Angiographically Documented Coronary Artery Disease in Asymptomatic Middle Aged Men Suspected of Silent lschaemic Heart Disease

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Rashid Bashir, Ashur Khan, Muhammad Yousaf (Armed Forces Institute of Cardiology, National Institute of Heart Discuses, Rawalpindi.)

Abstract

One hundred and fourteen asymptomatic mid dle aged men, with a positive stress test, underwent coronary angiography at Armed Forces Institute of Cardiology/National Instotite of Heart Diseases (AFIC/NIHD), Rawalpindi. Of these, 66 (58%) were found to have significant disease (>50% luminal narrowing in atleast one of the major epicardial arteries) while 48 (42%) had normal coronary arteries. Of the former, 27(41%) had 1-vessel CAD, 18(27%) had 2-vessel CAD and 21 (32%) had 3-vessel CAD. There were significantly more hypertensives, hyperlipidamics and diabetics in CAD group, while other risk factors were the same. The overall risk factor prevalence was lOW. The major reasons for performing coronary angiography were a positive stress test done as part of routine annual medical checkup and resting ECG changes of enough significance to warrant further investigations. It is concluded that the presence of significant coronary artery disease can be silent in a large number of asymptomatic middle aged men, especially those who have conventional risk factors. (JPMA 46:225, 1996).

Introduction

The concern for coronary artery disease (CAD) is growing for numerous reasons, the most important being the initial presentation as sudden death or acute myocardial infarction. The prevalence of coronary artery disease in a population determines the level of concern and ultimately plays an important role in deciding about the invasive procedures like, coronary angiography to select suitable candidates for revascularization procedures. The natural history of coronary artery disease in an asymptomatic cohort was first described in the Framingham study[1]. It was reported that 45%of the initial cardiac events were episodes of angina, 26% non-fatal infarctions and 29% sudden deaths. In the Framingham study update[2], 25% of the total myocardial infarctions were reported to be silent. Ten yeas follow-up of such patients revealed that frequencies of death, recurrent rnyocardial infarctions and most other CAD end points were essentially the same as for patients who had painful myocardial infaictioa Several other studies have reported sirnilarprognosis inpainful andpainless ischaemia[3-5]. Other studies have followed asymptomatic subjects with angiographically proven coronary artery disease and found their prognosis similar to the symptomatic patients[6-8]. However, the data regarding coronary angiographic findings in completely asymptomatic subjects is scarce[9]. Keeping in view the clinical importance of coronary artery disease in completely asymptomatic individuals, this study was conducted to determine the extent and nature of angiographically documented coronary artery disease in asymptomatic middle aged men who underwent coronary angiography at Armed Forces Institute of CardiologyTNational institute of Heart Diseases (AFIC/NTHD), Rawalpindi, during the last three years.

Subjects and Methods

Armed Forces Institute of Cardiology/National Institute of Heart Diseases, Rawalpindi, is a tertiary care Institute in the field of Cardiology and cardiac surgery. Because of its affiliation with Pakistan Army, most of the patients are from the Armed Forces. Due to service and procedural reasons, many asymptomatic individuals undergo coronary arigiography at this institute. The detailed record of such individuals formed the database for this study. Asymptomatic subjects aged between 40 and 60 years were included in the study. Individuals with atypical symptoms, valvular heart disease, co-morbid conditions (except diabetes mellitus and hypertension) and known ischaemics were excluded. The data of 14 asymptomatic men could be collected. The data record included a risk factor profile of each individual, reason for performing coronary angiography (including resting ECG changes and old silent myocardial infarctions), result of exercise tolerance test and detailed results of the coronary angiography. The exercise stress test was done on treadmill with standard Bruce protocol. ST segment depression, horizontal or downsioping, of more than or equal to 1 mm, 0.06-0.08 seconds after the J-point, was taken as a positive response indicative of myocardial ischaemia. The test was usually terminated because of achievement of target heart rate (defined as 220 minus age beats per minute), ischaemic ST segment response, appearance of increasing VPCs, failure of systolic blood pressure to rise, or a fall in blood pressure[10]. Coronary angiography was performed at the catheterization laboratory of AFIC/NIHD by Judkins or Sones technique. Cineangiographic system employing a 35 mm camera was used to record films at a speed of 60 frames per second[11]. The angiographic films were interpreted by experienced cardiologists and results discussed in weekly Cardiac Catheterization Conference. A significant stenosis was defined as more than 50% of luminal narrowing and the artery was called diseased.

Results

Table I. Risk factor profile in normal subjects and subjects with coronary artery disease.

Risk factors	Normal n=48	CAD n=66
Smoking	13 (27%)	21 (32%)
Hypertension	2 (4%)	14 (21%)
Hyperlipidaemia	5 (10%)	15 (23%)
Diabetes mellitus	2 (4%)	5 (8%)
Obesity	5 (10%)	4 (6%)
+ve family history	8 (17%)	11 (17%)
No risk factor	23 (48%)	23 (35%)
One risk factor	17 (35%)	23 (35%)
Two risk factors	6 (13%)	13 (20%)
Three or more risk factors	2 (4%)	7 (10%)

Percentages adjusted to nearest round figure.
CAD= Coronary artery disease

Table I compares the prevalence of individual risk factors in subjects with normal and pathological coronary arteries. Three major risk factors, hypertension, hyperlipidacmia and diabetes mcllitus were significantly morn prevalent in subjects with coronaiy artery disease. However, the figures for other risk factors in the two groups was not significantly different. Even smoking had nearly equal

prevalence in the two groups, though subjects with CAD had a few more smokers. The number Of major risk factors present in two groups gave results contrary to the common belief (Table I). Seventy percent of the subjects with CAD had either no risk factors or only one risk factor present, while only 30% had two or more risk factors. The reasons for performing coronary angiography are shown in Table II.

Table II. Reasons for performing coronary angiography in asymptomatic middle aged men.

Reasons	Normal n=48 No (%)	CAD n=66 No (%)	All cases n=114 No (%)
Annual medical	19 (39)	34 (51)	53 (46)
Inferior lead changes	9 (19)	9 (14)	18 (16)
Anterior lead changes	12 (25)	7 (11)	19 (17)
Both anterior+inferior changes	7 (15)	2 (3)	9 (8)
Ventricular premature complexes	1 (2)	1 (1)	2 (2)
Sinus bradycardia	-	1 (1)	1 (1)
Old silent myocardial infarction	-	12 (18)	12 (10)

Percentages adjusted to nearest round figure.

The maximum number of subjects in both groups underwent coronary angiography because of a pOsitive treadmill stress test done as part of annual medical checkup mandatory for some of the army officers of this age group. The next frequent reason was resting ECG changes of enough significance to warrant coronary angiogram for a final diagnosis.

Table III. Comparison of coronary angiographic findings of our study with other studies.

Angiographic findings	Our study (%)	Thaulow[7] et al (%)	Antoniucci[9] et al (%)	Droste[8] et al (%)
Normal	42	42	46	-
Coronary artery disease	58	58	54	-
Single vessel coronary artery disease	41	30	31	34
Double vessel coronary artery disease	27	36	35	30
Triple vessel coronary artery disease	32	34	35	36

Percentages adjusted to nearest round figure.

Table III shows that all non-specific T wave changes, whether in inferior leads, anterior leads or in both, were much more prevalent in subjects with normal coronary arteries. Old silent Q-wave myocardial infarctions always showed some disease in the angiogram.

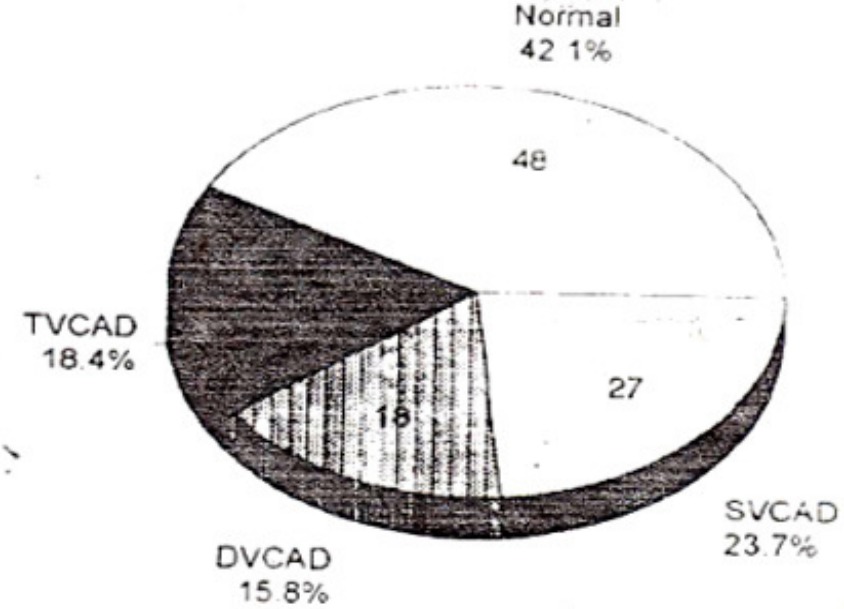

Figure 1. Distribution of coronary artery disease in asymptomatic men. SVCD= Single vessel coronary artery disease. DVCAD= Double vessel coronary artery disease. TVCAD= Triple vessel coronary artery disease.

Figure 1 shows the results of coronary angiography in 114 asymptomatic men. In Single vessel

coronary artery disease (SVCAD) group, narrowing of right coronary artery (RCA) was significant in 10 subjects and minor in 4. Two subjects had completely occluded RCA. Left anterior descending artery (LAD) was significantly narrowed in 12 and 2 subjects had minor disease. Two subjects had completely occluded LAD. Five subjects had more than 50% stenosis in left Circumflex Artery (CXA) and six had minor
disease in it. In Double vessel coronary artery disease (DVCAD) group six had significant disease in both RCA and LAD, six had significant disease in RCA and CxA and six had such disease in LAD and CxA. Minor disease was discovered in two RCAs, one LAD and one CxA. In six subjects RCA was totally blocked, in one LAD was completely occluded and in three CxA was totally occluded. In Triple vessel coronary arter disease (TVCAD) group complete occlusion of RCA was found in three, ofLAD in four and of CxA in one. Two subjects had complete occlusion of obtuse marginal branch of CxA. The extent of minor disease present in excess of these stenoses was not recorded in this group. The different modes of treatmnt suggested for the asvmptomatic subjects with angiographically proven coronaiy artery disease, are shown in Figure 2.

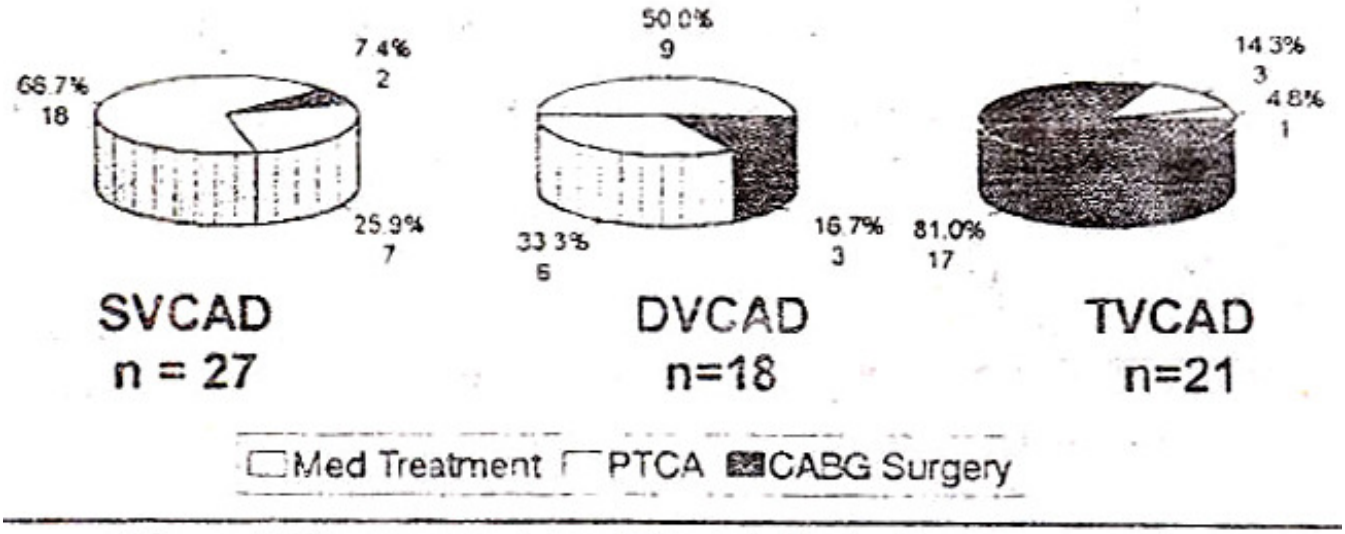

Figure 2. Treatment advised for pathological coronary arteries.

Majority of the patients(67%) with SVCAD, were advised medical treatment. Fifty percent of DVCAD subjects were advised PTCA and 81% of TVCAD subjects wQrc advised Coronary Artery By-pass Graft.

Discussion

In this study, 12 out of 114 (10%) subjects had silent, previously unrecognized myocardial infarctions. Thaulow et al7, reported a figure of 35% in asymptomatic subjects which is higher than 25-30% of total new MIs reported in Framingham study[2]. The loweTfigure reported inthis study may be due to selection bias. Number o subjects was small, sample was not cross sectional and only those with positive stress test were studied.
Specificity of T waves changes in coronary artery disease could not be established in this study. Actual depth and shape of T waves on resting ECG if recorded, would have givea the frequency of deeper symmetrical pattern characteristic of CAD. The prevalence of risk factors in our study is comparable to that of Fleg et al[12]. They studied silent myocardial ischemia in completely asymptornatic individuals by Thallium Scintigraphy and stress ECG and compared risk factors prevalence in subjects with silent iso chaemia who developed some coronary event (MI, Angina, death) to those with silent ischaemia

and no cardiac event. Subjects experiencing events were significantly more likely to be hypertensives (62% versus 33%) but did not differ in their cuffent smoking status (14%) had high serum cholesterol (10%) and raised fasting blood glucose levels. Their reason for this low prevalence of risk factors was that the subjects were generally well educated, health conscious, upper middle class individuals and were comparable to the subjects of our study. Risk factors in subjects with painless ischaemia were high in other studies[8,13] , as smoking >70%, hypertension >35%, hyperlipidaemia 60% and diabetes >10%. For smoking Barefoot et al[14] reported results of hostility in asymptomatic men with coronary artery disease documented by coronary angiography, from U.S. Air Force School of Aerospace Medicine. There were 36% smokers in controls and 75% in proven CAD group of asymplomatic subjects. uJy was the corona ry angiographic findings in completely asymptomatic mid dle aged men. There are very few studies giving data on coronary angiographic findings in completely asymptomatic subjects9. The older studies of Erikssen et al[15] and Froelicher[16] gave conflicting results about the prevalence of coronary artery disease and the predictive values of non-invasive diagnostic tests in asymptomatic subjects with abnormal screening procedures. Three latest studies which have given angiographic findings in asymptomatic men are compared with our study in Table III[7-9]. There are striking similarities in the extent and distribution of coronary arierv disease in asymptomatic individuals in these studies and ours. A recent study conducted on asvrnptomatic diabetic and non-diabetic subjects[17], reported that 39% of the former and only 18% of the latter with positive stress test had significant of coronary arteries[17]. These results differ from the present and other studies, However, many other investigators have found a high prevalence of silent ischaemia in diabetics[18,19]. It has been estimated that about 25% of the middle aged populatlo.. sufferfrom significant coronary artery disease and remain asymptomatic. The risk factors and prognosis for this group is similar to those subjects with painful ischaemia[20]. The use of non-invasive tests can unmask the presence of disease and early intervention can improve the prognosis.

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