

ISCHEMIC HEART DISEASE IN PATIENTS WITH HEART BLOCKS REQUIRING PERMANENT PACEMAKER

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Date Received:

June 22, 2016

Date Revised:

April 01, 2017

Date Accepted:

April 07, 2017

ABSTRACT

Objective: To find out the frequency of ischemic heart disease in patients with conduction disorders requiring permanent pacemaker implantation.

Methodology: This cross sectional descriptive study was carried over 78 patients at Electrophysiology Department, Cardiology, Hayatabad Medical Complex, Peshawar from September 2014 till September 2015 for a period of one year who presented with conduction defects and had been hospitalized for permanent pacemaker implantation. Coronary angiography (CAG) was carried out in all patients to diagnose ischemic heart disease (IHD). We determined the frequency of various degrees of ischemic heart disease in different types of heart blocks.

Results: Out of 78 patients, there were 42 (53.8%) males and 36(46.2%) females. 53 patients (67.9%) had coronary artery disease. Patients with age more than 40 years were having the highest frequency of IHD 26(33.3%). Regarding the severity of IHD, 21.8% had mono-vessel disease, 60.3% had two-vessel disease and 17.9% had three-vessel disease. 25 patients (32.1%) had no significant lesion on coronary angiography.

Conclusion: Ischemic heart disease was present in high frequency in patients with chronic conduction disorders and the most common artery involved was right coronary artery.

Key Words: Coronary artery disease, Chronic conduction defect, Coronary angiography, Permanent pacemaker

This article may be cited as: Khan ZA, Ullah H, Ullah S, Awan ZA. Heart blocks requiring permanent pacemaker in patients with ischemic heart disease. *J Postgrad Med Inst* 2017; 31(2): 138-41.

INTRODUCTION

Heart blocks can result in catastrophe leading to sudden cardiac death¹. Sino-atrial (SA) node, atrio-ventricular (AV) node and the intra-ventricular conduction system can be affected by any alteration in the conduction system. Symptoms include dizzy spells, palpitations, shortness of breath and unconsciousness. Permanent pacemaker implantation should be considered in patients with these recurrent symptoms due to conduction disorders.

Cardiac conduction disorder, associated with hypertension and diabetes in the elderly patients accounts for almost 40% of all permanently implanted pacemakers in the US². Variable results have been found between different countries regarding the prevalence of permanent pacemaker implantation due to conduction disorders³.

Majority of patients presenting with conduction disorders have an associated coronary artery disease which may be the underlying cause and makes the prognosis of conduction disorder worse^{4,5}. The prevalence of CAD in chronic conduction disorder has been reported to be

30-70%, depending on patients characteristics and the ways to detect CAD⁶.

The 2008 ACC/AHA/HRS Guidelines for device-based therapy acknowledge that, in cases of third-degree AV block complicating inferior wall MI, permanent pacing should be reserved for patients in whom the block does not resolve with revascularization⁷.

The present study was designed to look for the presence of ischemic heart disease in patients who presents with heart blocks requiring permanent pacemaker. The rationale behind this study was that conduction block has many underlying causes but patients with coronary artery disease have a worst prognosis and this group has to be identified to initiate treatment timely and to reduce morbidity and mortality.

METHODOLOGY

This was a one year cross sectional descriptive study from September 2014 till September 2015 conducted in Department of Electrophysiology, Cardiology, Hayatabad Medical Complex, Peshawar on 78 patients us-

ing WHO criteria after taking permission from hospital ethical committee and patient informed consent. All patients with chronic conduction disorder in whom no reversible cause was found and hence were candidate for permanent pacemaker implantation were subjected to coronary angiography. We determined the frequency of various degrees of CAD. Narrowings in the coronary tree was identified in different types of heart blocks. Extent and severity of CAD was categorized as no CAD, single vessel, two vessels and three vessel disease.

Patients who were excluded from study were, conduction disorders due to reversible causes like renal failure, and electrolytes imbalance on lab investigations, acute coronary syndrome, adult congenital heart disease, myocarditis, cardiomyopathies, valvular heart dis-

ease and heart failure. Data were entered and analyzed in SPSS program version 16. Characteristic of patients were described in terms of frequencies, percentages, mean, standard deviation and presented in the form of tables and graphs.

RESULTS:

Out of 78 patients, there were 42 (53.8%) males and 36(46.2%) females. 1.17:1 was male to female ratio. Mean age was 58.62 ± 11.57 years, with range 30-80 years. According to the age, patients were divided into three groups and those who were more than 40 years were the most common age group. (Figure 1)

53 patients (67.9%) had coronary artery disease. Regarding the severity of IHD, 21.8% had single-vessel

Figure 1: Age distribution of patients

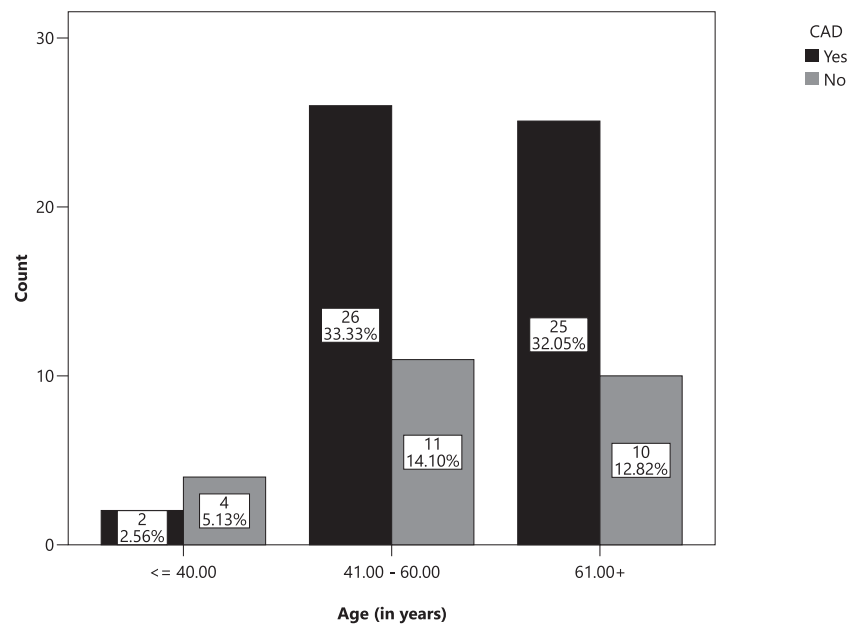
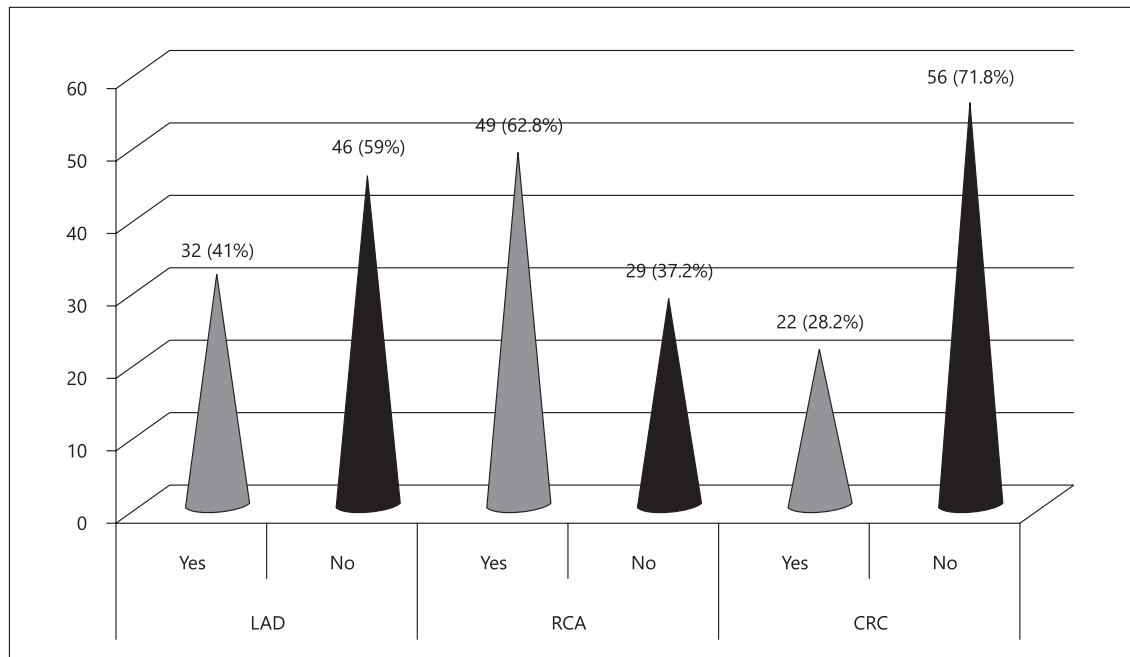


Table 1: Frequency and type of coronary artery disease and cardiac conduction disorders (n=78)

		Frequency	%
CAD	Yes	53	67.9%
	No	25	32.1%
Type of CAD	SVD	17	21.8%
	DVD	47	60.3%
	TVD	14	17.9%
Type of PPM	Single Chamber	55	70.5%
	Double Chamber	23	29.5%
Heart Block	CHB	64	82.1%
	2nd Degree	8	10.3%
	SSS	6	7.7%

Figure 2: Type of coronary artery involved

disease (SVD), 60.3% had double - vessel disease (DVD) while 17.9% had three-vessel disease (TVD). 25 patients (32.1%) had no significant lesion on coronary angiography. Overall, Three groups of cardiac conduction disorders were complete heart block 64(82.1%), second degree heart block 8(10.3%) and sick sinus syndrome 6 (7.7%) patients.(Table 1)

The most common coronary artery involved in this study was right coronary artery as compared to circumflex and left anterior descending artery in patients with heart blocks due to ischemic heart disease. (Figure 2)

DISCUSSION

In this study the prevalence of coronary artery disease in patients undergoing permanent pacemaker implantation for chronic conduction disorder was 67.9% which is well within broad range (30-70%)⁶ mentioned in the literature. This broad range is due to the different methods to diagnose ischemic heart disease but in this study we used gold standard method by coronary angiography; thus our result are as close to the real prevalence of ischemic heart disease in chronic conduction disorder.

Hwang et⁸ al assessed 188 patients with high-grade AV block for the presence of concomitant CAD. 30.8% individuals were found to have CAD, distributed as follows: stable angina, 41; acute MI, 15; and unstable angina, 2.

In acute inferior wall MI, where the RCA is often the culprit, high-grade AV block has been described in up to 17% of cases⁹. Most of these cases are transient and

resolve either spontaneously or with revascularization, whereas approximately 9% will ultimately require a permanent pacemaker, implicating permanent damage to AV conduction tissue prior to or due to lack of revascularization^{10,11}.

Yesil et al studied 53 pacemaker patients with complete heart block and significant CAD, defined by the presence of a coronary lesion with greater than 70% stenosis. After a mean follow-up of months, third-degree AV block persisted in 13/16 (81%) patients treated medically and in 27/37 (73%) of the re-vascularized patients. The authors concluded that, in the absence of acute MI, coronary revascularization has minimal impact on regaining normal AV function with concomitant complete heart block and CAD.

It seems the frequency of ischemic heart disease is high enough to be assessed for permanent pacemaker implantation especially diagnosed by gold standard CAG. Even if CAG was not the cause and revascularization was enough to eliminate the need for permanent pacemaker as noted in Omeroglu et al study¹², it may prevent future episodes.

The majority of published data¹⁷ suggest that high-grade AV block is usually not reversible with revascularization in patients who have coronary artery disease and require, in majority, pacemaker implantation.

Among the patients with ischemic heart disease the most common vessel involved in this study was the right coronary artery (RCA) i.e. 49 patients (62.8%). The right coronary artery supplies the AV node through AV branch¹³, therefore associated with a variety of conduc-

tion disturbances^{14,15}. In another study¹⁶ the significant RCA lesions was seen in 60% with heart block and ischemic heart disease.

In this study the average age of patients with significant coronary artery disease was 58 years which is almost comparable to study by Mond and colleagues³; in which the average age of patients with a pacemaker substantially varied from 44 to 78 years. However, the most common group of patients implanted with permanent pacemaker was the one with age more than 60 years.

CONCLUSION

Ischemic heart disease was present in high frequency in patients with chronic conduction disorders and the most common artery involved was right coronary artery.

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CONTRIBUTORS

ZAK conceived the idea, planned the study, and drafted the manuscript. HU and SU helped acquisition of data and did statistical analysis. ZAA supervised the study and critically revised the manuscript. All authors contributed significantly to the submitted manuscript.