ORIGINAL RESEARCH

CLINICAL PROFILE OF PATIENTS OF ACUTE CORONARY SYNDROME WITH NON OBSTRUCTIVE CORONARY ARTERIES

Dr. Pinniboyana Vijaya Kumar[1], Dr. Pinniboyana Sri Harshitha[2],

1. MBBS, MD, Associate Professor, Department of Emergency Medicine, Narayana Medical College, Nellore.
2. MBBS, MD, Senior Resident, Department of General Medicine, Narayana Medical College, Nellore.

Corresponding Author
Dr. Pinniboyana Vijaya Kumar, MBBS, MD, Associate Professor, Department of Emergency Medicine, Narayana Medical College, Nellore.

ABSTRACT
Aim: To study the clinical and angiographic profile of patients who are diagnosed with acute coronary syndrome having non obstructive coronary arteries.
Materials and method: The study was designed to study seventy-three patients who had been diagnosed with ACS and found to have normal coronaries that is obstruction less than 50% after coronary angiography. All these subjects detailed clinical profile; angiographic profile was analysed.
Results: This study on 73 MINOCA patients 41.10 % of them were young in the age group of 31- 40 years and most of them were males (56.2%) with dyslipidaemia (71.2%), comorbidities like diabetes mellitus is found in 78% of MINOCA patients. 78.1% had alcohol consumption history and smokers were 28.8% of study population. Positive family history of CAD was found among 42.5 % of study population. Majority of the subjects had NSTEMI (80.8%), elevated troponin (98.6%), RWMA in found among 49.3% and 35.6% had heart failure at presentation. Slow flow coronaries were found in 16.4% and culprit artery was LAD in 49.3% of MINOCA patients.
Conclusion: This study complements the study of MINOCA and provides some new data in this field that could improve the future management of these patients.
Keywords: Acute Coronary Syndrome, Myocardial Infarction, Non-obstructive Coronary Arteries, Clinical Profile, Angiographic Profile

Introduction: Coronary Artery Disease (CAD) is the major cause of mortality and morbidity of humankind. It is the most common cause of death in the most western world. In 2003, the prevalence of CAD was found to be 3-4 percent in rural India (two-times compared with 40 years statistics), and 8-10 percent in urban India (six-times higher compared with 40 years statistics), with a total of 29.8 million affected (14.1 million in urban population, and 15.7 million in rural population) according to surveys of population-based cross-sectional type.[1,2]

Unstable angina, ST-segment elevation myocardial infarction, and non-ST segment elevation myocardial infarction are all part of the acute coronary syndrome. An acute coronary syndrome is the leading cause of morbidity and mortality not only in the western world it is also the most prevalent disease in Asian countries like India. In India, there is a transition from infectious diseases to non-infectious diseases in the past two decades. ACS is not only common in the urban population it is also prevalent in rural India.[3]

The occurrence of an acute coronary syndrome without significant obstructive coronary artery disease (CAD) was reported nearly 80 years ago.[4,5] According to the definition of MINOCA outlined in

the 2016 European Society of Cardiology[6], the term MINOCA should be reserved for those patients with an ACS in the absence of obstructive epicardial coronary arteries and no other clinical findings to suggest alternative causes for the elevated cardiac biomarkers.[7,8]

Patients with myocardial infarction with nonobstructive coronary arteries (MINOCA) were found to be 6% to 14% of all those with acute myocardial infarction (AMI).[9-14] Recent evidence demonstrates that Patients with MINOCA are not the same as those who have AMI and have the usual culprit lesion namely, >50% plaque-mediated stenosis of the coronary artery myocardial infarction due to coronary artery disease by having very low association with traditional cardiac risk factors and a lower but significant annual mortality rate. Existing literature on MINOCA is drawn mostly from studies enrolling predominantly men and older patients, which may limit opportunities to adequately describe the afflicted population of disease designated as MINOCA, their clinical characteristics, and their outcomes.[15-17]

This study has been designed to evaluate a detailed clinical profile, including demographic profile, associated comorbidities, risk factors and angiographic profile in patients of acute coronary syndrome with non-obstructive coronary arteries diagnosed in a territory care hospital.

Material and methods:

This was a single centered prospective observational cross-sectional study, which was conducted at tertiary care hospital (Southern Andhra Pradesh). The Institutional Medical Ethics Committee approved this study. From July 2022 to December 2022, we enrolled all those patients diagnosed as Acute coronary syndrome with non-obstructive coronary arteries after coronary angiogram who were admitted to the department of General Medicine and Department of Cardiology to participate in this study. Written informed consent was obtained from the patients and their clinical profile and detailed risk factor profile was studied an assessment of EF by 2D-echo, basic laboratory investigations were carried out.

Inclusion Criteria

1. Patients of myocardial infarction found to have non obstructive coronary arteries after coronary angiogram.
2. Age > 18 years

Exclusion Criteria

1. Patients with Myocarditis, Takotsubo and other cardiomyopathies.
2. Non cardiac troponin elevation cases like Pulmonary embolism, Chronic kidney disease were excluded.

Study Procedure

After coronary angiography patients with normal coronaries, obstruction less than 50%, slow flow coronaries were included in the study. Detailed history of presenting symptoms-chest pain, palpitation, sweating, history of diabetes mellitus (DM), hypertension (HTN), PVD, Congestive Heart Failure (CHF) and family history of coronary artery disease, history of angina was recorded

All patients were examined for blood pressure, pulse rate, peripheral pulses. A thorough examination of Cardiovascular system, Respiratory system, Gastrointestinal system, and Central nervous system was done.

Laboratory Investigations:

a. Complete Blood Count
b. Renal function test -with creatinine clearance
c. Lipid profile
d. Fasting blood sugar
e. HbA1C
f. Troponin I
g. A standard 12 lead resting electrocardiogram was taken for all participants.

Transthorasic 2d-Echocardiography: Each participant underwent a thorough conventional transthorasic two-dimensional echocardiography with the participants in the left lateral decubitus position.

Data was collected and subjected to statistical analysis.

Results:

Out of 73, maximum subjects were from the age group of 31-40 years (41.10%) followed by 51-60 and 41-50 years. Only 9.59% of the subjects were from the age group of 26-30 years. 56.2% and 43.8% of the subjects were male and female respectively (graph 1).
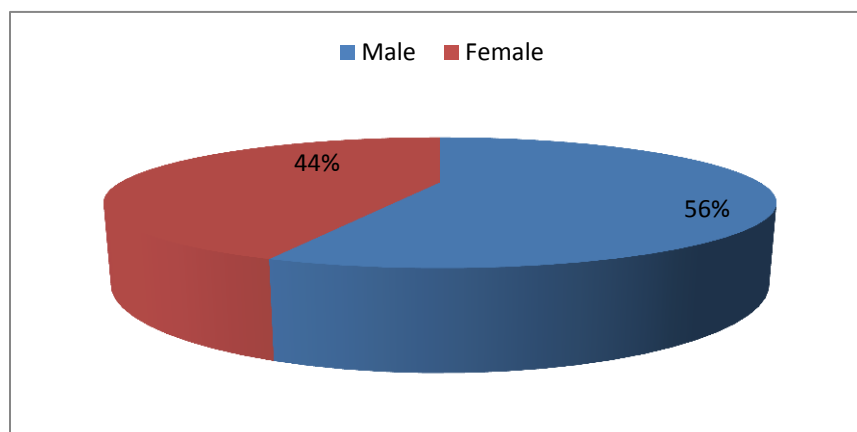
GRAPH 1: Gender distribution among the study subjects

Family history of CAD was reported among 42.5% of the subjects while history of Angina was revealed in 60.3% of the subjects. Normal weight, overweight and obesity was reported among 39.7%, 39.7% and 20.5% of the subjects respectively. Dyslipidemia was found in 71.2% of the subjects. Diabetes mellitus and hypertension was reported among 78.1% and 50.7% of the subjects respectively (table 1).

Table 1: Co-morbidities and deleterious habits among the study subjects

Variables	N	%
Dyslipidemia	52	71.2
Diabetes Mellitus	57	78.1
Hypertension	37	50.7
Alcohol	35	47.9
Smoking	21	28.8

Elevated troponin level was found in 72 (98.6%) subjects. NSTEMI and STEMI was found in 80.8% and 19.2% of the subjects respectively. RWMA 2D ECHO was found in 49.3% of the subjects (table 2).

Table 2: Troponin level, ECG changes and RWMA 2D ECHO among the study subjects

Troponin Level	N	%
Elevated	72	98.6
Normal	1	1.4
ECG		
NSTEMI	59	80.8
STEMI	14	19.2
Total	73	100
RWMA 2D ECHO		
Yes	36	49.3
No	37	50.7
Total	73	100

Heart failure at presentation was reported in 35.6% of the study subjects (graph 2).
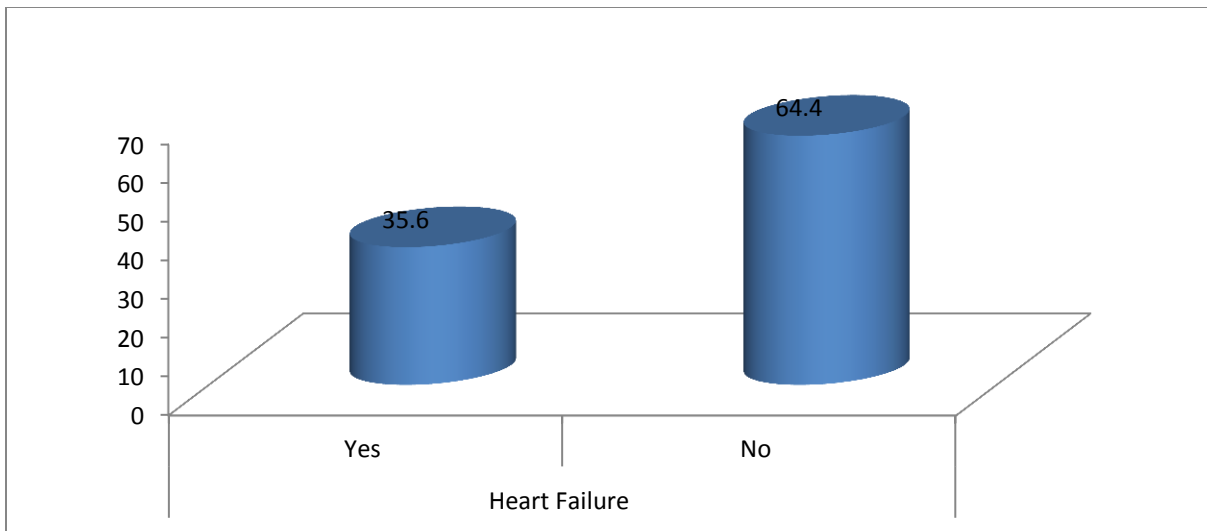
GRAPH 2: Heart failure at presentation among the study subjects

Normal and abnormal coronaries were found in 9.6% and 90.4% of the subjects respectively. Stenosis <30% and <50% was reported in 34.2% and 42.5% of the subjects respectively. SCAD was reported in 38.4% of the subjects. Slow flow coronaries were found on 16.4% of the study subjects. Recurrent CAD was reported among 53.4% of the study subjects (table 3).

Table 3: Normal coronaries, stenosis, SCAD and slow flow coronaries among the study subjects

Normal Coronaries	N	%
Yes	7	9.6
No	66	90.4
Stenosis		
<30%	25	34.2
<50%	31	42.5
SCAD		
Yes	28	38.4
No	45	61.4
Slow flow coronaries		
Yes	12	16.4
No	61	83.6

Table 4: LAD, LCX and RCA involvement among the study subjects

Parameters	N	%
LAD	36	49.3
LCX	35	47.9
RCA	26	35.6

LAD, LCX and RCA involvement was revealed in 49.3%, 47.9% and 35.6% of the subjects (table 4).

Discussion: The present single-centre observational cross-sectional prospective study was conducted at tertiary care hospital (Southern Andhra Pradesh). 73 patients were diagnosed as MINOCA after coronary angiography. Their detailed sociodemographic, clinical, and angiographic data is analysed and found to have results as mentioned below.

Out of 73, maximum subjects were from the age group of 31-40 years (41.10%) followed by 51-60 and 41-50 years. Only 9.59% of the subjects were from the age group of 26-30 years in this study. Routray SN et al[8] in their study found that patients with MINOCA were younger which is like our study. According to Pasupathy S et al[12], the mean age was 58.8 years. MINOCA is more common in the younger age group. In our study patients with MINOCA had a younger age of presentation than other studies.

56.2% of the subjects were males which is distinguishable result when compared to most of the studies. Hence there were more males as compared to females in contrary to many studies. Routray SN et al[8] in their study revealed that males were more as compared to females.

Normal weight, overweight, and obesity were reported among 39.7%, 39.7%, and 20.5% of the subjects respectively. Similarly, Iqbal M Net al[18] study found the prevalence of obesity was 26.9% of the subjects. Routray SN et al[8] in their study revealed that the prevalence of obesity was 8%, which is dissimilar to our study.

Dyslipidaemia was found in 71.2% of the subjects, which is a significant result dissimilar to most of the studies. Ramnath V S et al[19] showed dyslipidaemia among 64.3% of the subjects, which is approximately like our study. However, Routray SN et al[8] in their study found dyslipidaemia among 38.7% of the subjects.

Diabetes mellitus and hypertension were reported among 78.1% and 50.7% of the subjects respectively. According to Routray SN et al[8], the prevalence of diabetes was 19.3% in MINOCA. A study by Pasupathy S et al[12] showed 15%, Iqbal M N et al[18] 34.4%, and Ramnath V S et al[19] revealed 23.6% of the subjects were suffering from diabetes. In contrary to these studies our study found a higher incidence of diabetes mellitus in MINOCA patients. There is a significant epidemiological occurrence of DM in younger population. Younger population with Diabetes always has more adverse events.

Deleterious habits like alcohol consumption and smoking were revealed in 47.9% and 28.8% of the subjects respectively in our study. Routray SN et al[8] in their study found that the prevalence of smoking was 30.3%, which is like our study. In another study, it was 42% by Pasupathy S et al[12] 5.4% by Iqbal M N et al[18], 19% by Ramnath VS et al[19] in the MINOCA group. The overall prevalence of smoking was higher in our study population compared to the other studies.

Family history of CAD was reported among 42.5% of the subjects. The incidence of family history in other studies were variable. Family history was positive in 21% by Pasupathi S et al[12], 28.1% by Iqbal M N et al[18] and 45.3% by Ramnath V S et al[19] for MINOCA. Routray SN et al[8] in their study revealed that family history of CAD was 8%.

Elevated troponin level was found in 72 (98.6%) subjects, the overall elevation of troponin levels was higher in our study population compared to the other studies[20].

NSTEMI and STEMI were found in 80.8% and 19.2% of the subjects respectively. RWMA in 2D ECHO was found in 49.3% of the subjects. Heart failure at presentation was reported in 35.6% of the study subjects. Hypotension at presentation was reported in 35.6% of the study subjects. Normal and abnormal coronaries were found in 9.6% and 90.4% of the subjects respectively. Slow flow coronaries were found on 16.4% of the study subjects. LAD, LCX, and RCA involvement were revealed in 49.3%, 47.9%, and 35.6% of the subjects.

According to Routray SN et al[8], the ST elevation MI was 86.5% in males and 62.2% in females. NSTEMI was 13.5% in males and 37.8% in females. MINOCA patients were less likely to have hypertension, which is like our study. 50.6% had recanalized vessels with non-obstructive lesions, 24% had normal coronaries and 12% had slow flow. There is equal distribution of about 2.7% for Coronary anomalies, myocardial bridging, and coronary thrombus each. In a study by Javier Lopez Pais et al[21], the most prevalent pathophysiological mechanisms of MINOCA were plaque disruption (25%) and stress cardiomyopathy (25%). Other mechanisms were coronary spasm (13.6%), coronary embolus (9.1%), and coronary artery dissection (2.3%). In 11.4% of the patients, they did not find the mechanism.

Limitation

This is a single centred observation study. In addition to the conventional coronary angiogram, other imaging modalities like CMR, IVUS, and OCT, nuclear myocardial perfusion imaging are needed to

identify the potential pathological mechanism involved in this disorder. Due to inaccessibility and financial constraints, additional imaging modalities were not done in our study.

The limited sample size is other limitation of this study, and it needs to be substantiated by a large longitudinal study so that it will help to reduce morbidity and improve quality of life among MINOCA patients.

Conclusion: Dyslipidaemia was found in 71.2% of the subjects. Majority had risk factors like Diabetes mellitus (78.1%) and hypertension (50.7%). Family history of CAD was reported among 42.5% of the subjects. Majority of the subjects presented with NSTEMI (80.8%). Almost half of MINOCA patients had RWMA in 2D ECHO (49.3%). Majority of study subjects found to have LAD involvement (49.3%).

MINOCA represents a considerable proportion of all AMIs. Its clinical presentation is very similar to MIOCA, so it reinforces the idea of considering it as a working diagnosis. This study complements the study of MINOCA and provides some new data in this field that could improve the future management of these patients.

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