CLINICAL PROFILE OF PATIENTS WITH NORMAL CORONARY ANGIOGRAM

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ABSTRACT

Objective: To observe the clinical and bio-chemical profile of patients having normal coronary angiogram following an abnormal stress test.

Methodology: This was a single center retrospective, descriptive study. Coronary angiograms done from July 2009 to December 2011 were retrieved and reviewed for normal coronary arteries. Clinical and bio-chemical profile of the patients having normal coronary angiogram was retrieved from hospital record. Patients, whose computerized data could not be retrieved from department database, were excluded from the study.

Results: Out of 8425 angiograms reviewed, 816(9.7%) were having normal coronary arteries. Mean age was 42±7.4 years. Females were 66.7%. Clinical and biochemical profile for normal coronary angiograms was as follows: smokers 59%, family history of premature coronary artery disease 41%, hyperlipidemia18.5% and hypertension 14%. Diabetes was present only in 2.1%. Among females: 11% were current users of oral contraceptives pills, 3.4% were post menopausal and 0.87% pregnant. Mean BMI was 25.4±5.2 and total cholesterol and triglyceride were 278±31mg/dl and 180±28mg/dl respectively.

Conclusion: Normal coronary angiogram is infrequently observed in catheterization laboratories and mostly found in younger to middle aged females. Smoking is very common in such patients. Hyperlipidemia, hypertension, diabetes mellitus are not frequently present in these patients.

Key Words: Normal coronary angiogram, clinical characteristics, biochemical features.

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INTRODUCTION

In routine clinical practice, patients with chest pain are assessed in terms of their chest pain characteristics, coronary risk profile, and the results of non-invasive investigation, usually a treadmill exercise test[1-3]. Chest pain has traditionally been classified as 'typical', 'atypical' and 'non-cardiac', which are subjective terms open to wide interpretation[4]. Chest pain is reported by 16–20% of the population of the UK and USA, and usually has a benign non-cardiac etiology[5]. In those referred to cardiologist, the incidence of cardiac disease may be as low as 11–27%[6]. The incidence of normal coronary anatomy varies widely, between 11% and 37%, at different cardiac centre, and also among different physicians at a single centre[7].

Chest pain with normal coronary arteries may be of cardiac or non cardiac origin. Chest pain with abnormal stress tests results but normal coronary angiography is a medical condition called syndrome X[8,9]. Non cardiac causes of chest pain include: gastro-oesophageal reflux disease, hernia, or degeneration of the skeletal system[9,10]. Differentiating between cardiac and non-cardiac origin of chest pain is often difficult but necessary for initiation of the appropriate therapy[11].

In a small number of patients, Myocardial Infarction (MI) is not associated with Coronary Artery Disease (CAD) and normal coronary arteries are documented on angiography[12]. The reasons for this paradox are varied. Thrombosis, embolism and vasospasm are believed to be the mechanisms of ischemia and infarction in these cases[13,14]. Intravascular thrombosis can result from hematological disturbances as in protein S deficiency and high progestational states in females[15]. Coronary embolism has been reported with prosthetic and abnormal valves, endocarditis and cardiac arrythmias[16]. Vasospasm is an important mechanism in cocaine and amphetamine induced infarction[17,18]. Clinically, patient

with chest pain with normal coronary angiogram, are younger and lack classic risk factors for CAD. Smoking is common in these patients and has been hypothesized to play a role in its pathogenesis[19,20].

Currently, local studies have not been performed to determine the clinical and biochemical characteristics of patients having normal coronaries angiogram. The purpose of this study was to know the clinical and bio-chemical profile of such patients. It will help identify such patients thus avoiding invasive investigations. In addition, it will reduce unnecessary cost and burden on our catheterization laboratory.

METHODOLOGY

This was a single center retrospective, descriptive study. Data of all patients of either gender with age 18 years or more, who had coronary angiography, was retrieved from digital library of catheterization laboratory, Cardiology department, Lady Reading Hospital, Peshawar. Coronary angiograms performed from July 2009 through December 2011 were evaluated for the presence of normal coronary angiogram. Normal coronary angiogram was defined as, smooth outline of coronary arteries-confirmed in multiple planes as reported by at-least two cardiologists. Both of the reporting cardiologists were blind to the purpose of evaluation of coronary angiograms. Patients with normal coronary angiograms were included in the study by using non-probability, purposive sampling technique. Following ethical and research approval from the hospital administration, clinical and bio-chemical profile of the patients having normal coronary angiogram were retrieved from hospital record. Clinical profile included: age, gender, Body Mass Index (BMI), smoking status, mean systolic and diastolic blood pressure, presence of hypertension, diabetes mellitus, family history of coronary artery disease, post menopausal status, current pregnancy and use of oral contraceptive pills in female patients. Bio-chemical profile included: lipid profile, serum creatinine, blood urea, mean HbA1c and hemoglobin level. Patients, who had normal coronary angiograms but their clinical and bio-chemical profile could not be traced in hospital record, were excluded from the study.

SPSS version 16.0 was used for analyzing the data. Frequency and percentages were used for categorical variables. Mean±SD was used for numerical variables. Data were presented in the form of tables.

RESULTS

A total of 8425 coronary angiograms were studied of which 816(9.7%) patients had a normal coronary angiogram. Among these 543 (66.7%) were female patients. Mean age of the female patients was 42±7.4 years with an age range of 19-58 years. Male patients were 273(33.3%) with mean age of 49±6.5 years and age range was 62-32 years.

All patients were evaluated for clinical and biochemical profiles. Smoking was the commonest factor present

Table 1: Clinical Profile of Patients with Normal Coronary Angiogram (n=816)

Parameter	n (%)
Female	543 (66.7)
Male	273 (33.3)
Smokers	481 (59)
Family History of CAD	335 (41)
Hyperlipidemia	155 (18.5)
Hypertension	114 (14)
Female Using Oral Contraceptive Pills	91 (11)
Post Menopausal Women	28 (3.4)
Diabetes Mellitus	17 (2.1)

Table 2: Bio-Chemical Profile of Patients with Normal Coronary Angiogram (n=816)

Parameter	Value
Mean Cholesterol	278±31 mg/dl
Mean Triglyceride	180±28 mg/dl
Mean BMI	25.4±5.2
Mean HbA1c	6.7±1.1%
Mean Serum Creatinine	0.9±0.4 mg/dl
Mean Hemoglobin	12.1±2.5gm/dl

in 481 (59%) patients followed by family history of premature coronary artery disease in 335 (41%) patients, and hyperlipidemia in 155 (18.5%) patients (Table 1).

Among biochemical characteristics, mean value of total cholesterol was 278±31mg/dl and triglyceride were180±28mg/dl (Table 2).

DISCUSSION

Invasive catheter-based coronary angiography is the gold standard for deciding about the presence of significant coronary artery disease (CAD). Normal coronary angiography (NCA) is not commonly reported from cardiac catheterization laboratories. The frequency of NCA is common in younger to middle aged females and these patients are frequently smokers, having family history of CAD, dyslipidemia and hypertension as was observed in our study.

Smoking was the most frequently reported risk factor in these patients. Nearly two third 481 (59%) patients were either current or Ex-smokers. This finding is supported by other international studies; Greenberg et al[14] reported that smoking was present in 52% of patients with NCA. Similarly, Chambers et al[6] observed that 61% of patients were smokers at the time of NCA. The proposed reasons in literature for normal coronary angiography among smokers are; smoking induces spasm in coronary arteries[3] and smoking also causes coronary artery endothelial dysfunction that leads to platelets activation[2] and oxidative stress leading to abnormal myocardium perfusion and ischemia at micro vascular level[14].

Family history of premature coronary artery diseases (CAD) is another risk factor that was present in 335 (41%) patients with normal coronary angiography. This frequency is higher compared to western data. Wu et al[1] documented that 23% patients with NCA were having family history of premature CAD. We assumed that those who had seen their close relatives suffering from CAD or death of any close relative due to a cardiac event, they become more sensitive to chest pain. Their threshold to chest pain becomes lower and mostly they insist for coronary angiography. This trend is also observed mostly in Indian subcontinent region but less frequently in western world[20].

Diabetes mellitus was observed in just 17 (2.1%) patients. Almost the same frequency has been reported by Chambers J et al[6] and Proudfit et al[12]; i-e; 5.3% and 3.7%, respectively. It is an established fact that patients with diabetes mellitus have diffuse and severe coronary artery disease and the lower incidence of diabetes mellitus in patients with NCA was not a surprise[9,13].

Other theories which have been suggested to explain chest pain in patients with normal coronary angiogram are: impaired coronary vascular reactivity[3], subendocardial hypoperfusion detected by 3T MRI[3], micro vascular dysfunction[13], metabolic abnormalities-such as net myocardial lactate production[14], sustained coronary spasm[3], vasculitis[15], coagulopaties[15] and misinterpretation of coronary angiograms[12].

It is possible that better clinical assessment and non-invasive cardiac stress testing could lower the rate of referral for invasive coronary artery angiography with non-cardiac/atypical chest pain, and reduce the incidence of normal coronary angiograms.

CONCLUSION

Normal coronary angiogram is infrequently observed in catheterization laboratories and mostly found in younger to middle aged females. Smoking is very common in such patients, followed by family history of coronary artery disease. Hyperlipidemia, hypertension, diabetes mellitus are not frequently present in these patients.

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