



NORMAL CORONARY ANGIOGRAM; CLINICAL CHARACTERISTICS OF PATIENTS.

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ABSTRACT... Objectives: To observe the clinical characteristics of patients having normal coronary angiogram following an abnormal stress test or presented with chest pain indicating coronary angiogram. **Study Design:** A single center retrospective, descriptive study. **Period:** Coronary angiograms done from September 2015 to September 2016 were retrieved and reviewed for normal coronary arteries. **Setting:** Khatum-un-Nabyeen Heart Center. **Methodology:** Clinical profile of the patients having normal coronary angiogram was retrieved from hospital record. **Results:** Out of 900 angiograms reviewed, 81(9%) were having normal coronary arteries. Mean age was 43±10 years. Females were 64.1%. Clinical characteristic of study group was as follows: smokers 32.09%, family history of premature coronary artery disease 51.8%, hyperlipidemia 60.4% and hypertension 19.7%. Diabetes was present only in 20.9%. Among females: 19.2% were current users of oral contraceptives pills and 13.4% were post menopausal. Mean BMI was 25.4±4. **Conclusion:** Normal coronary angiogram is infrequent observation in cardiac catheterization laboratories and mostly found in younger to middle aged females. Family history of coronary artery disease and hyperlipidemia are very common in such patients.

Key words: Normal Coronary Angiogram, Clinical Characteristics.

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INTRODUCTION

Routinely patients in cardiology clinic are assessed based on their chest pain characteristics, coronary risk profile, and the results of non-invasive investigation.¹⁻³ The 'typical', 'atypical' and 'non-cardiac' chest pain are subjective terms with wide range of interpretation.⁴ Usually 16–20% of patients in cardiology clinic has chest pain not related to cardiac disease while in referred patients only 11–27% has cardiac diseases.^{5,6} Between 11% and 37% of cases referred for cardiac workup the coronary angiogram shows normal coronary vessels.⁷ However the term syndrome X is used for those who present with chest pain and abnormal stress tests results but normal coronary arteries.^{8,9} Number of non-cardiac conditions are associated chest pain.^{9,10} This differentiation between cardiac and non-cardiac conditions presenting with chest pain is often difficult but have great importance for treatment.¹¹ Similarly in a some patients, Myocardial Infarction (MI) is

caused by coronary Artery Disease (CAD) and thrombosis, embolism, vasospasm and smoking are believed to be the mechanisms other than atherosclerosis leading to ischemia.¹²⁻²⁰ Literature review shows that patients with normal coronary angiogram are young and they lack classic risk factors for CAD. However there is significant geographical variation. This study was designed to identify clinical characteristics of patients with normal coronary angiogram to avoid invasive investigations and reduce unnecessary cost and burden on our catheterization laboratory.

PATIENTS AND METHODS

This was a single center retrospective, descriptive study. Patients of either gender with age 30 years or more, who had coronary angiography, in Khatum-un-Nabyeen Heart Center were included in the study. Coronary angiograms performed from September 2015 to September 2016 were evaluated for the presence of normal

coronary angiogram. 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 profile of the patients having normal coronary angiogram were retrieved from hospital record. Clinical profile included: age, gender, Body Mass Index (BMI), smoking status, presence of hypertension, diabetes mellitus and family history of coronary artery disease. In cases of female patients postmenopausal status and use of oral contraceptive pills was also noted. 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.

OBJECTIVE

To observe the clinical characteristics of patients having normal coronary angiogram following an abnormal stress test or presented with chest pain indicating coronary angiogram.

Inclusion criteria

1. Patients admitted with acute coronary syndrome.
2. Patients with history of chest pain and abnormal noninvasive stress test.

Exclusion criteria

1. Patients, who had normal coronary angiograms but their clinical and bio-chemical profile could not be traced in hospital record.
2. Patients with current pregnancy.
3. Previous history of PCI.
4. Documented coronary artery disease in previous angiogram.

OPERATIONAL DEFINITIONS

Normal coronary angiogram

It was defined as, smooth outline of coronary arteries-confirmed in multiple planes as reported by atleast two cardiologists.

Hyperlipidemia

Patients with LDL level greater than 130 mg/dl were labeled as hyperlipidemic.

RESULTS

Table-I shows frequency of normal coronary angiogram. Among 900 coronary angiograms were studied of which 81(9%) patients had a normal coronary angiogram. The clinical characteristics of patients with normal coronary angiogram are documented in Table-I.

Parameter	N (%)
Patients having Normal coronary angiogram	81 (9%)
Patients with documented coronary artery disease.	819 (91%)

Table-I. Frequency of normal coronary angiogram.

Parameter	N (%)
Age	43 ± 10 years
BMI	25.4±4
Male	29 (35.8 %)
Female	52 (64.1 %)
Smoker	26 (32.09 %)
Family history of CAD	42 (51.8 %)
Hyperlipidemia	49 (60.4%)
Hypertension	16 (19.7%)
Diabetes Mellitus	17 (20.98 %)
Female Using Oral Contraceptive Pills	10 (19.2%)
Post Menopausal Women	7 (13.4%)

Table-II. Clinical characteristics of Patients

DISCUSSION

Coronary angiogram is the gold standard for detecting significant coronary artery disease (CAD). In our study, we observed that Normal coronary angiography (NCA) is not commonly reported from cardiac catheterization laboratories. However its frequency is common in younger to middle aged females and their cardiovascular risk factor profile shows hyperlipidemia and having family history of CAD as the most common risk factor that why these patients are frequently investigated with coronary angiogram. Among other risk factors are smoking, diabetes and hypertension while in female patients use of oral contraceptive and post menopausal status are additional risk factor for cardiovascular disease. These finding are supported by other international studies; Greenberg et al¹⁴ reported that smoking was present in 52% of patients with NCA. Similarly, Chambers et al⁶ 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 arteries³ and smoking also causes coronary artery endothelial dysfunction that leads to platelets activation² and oxidative stress leading to abnormal myocardium perfusion and ischemia at micro vascular level.¹⁴ However in our study smoking was most frequent risk factor in male patients but overall smoking was not major risk factor because mostly female were included in the study and there lower trend of smoking in women in Pakistan. Family history of premature coronary artery diseases (CAD) is major risk factor that was present in 51.8% patients with normal coronary angiography in our study. This frequency is higher compared to western data. Wu et al¹ 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 22.8% patients this frequency is higher than reported by Chambers J et al⁶ and Proudfit et al¹²; i-e; 5.3% and 3.7%, respectively. This explains that increasing trend of diabetes in Asians however diabetes mellitus is associated with diffuse and severe coronary artery disease.^{9,13} The theories to explain chest pain in diabetics with normal coronary angiogram are: impaired coronary vascular reactivity³, subendocardial hypoperfusion detected by 3T MRI³, micro vascular dysfunction¹³, metabolic abnormalities-such as net myocardial lactate production¹⁴, sustained coronary spasm³, vasculitis¹⁵, coagulopathies¹⁵ and misinterpretation of coronary angiograms.¹² Improving the clinical assessment and non-invasive cardiac stress testing will lower the referral rate of patients with on-cardiac/atypical chest pain for invasive coronary artery angiogram..

CONCLUSION

Normal coronary angiogram is infrequent

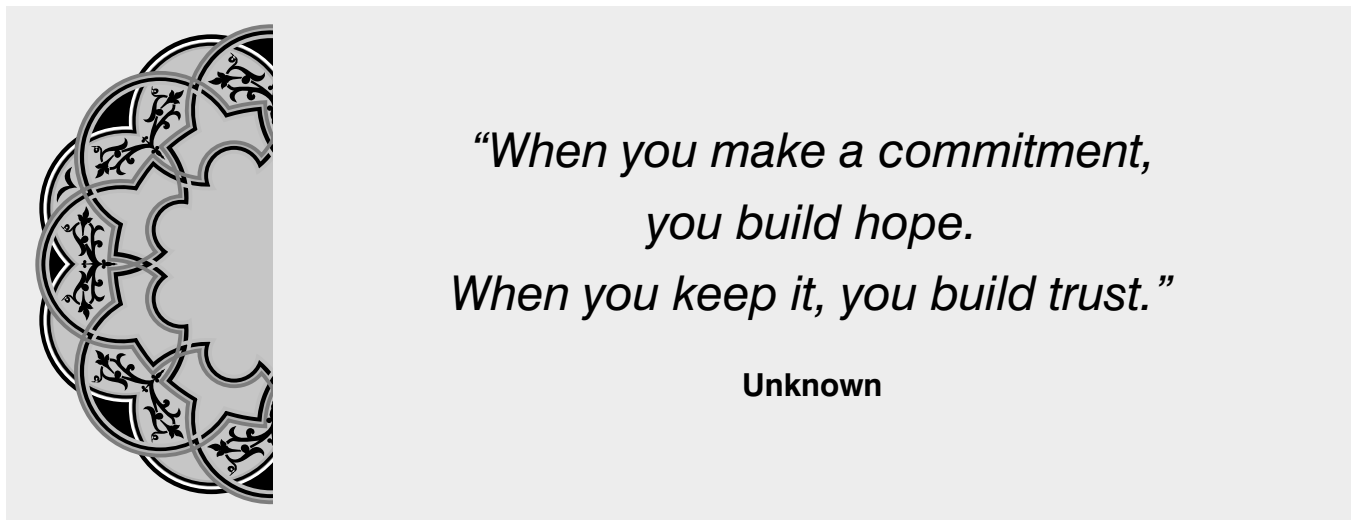
observation in cardiac catheterization laboratories and mostly found in younger to middle aged females. Family history of coronary artery disease and hyperlipidaemia are very common in such patients.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Naeem Asghar	Data collection	
2	Dr. M. Faiq Ilyas	Drafting	
3	Dr. Muhammad Nazim	Statistical analysis	