

# FREQUENCY OF CORONARY ARTERY DISEASE IN PATIENTS WITH CHRONIC HEART BLOCKS, CANDIDATES FOR PERMANENT PACE-MAKER IMPLANTATION

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## Abstract

**BACKGROUND:** Coronary artery disease (CAD) is associated with chronic heart blocks. The purpose of this study was to find the frequency of CAD in four major types of cardiac conduction disorders i.e.: Sick Sinus Syndrome (SSS), 2<sup>nd</sup> degree atrioventricular (AV) block, complete heart block (CHB) and bifasicular and trifasicular blocks.

**METHODS:** During this one- year study, we performed coronary angiography (CAG) in all patients with above mentioned conduction defects, who have been hospitalized for permanent pacemaker implantation; we determined the frequency of various degrees of CAD in different types of heart blocks.

**RESULTS:** 34 patients (64%) had no significant lesion in CAG, 20 (36%) had above 50% stenosis in at least one major coronary artery branch with 13% mono-vessel disease ,9.3% two- vessel disease and 14.8% three-vessel disease. Overall, 13 patients (24%) had critical CAD.

**CONCLUSION:** CAD is common in patients with chronic conduction defects and might have a causative role in this regard.

**Keywords:** Coronary artery disease, Chronic conduction defect, Coronary angiography.

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## Introduction

The presence of CAD makes the prognosis of conduction disorder worse.<sup>1,2,3</sup> 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.<sup>4</sup> In a study conducted by Evans et al .in 1994 in 154 patients, which all of them ,were 65 years old or more ,45% had isolated conduction disorder ,while 55% had organic cardiac diseases including CAD ,cardiomyopathy & valvular heart disease. In another study conducted on 248 patients with complete heart block(CHB) 35% had CAD without myocardial infarction(MI) & 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%).<sup>5</sup>

To what extent, revascularization may benefit

this group of patients, remained a matter of debate. In a case report by Kavac et al. PCI of right coronary artery (RCA) lesion was reported to be successful in relieving symptoms of a 57 year- old female patient with frequent episodes of syncope due to 2<sup>nd</sup> degree atrioventricular (AV) block.<sup>6</sup> In another case report by Deaner et al. PCI was effective in the treatment of exertional AV block.<sup>7</sup> However others <sup>8</sup> were unable to show any benefit for coronary artery bypass graft (CABG) to reverse pre operative CHB. Thus how frequent revascularization may be effective in relieving conductive symptoms of patients & even abolish the need for permanent pacemaker implantation, must be addressed in other large studies.<sup>9</sup> This study was done to determine the frequency of different degrees of CAD in patients with chronic conduction defects who were candidates for permanent pacemaker implantation.

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## Materials and Methods

In this cross-sectional study, coronary angiography (CAG) was done in all the patients (54) with sick sinus syndrome (SSS), CHB, 2<sup>nd</sup> AV block & bifascicular conduction defects with undetectable reversible cause which were candidate for permanent pacemaker implantation in a one year study at our center. The following patients were not enrolled in our study: 1) patients in whom conduction disorder was due to a reversible cause like drug intoxication & electrolyte disturbances 2) patients older than 80 years old & patients with severe comorbid conditions like cerebrovascular accident (CVA) or cor pulmonale 3) patients in whom the disorder was related to acute MI or the etiology was congenital.

Significant coronary artery disease was defined as more than 50% stenosis of at least one major coronary artery branches: left ascending, left circumflex, right coronary artery (LAD, LCX, RCA) as assessed by visual estimation of coronary angiograms by experts. Critical coronary artery disease (in which the patient may benefit from revascularization) was defined as more than 70% stenosis of at least one major coronary artery branch as assessed by visual estimation of coronary angiograms by experts. Extent and severity of CAD was categorized as no significant CAD, monovessel CAD, two-vessel CAD & three-vessel CAD according to the number of major branches with significant involvement. Characteristics of patients were described in terms of frequencies, percentages and means.

Table 1. shows demographic characteristics of our patients.

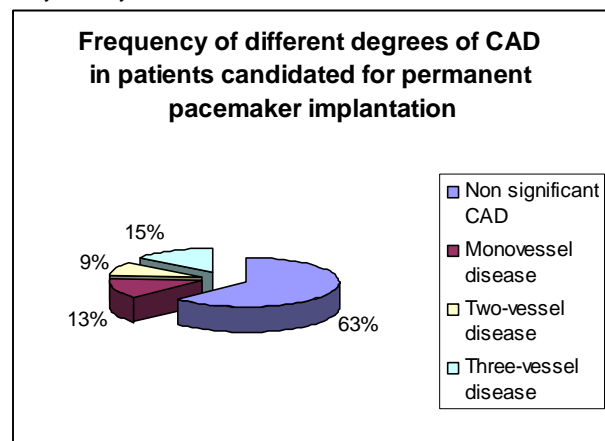
**Table 1:** Demographic characteristics of patients

Patients	n=54
Age (years)	53-86(70±7)
Gender	Male: 29(53.7%)
Risk factors	
Hypertension	33(61.1%)
Diabetes mellitus	10(18.5%)
Dyslipidemia	7(13%)
Smoking	4(7.4%)
Kind of conduction defect	
CHB	27(50%)
Sick Sinus Syndrome	12(22.2%)
2 <sup>nd</sup> degree AV block	11(20.4%)
Two & three fascicular blocks	4(7.4%)

## Results

54 patients, 29 (53.7%) male & 25 (46.3%) female with the mean age of 70+7 were enrolled in our study.

In CAG, 20 patients (36%) had significant CAD with 7 patients (13%) monovessel disease, 5 patients (9.3%) two-vessel disease & 8 patients (14.8%) three-vessel disease. 34 patients (63%) had normal coronary arteries or nonsignificant coronary artery disease (fig 1). 13 patients (24%) had critical coronary artery disease.



## Discussion

CAD is common in patients with chronic conduction disorders and it may also have a causative role in developing this condition.

In our study the prevalence of significant CAD in patients with chronic conduction disorders was reported to be 36% which was well within the broad range (30-70%) reported in the literature. This wide range was attributed to several factors like patient characteristics, specific varieties of conduction defects evaluated, and the most important factor which is the way to detect CAD. In many of previous studies non-invasive methods were used for this purpose, with inherent limitations in sensitivity and specificity. As a gold standard for detection of CAD, 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.

It seems that the frequency of CAD in this group of patients is high enough to be assessed (whether invasively or non-invasively) in candidates for permanent pacemaker implantation especially in

those with symptoms, history or ECG changes consistent with CAD. Even if CAD were not causative & revascularization was enough to eliminate the need for pacemaker implantation (as Omeroglu et al. noted (8)), it may ameliorate patient symptoms or prevent future events. Due to small number of patients in each subgroup of conduction disorder, we were unable to have any conclusion, regarding excess of CAD in any specific form of conduction disorder.

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