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RESEARCH ARTICLE

A STUDY ON CORRELATION BETWEEN CHRONIC CONDUCTION BLOCK AND CORONARY ARTERY DISEASE

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ABSTRACT

Background: Coronary artery disease is sometimes associated with chronic conduction block. Our aim is to correlate between chronic conduction block and coronary artery disease. We performed ECG and coronary angiography of all patients who were admitted for permanent pacemaker implantation to find correlation between them.
Methods: Coronary angiography was performed in all 160 patients of chronic conduction block during twenty four months of study period who were admitted for pacemaker implantation. We compared the coronary artery disease in different types of conduction block.
Results: Among the study population 35(22%) patients are of single vessel coronary artery disease (CAD),13 (8%) patients had double vessel coronary artery disease, 6 (4%) patients had triple vessel coronary artery disease, 2 (1%) patients had left main disease and 104 (65%) patients had normal or insignificant coronary anatomy.
Conclusion: Coronary artery disease is quite common in chronic conduction disorder. So there must be a correlation between coronary artery disease and chronic conduction block.

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INTRODUCTION

The prevalence of CAD in chronic conduction disorders has been reported to be 30 to 70% depending on patients characteristics & the way to detect CAD (Hsueh *et al*., 2001). In a study by Evans *et al*. in 1994 in 154 patients, in patients older than 65 years, 45% had isolated conduction disorder, while 55% had CAD, cardiomyopathy & valvular heart disease. In another study conducted on 248 patients with complete heart block (CHB) 35% had CAD & in 15% CHB was developed in the setting of acute MI. Other causes of CHB in this study was rheumatic heart disease (8%) congenital CHB (6%), & digoxin toxicity (6%) (Kojic *et al*., 1999). Different types of conduction block are also observed in acute myocardial infarction. Coronary artery disease is also ocassionally associated with bundle branch block. Persons with bundle branch block have a cardiovascular mortality rate higher than that of age-matched persons without such block (Schneider *et al*., 1983; McAnulty *et al*., 1978).

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It is possible that this increased mortality is due to the underlying heart disease (Shreenivas *et al*., 1950; Johnson *et al*., 1951; Messer, 1951). Previous study of the independent influence of bundle branch block on mortality (Schneider *et al*., 1983) has taken into account associated clinical conditions, but not angiographic quantitation of the extent of coronary disease or left ventricular dysfunction, both of which are important determinants of survival in patients with coronary artery disease (Mock *et al*., 1982).

MATERIALS AND METHODS

The main objective of the study is details work up of the patients with conduction disorder who underwent coronary arteriography to determine the extent of coronary atherosclerotic disease that might be responsible for the conduction disturbances. In this cross-sectional study of two years duration from February 2015 to January 2017, coronary angiography (CAG) was done in all the patients (160) with sick sinus syndrome (SSS), CHB, 2nd degree AV block & bi-trifascicular conduction defect which were candidates for permanent pacemaker implantation.

Table 1. Demographic, haemodynamics, angiographic and conduction disorder of 160 patients

Gender:	
Male	88 (55%)
Female	72 (45%)
Age (Years):	62.7 (Mean)
Risk factors:	
Hypertension:	85 (53%)
Diabetes:	78 (49%)
Dyslipidemia:	69 (43%)
Smoking:	50 (31%)
Family history:	48 (30%)
Conduction defect:	
Bi & Trifascicular block:	25 (15.62%)
2nd degree AV block:	10 (6.25%)
Sick sinus syndrome:	24 (15%)
CHB:	101 (63.13%)
LV ejection fraction:	
EF: > 55%	108 (68%)
EF: = 45% - 54%	37 (23%)
EF: < 44%	15 (9%)

The following patients were excluded from our study, patient older than 80 years, congenital heart block, having history of acute myocardial infarction, conduction block due to reversible cause like drug intoxication & electrolyte disturbances or patients having severe comorbid conditions like cerebrovascular accident, corpulmonale or malignancy. Coronary disease was classified as critical if there was disease meeting one of the following criteria. The left main coronary artery was considered diseased if it had a stenosis of > 50%. The left anterior descending artery was considered diseased if there was > 70% stenosis in it or in a major diagonal branch. The left circumflex artery was considered diseased if there was >70% stenosis in it, in a major obtuse marginal branch or in the presence of a left dominant coronary circulation, in a posterolateral branch or the posterior descending artery. The right coronary artery was considered diseased if there was > 70% stenosis in it or in the presence of right dominant coronary circulation, in the posterior descending artery. Extent and severity of CAD was categorized as left main disease, single vessel CAD, two vessels CAD & three vessels CAD according to the significant involvement of major arteries and its branches. ECG and echocardiography was performed in each patient and accordingly type of conduction block and left ventricular function were assessed.

Different degrees of CAD:	
Non significant CAD:	104 (65%)
Monovessel CAD:	35 (22%)
Double vessels CAD:	13 (8%)
Triple vessels CAD:	6 (4%)
LMCA disease:	2 (1%)

RESULTS

In these 160 patients, 88 patients (55%) were male and 72 (45%) female and majority of patients belong to 50 to 70 years age group. Among the study population, 35 (22%) patients were suffering from single vessel disease, 13 (8%) patients had double vessel disease, 6 (2%) patients had triple vessel disease, 2 (1%) patients had left main disease and 104 (65%) patients had normal coronary anatomy or insignificant coronary artery disease.

DISCUSSION

Out of 160 patients, 78 patients were diabetic, 85 were hypertensive, 69 were dyslipidemic, 50 were smoker. Family history of cardiac disease was present in 48 (30 %) of patients. In our study the prevalence of significant CAD in patients with chronic conduction block reported to be 35% which was well within the broad range (30-70%) reported in various literature. Among the study population 56 (35%) patients had significant coronary artery disease with 35 patients (22%) single vessel disease, 13 patients (8%) double vessel disease, 6 patients (2%) triple vessel disease, 2 patients (1%) left main disease. Different types of coronary diseases were attributed as a causative role of conduction block. As a gold standard, coronary angiography was used in our study in all patients. So it is rational, that our results are as close as possible to the real frequency of CAD in patients with chronic conduction defects. Several risk factors are associated with coronary artery disease mainly diabetes, hypertension, dyslipidemia, smoking, family history of heart disease. In our study population 49% patients are diabetic, 53% are hypertensive, 43% are dyslipidemic, 31% are smoker and 30% had family history of heart disease. It seems that the frequency of CAD in these varieties of patients was high enough to be assessed in candidates for permanent pacemaker implantation especially in those with symptoms, history or ECG changes consistent with CAD. So routinely coronary angiography is to be performed in all patients waiting for permanent pacemaker implantation. The purpose of the present study is details work up of the patients with chronic conduction disorder who underwent coronary arteriography to determine the extent of coronary atherosclerotic disease that might be responsible for the conduction disturbances. The presence of CAD makes the prognosis of conduction disorder worse and in few cases coronary revascularization was enough to eliminate the need for permanent pacemaker implantation. So CAD is common in patients with chronic conduction disorders and it may also have a causative role in developing this condition.

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