary artery bypass grafting surgery. *Pak Heart J*. 2014; 47: 141-4.
- Demirbağ R, Sade LE, Aydin M, Bozkurt A, Acartürk E. The Turkish registry of heart valve disease. *Türk Kardiyol Dern Ars*. 2013; 41: 1-10.
- Asher CR, Miller DP, Grimm RA, Cosgrove DM, Chung MK. Analysis of risk factors for development of atrial fibrillation early after cardiac valvular surgery. *Am J Cardiol*. 1998; 82: 892-5.
- Almassi GH, Schowalter T, Nicolosi AC. Atrial fibrillation after cardiac surgery: a major morbid event? *Ann Surg*. 1997; 226: 501-1.