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RESEARCH ARTICLE

CLINICAL PROFILE, ANGIOGRAPHIC CHARACTERISTICS AND TREATMENT RECOMMENDATIONS IN WOMEN WITH CORONARY ARTERY DISEASE

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ABSTRACT

Introduction: Coronary artery disease**(CAD)**the leading cause of Mortality and Morbidity in middle aged women in developed and developing countries. The aim of this study was to define the clinical profile of patients with CAD in terms of risk factors, clinical presentation, angiographic characteristics and treatment recommendations for percutaneous interventions(PCI), coronary artery bypass surgery(CABG) or medical therapy.

Materials&Methods: Two hundred thirty eighty (238) consecutive in-patients were enrolled. The clinical presentations of patient were categorised as stable angina, unstable angina and myocardial infarction as explained. Elective coronary angiography was performed. Based on the baseline diagnostic angiogram, each coronary lesion producing $\geq$ 50% diameter stenosis in vessels $\geq$ 1.5 mm was scored separately. Syntax Score was calculated using the SX-score algorithm. The angiograms were performed for chronic stable angina in 56.15%, ACS in 20%. In Univariate Analysis of SX Score no significant correlation between intermediate/high SX Score and other variables.

Discussion: In this present study the mean age was 56.57 + 10.09. In western studies reported the mean age was higher as compare to other studies conducted in India. Chest pain was the most common presenting complaint in ACS patients, AWMI was the most common. 23.85% of the patients presented with intermediate / high SX score. Majority of patients 20 (15.38%) were treated with PCI and 6 (4.62%) underwent CABG.

Conclusion: Post menopausal state was the commonest cardiovascular risk factor in this study. Type B Lesion is the most common .PCI is the most frequently used treatment modality.

INTRODUCTION

Coronary Heart Disease (CHD) is perceived to be of greater importance in men and is largely considered to be a man's disease. It is also the leading cause of Mortality and Morbidity in middle aged women in developed and developing countries. Women constitute about 48% of the total population in India. They have been studied in predominantly male populations. Compared with men, women are at increased risk of adverse outcomes after acute coronary syndrome, Invasive procedures such as percutaneous coronary interventions (PCI). They are also at increased risk of bleeding complications of both medical therapies for acute coronary syndromes. Among women who routinely undergo CAG prior to radiofrequency ablation, the angiographically determined prevalence of "single vessel disease" (SVD), "double vessel disease" (DVD) and "triple vessel disease (TVD) are 2.5%, 1.3% and 0% respectively. [5] CAD in women less than 45 years of age does not differ from other patients. Significant CAD is seen in 55% of women with more than two risk factors. Study done by Dave *et al* among Indian women undergoing coronary angiography showed greater proportion of TVD (39.6%) than DVD (12.9%) and SVD (15.8%). The aim of our study was to investigate the clinical presentation and risk factors of coronary artery disease in female patients, second objective was to study the prevalence of and pattern of CAD and third objective was treatment recommendation of coronary artery disease in women.

MATERIALS AND METHODS

Study patients

Two hundred thirty eight (238) consecutive in-patients from the department of Cardiology were enrolled in this study during the

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period from May'2013 to August '2014. Ethical committee approval and informed consent from each patient was obtained. Coronary Artery Disease was defined as presence of stable angina, unstable angina or myocardial infarction. Patients with stable angina were recruited from outpatient department while those of unstable angina and myocardial infarction were recruited from both ward and outpatient department.

Baseline demographics, clinical and risk factor profile were collected. Only conventional risk factors including diabetes mellitus, hypertension, and dyslipidemia, smoking and family history of premature CAD and postmenopausal state, hypothyroidism as defined in operational definitions were assessed in this study. The clinical presentations of patient were categorized as stable angina, unstable angina and myocardial infarction as explained above.

Elective coronary angiography was performed through standard femoral or radial artery approach. Angiographic data were collected by analyzing the angiograms by two interventional cardiologists. CAD was defined as >1 epicardial coronary segment with stenosis > 50% and was diagnosed visually and using quantitative coronary angiography (QCA) software. Patients were grouped as having single vessels disease (SVD), double vessel disease (DVD) and triple vessel disease (TVD) according to the number of vessel involvement. Patients were also grouped according to the type of artery involved. Stenosis of a vessel was categorized as mild (<50%), moderate (50-69%) and severe (>70%). Atherosclerotic lesions complexity was further categorized according to the Joint American College of Cardiology/American Heart Association (ACC/AHA) task force classification system as given in operational definitions. Treatment recommendations were based on AHA/ACC Guideline 2011 for coronary artery revascularization [7] and also expert opinion as PCI, CABG or medical theray

Statistical Analysis

The Statistical Package for Social Science (SPSS) version 15 was used for data analysis.

Results were expressed as mean ± standard deviation for numerical variables and frequencies (percentages) for categorical variables in the form of tables. Categorical data were compared using the chi-square or Fisher's exact test, as appropriate

Definitions

Stable angina: It was diagnosed on the basis of clinical (chest pain typical or atypical) and non - invasive evaluation (1mm horizontal or down sloping ST–depression on exercise ECG or perfusion defects on technetium 99 scan).

Myocardial Infarction (MI): It was diagnosed in the presence of two of the following criteria: pain suggestive of myocardial ischemia lasting for at least 30 minutes; unequivocal new electrocardiographic alterations; or increase of creatinine kinase (CK- MB isoenzyme) to more than two times the upper limit. Patients with both ST elevation (STEMI) and non-ST elevation MI (NSTEMI) were included. ST segment elevation myocardial infarction (STEMI) was diagnosed when ST elevation of ≥2 mm in ≥2 contiguous precordial leads, or 1 mm in ≥2 contiguous limb leads or when new left bundle branch block was found on the qualifying ECG.

Unstable Angina: It was diagnosed in presence of typical ischemic chest discomfort of increasing severity and ST segment depression of 1 mm on limb leads and 2mm on chest leads with negative results for troponin T or I measured with help of ROCHE diagnostic kits for troponin T or I..

Type A Lesions: It included lesion having any of the following characteristics; discrete (<10mm), concentric, readily accessible, non angulated segment <45 degrees, smooth contour, little or no calcium. Less than totally occlusive, not ostial in locations, no major side branch involvement, absence of thrombus.

Type B Lesions (moderate risk) It included lesions having any of the following characteristics; tubular (10 to 20 mm length), eccentric, moderate tortuosity of proximal segment, moderate angulated segment ≥ 45 degrees but <90 degrees, irregular contour, total occlusions < 3 months old, osteal in locations, bifurcation lesion requiring double guide wire, some thrombus present.

Type C Lesions: It included lesions having any of the following characteristics; diffuse (>2 cm length), excessive tortuosity of proximal segment, extremely angulated segments ≥ 90 degrees, total occlusion >3 months old, inability to protect major side branches, degenerated vein grafts with friable lesions. The terms used in description of type of lesions are explained below.

Coronary artery territories and segments: The left main coronary artery was considered a segment and a territory of its own. Proximal segments comprised the proximal parts of the left anterior descending, the left circumflex, and the right coronary arteries. Mid segments consisted of the mid parts of the 3 main coronary arteries, and of the proximal 1 to 2 cm of major diagonal and obtuse marginal branches. Segments distal to mid segments were considered distal.

Lesion length: Lesion length was measured by caliper as the distance from the proximal to distal shoulder of the lesion in the projection that best elongated the stenosis using quantative coronary angiography (QCA). Stenosis of 10-20 mm length were defined as tubular and those of >20mm length were defines as diffuse.

Ostial Stenosis: A stenosis was classified as "ostial" when it involved the origin of the proximal left anterior descending, left circumflex, or right coronary arteries.

Stenosis angle: The vessel angle formed by a centreline through the lumen proximal to the stenosis and extending beyond it and a second centreline in the straight portion of the

artery distal to stenosis was measured in a non foreshortened view at end-diastole.

Thrombus: A thrombus was scored if an intra luminal filling defect, largely separated from the adjacent vessel wall, was clearly definable.

Tortuosity: The difficulty in accessing the stenosis to be dilated due to tortuosity proximal to its site was assessed. Stenosis distal to two bends was, in general, scored as moderately tortuous, and those distal to three or more bends were considered to be associated with excessive tortuosity.

Bifurcation stenosis: The stenosis was recorded a bifurcation stenosis if a branch vessel of medium or large size originated within the stenosis and if the side branch was completely surrounded by significant stenotic portions of the lesion to be dilated.

Calcification: Calcification was recorded if readily apparent densities were seen within the apparent vascular wall of the artery at the site of the stenosis.

Chronic total occlusion: A total occlusion (thrombolysis in myocardial infarction [TIMI] flow grade0), judged to be ≥3 months duration on the basis of clinical and angiographic findings, was coded as a chronic total occlusion.

Table 1 Demographic Data

Age, Years	**56.57 ± 10.10**
BMI	24.47±4.97
Diabetes (%)	38.23%
Hypertension (%)	64.73%
Smoking (%)	5.88%
Total Cholesterol(mg/dl)	166.78±39.88
Triglycerides(mg/dl)	161.90 ± 126.11
LDL-C (mg/dl)	93.08 ± 31.38
HDL-C(mg/dl)	45.28 ± 27.82
Cardiovascular Medication	
Aspirin	36.92%
Statin	45.38%
ß-Blockers, n%	43.85%
ACE Inhibitors, n%	46.80%
CCB, n%	3.85%
LVEF	56.17 ± 13.72
Serum Creatinine(mg/dl)	1.08 ± 0.41
Haemoglobin	12.01±1.38
Fluoroscopy Duration (min)	6.77 ± 13.74
Amount of Contrast(ml)	56.92 ± 32.64

Eccentric stenosis: A stenosis was classified as eccentric when its lumen was in the outer on equator diameter of the apparent normal lumen.

Irregular contour: A stenosis was classified as having irregular contour if the vascular margin was rough or had a "saw tooth" appearance.

Syntax Score: Syntax score is an angiograpic tool grading the complexity of coronary artery disease. The algorithm is available on the SYNTAX website.

RESULTS

A Total of 238 Female patients were included in this study. Table 1 showing the mean age was 56.57 ± 10.09, BMI was 24.47 ± 4.97, frequency of risk factors for CAD were HTN 64.73%, Diabetes mellitus 38.23%, Smokers 5.88%, Total Cholesterol 166.78 ± 39.88, Triglycerides 161.90 ± 126.11, LDL Cholesterol 93.08 ± 31.38, HDL Cholesterol 45.28 ± 27.82, Postmenopausal State (78.96%).

The angiogram was performed for chronic stable angina in 34.03%, Acute Coronary Syndrome/Unstable Angina in 13.86%. Angiographically CAD was demonstrated in 99 out of 238 patients. Angiographic Analysis revealed that 24 (24.30%) patients had single vessel disease, 34(34.48%) patients had two vessel disease and 31(31.35%) patients had triple vessel disease and 139 (58.4%) patients had normal coronary arteries.

Table 2 showing the angiographic findings of patients with coronary artery disease. Out of 99 patients 11.1% had LMCA disease, 93.9% had LAD disease, 31.7% had LCX disease,71.7% had RCA disease. Severity of stenosis and type of lesions classified based on American College of Cardiology (ACC)/American Heart Association (AHA) lesions classification on angiography, Type B lesions are common in this study. Chest pain was the most common presenting complaint in ACS patients, AWMI was the most common type with Killip Class I, II. seen in 21.12%, IWMI present in 9.09% .SYNTAX score for LMCA was 13.9 ± 1.91, LAD was 9.04 ± 4.9, LCX was 5.82±3.29 and RCA was 6.34± 3.54. Low Syntax Score (≤18) was 50 (50.5%) patients; intermediated/high (≥ 18) was 49(49.49%) (Table 3).

Table 2 Severity of stenosis and type of lesions based on American College of Cardiology (ACC)/American Heart Association (AHA) lesions classification on angiography.

Angiographic Findings		**LMCA Frequency (%)**	**LAD Frequency (%)**	**LCX Frequency (%)**	**RCA Frequency (%)**
Total Lesions					
	Type A Lesions	3(27.27%)	13(13.97%)	7(22.58%)	38(53.52%)
Type of Lesions	Type B Lesions	8(72.72%)	68(73.11%)	19(61.29%)	17(23.94%)
	Type C Lesions	0	12(12.90%)	5(16.12%)	16(22.53%)
	Total Occlusion	0	6(6.45%)	3(9.67%)	7(9.85%)
	Tri-furcation	2(18.18%)	0	2(6.45%)	0
	Bi-furcation	7(63.63%)	37(39.78%)	10(32.25%)	12(16.9%)
Lesion	Severe Tortuisity	0	9(9.67%)	8(25.80%)	14(19.71%)
Characteristics	Lesion length >20mm	1(9.09%)	22(23.65%)	9(29.03%)	11(15.49%)
	Heavy Calcification	9(81.81%)	35(37.63%)	14	16(22.53%)
	Thrombus	1(9.09%)	8(8.60%)	2	1(1.4%)
	Diffuse/small vessel disease.	0	9(9.67%)	5	10(14.08%)

Table 3 Angiographic Characteristics of Patients

Coronary Angiography	
One Vessel, n%	24.24%
Two Vessel, n%	34.4%
Three Vessel, n%	31.35%
Multi Vessel, n%	11.61%
SYNTAX Score	
LMCA	11.1%(13.9±1.91)
LAD	70.7% (9.04 ± 4.9)
LCX	31.1% (5.82 ±3.29)
RCA	47.47% (6.34 ± 3.54)

There was no statistically significant difference of risk factors of coronary artery disease between low/intermediate to high syntax score groups. Percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG) were advised in 47(47.47%) and 13(13.13%) respectively. Medical follow up due to non-significant disease and diffuse disease was advised in 39(39.39%).

DISCUSSION

Although ischemic heart disease is a leading cause of mortality in women, they are significantly under-represented in clinical trials. For example, women have often comprised less than a third of the populations of clinical trials of recommended secondary prevention strategies**.**

In additions, trials that have defined the role of revascularization strategies for high-risk ACS patients or failure of medical therapy in stable angina have mostly included men.

Developing countries share a greater global burden of cardiovascular disease than developed countries. In this present study the mean age was 56.57 ± 10.09. In Western studies the reported mean age was higher as compare to the studies conducted in India. Such a study is Hochmann *et al* (69 Years) and Chang *et al* (73 years), most of the studies showing Dyslipidemia was the commonest risk factor ,where as in our study post menopausal status is the most common risk factor for CAD (but not statistically significant p value 0.09).

In our study 56.15% patients presented with stable angina, 20% patients had Acute Coronary Syndrome. Chest Pain was the most common presenting complaint in ACS patients, AWMI was the most common type with Killip Class I & II. Majority of the patients has 139 normal coronaries (58.40%%), 24 patients single vessel disease (24.3%), 34 patients two vessel disease (34.48%) and 31 patients triple vessel disease (31.35%), 11 patients has LMCA disease(11.10%) in our study. The prevalence of obstructive CAD is 33.1%.

In our study majority of patients had AHA/ACC type B lesions which is in agreement with previous studies. In our study 50 (50.50%) of the patients presented with lower SYNTAX score and 49 (49.40%) patients presented with intermediate/high SYNTAX score. Percutaneous Coronary Intervention (PCI) surpasses Coronary Artery Bypass Grafting (CABG) as the most frequent revascularization modality for obstructive CAD. In our study majority of 47 patients (47.47%) were treated with PCI while 13 patients (13.13%) underwent CABG.

CONCLUSION

Post menopausal state is the commonest cardiovascular risk factor in this study, single Vessel disease is the most common presentation in ACS Patients, PCI is the most frequently used treatment modality for the management of these patients.

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