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ORIGINAL RESEARCH

TO STUDY THE CLINICAL PROFILE OF PATIENT WITH MYOCARDIAL INFARCTION WITH NON OBSTRUCTIVE CORONARYARTERIES(MINOCA) AND ITS CORRELATIONSHIP WITH THE RISK FACTORS

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Abstract

Background: Clinical studies have reported a prevalence of MINOCA of 5% to 6% of AMI cases. The demographic and clinical characteristics of MINOCA patients differ from other patients with AMI-CAD. The prevalence of conventional CAD risk factors also varies among patients with MINOCA versus MICAD.

Objective: To study the clinical profile of patient with myocardial infarction with non-obstructive coronary arteries(MINOCA) in comparison to patient with myocardial infarction with obstructive coronary artery disease(MICAD) and its correlationship with the risk factors

Material and methods: Present study prospective comparative study was conducted in the Department of Cardiology, G.R. Medical College, Gwalior (M.P.) on an inpatient basis.Duration of study wasOne and half years. (Nov. 2019 to June 2021) A total of 214 patients presenting with Myocardial infarction who underwent coronary angiography were studied during this period. Our study consist of two groups of patients based on their angiographic findings that were patients with MINOCA (N=107) and patients with MI with obstructive coronary artery disease (MICAD) (N=107) which were compared based on their clinical profile and various risk factors.

Results: Patients with MINOCA were more likely to be younger with mean age of 47.94 ±9.02 year with female being more prevelant in comparison to patients with MICAD..Conventional cardiovascular risk factors such as Smoking (19.6% vs 36.4%),Diabetes (9.3% vs 29.9%) ,hypertension (20.6% vs35.5%,),obesity (5.6% vs 16.8%),dyslipidemia(22.4% vs 40.2%)were less prevelant. Patients with MINOCA usually presents with NSTEMI (64.5% vs 44.9%) and less likely to have left ventricular dysfunction(27.1% vs74.8%) in comparison to patient with MICAD.

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Conclusion: Patients with MINOCA were younger as compared to patient with MICAD.Prevalence of females were significantly higher among patients with MINOCA .Risk factors such as smoking, alcohol intake, obesity and Comorbid illness like hypertension, diabetes mellitus, dyslipidemiawere less prevalent among patients with MINOCAas compared to patients with MICAD.

Keywords- MINOCA, MICAD,CAD

Introduction

Myocardial infarction without obstructive coronary artery disease (MINOCA) is defined by the evidence of spontaneous acute myocardial infarction (MI) and angiographic exclusion of coronary stenosis ≥50% in any potential infarct related artery, after having ruled out other clinically overt causes for the acute presentation[7].

Clinical studies have reported a prevalence of MINOCA of 5% to 6% of AMI cases[1]with a range between 5% and 15% depending on the population examined[1-5]Although MINOCA can present with or without ST-segment elevation on the ECG, patients with MINOCA are less likely to have electrocardiographic ST-segment deviations and have smaller degrees of troponin elevation than their AMI counterparts with obstructive CAD (AMI-CAD).[2,3] The demographic and clinical characteristics of MINOCA patients differ from other patients with AMI. MINOCA patients are usually younger [1,2-4] than patients with AMI-CAD.Women are disproportionately represented among individuals with MINOCA[1-5].The prevalence of conventional CAD risk factors and clinical features also varies among patients with MINOCA versus AMI-CAD. MINOCA patients have a lower prevalence of dyslipidemia than their counterparts with AMI-CAD.[1,2,4,6] Other traditional CAD risk factors, such as hypertension, diabetes mellitus, tobacco abuse, and a family history of myocardial infarction, are less frequent in MINOCA patients[1,2,4,6]although this has not been consistently observed in all studies[1]. The reasons for these are varied. Thrombosis, embolism and vasospasm are believed to be the mechanisms of ischemia and infarction in these cases[8,9]. Intravascular thrombosis can result from hematological disturbances as in protein S deficiency and high progestational states in females[10]. Coronary embolism has been reported with prosthetic and abnormal valves, endocarditis and cardiac arrythmias[11]. Vasospasm is an important mechanism in cocaine and amphetamine induced infarction[12,13]. Currently, local studies have not been performed to determine the clinical characteristics of patients with MINOCA. The aim of this study was to know the clinical 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.

Objectives

- To study the clinical profile of patient with myocardial infarction with non obstructive coronary arteries(MINOCA)in comparison to patients with myocardial infarction with obstructive coronary artery disease(MICAD).
- To study the ECG and echocardiographic changes in patients with myocardial infarction with non obstructive coronary arteries in comparison to patients with Myocardial infarction with obstructive coronary artery disease.

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- To study correlationship of risk factors in patients with myocardial infarction with non obstructive coronary arteries (MINOCA)in comparison to patients with myocardial infarction with obstructive coronary artery disease.

Material and methods

Present study prospective comparative study will be conducted in the Department of Cardiology, G.R. Medical College, Gwalior (M.P.) on an inpatient basis. Duration of study wasOne and half years. (Nov. 2019 to June 2021) A total of 214 patients presenting with Myocardial infarction who underwent coronary angiography were studied during this period. Our study consist of two groups of patients based on their angiographic findings that were patients with Myocardial infarction with non obstructive coronary arteries (N=107) and patients with Myocardial infarction with obstructive coronary artery disease(N=107) which were compared based on their clinical profile (Detailed history, clinical examination, biochemical profile, electrocardiographic findings, echocardiographic findings and Angiographic findings to be studied)and various risk factors.

Inclusion criteria

Patients presenting with Myocardial infarction who underwent coronary angiography.

Exclusion criteria

- Patient age < 18 years.
- Previous history of Percutaneous Intervention.
- Documented coronary artery disease in previous angiogram
- Patients who refuse to give written informed consent.

Results

Comparison between Patients with MINOCA and MICAD based on Age distribution

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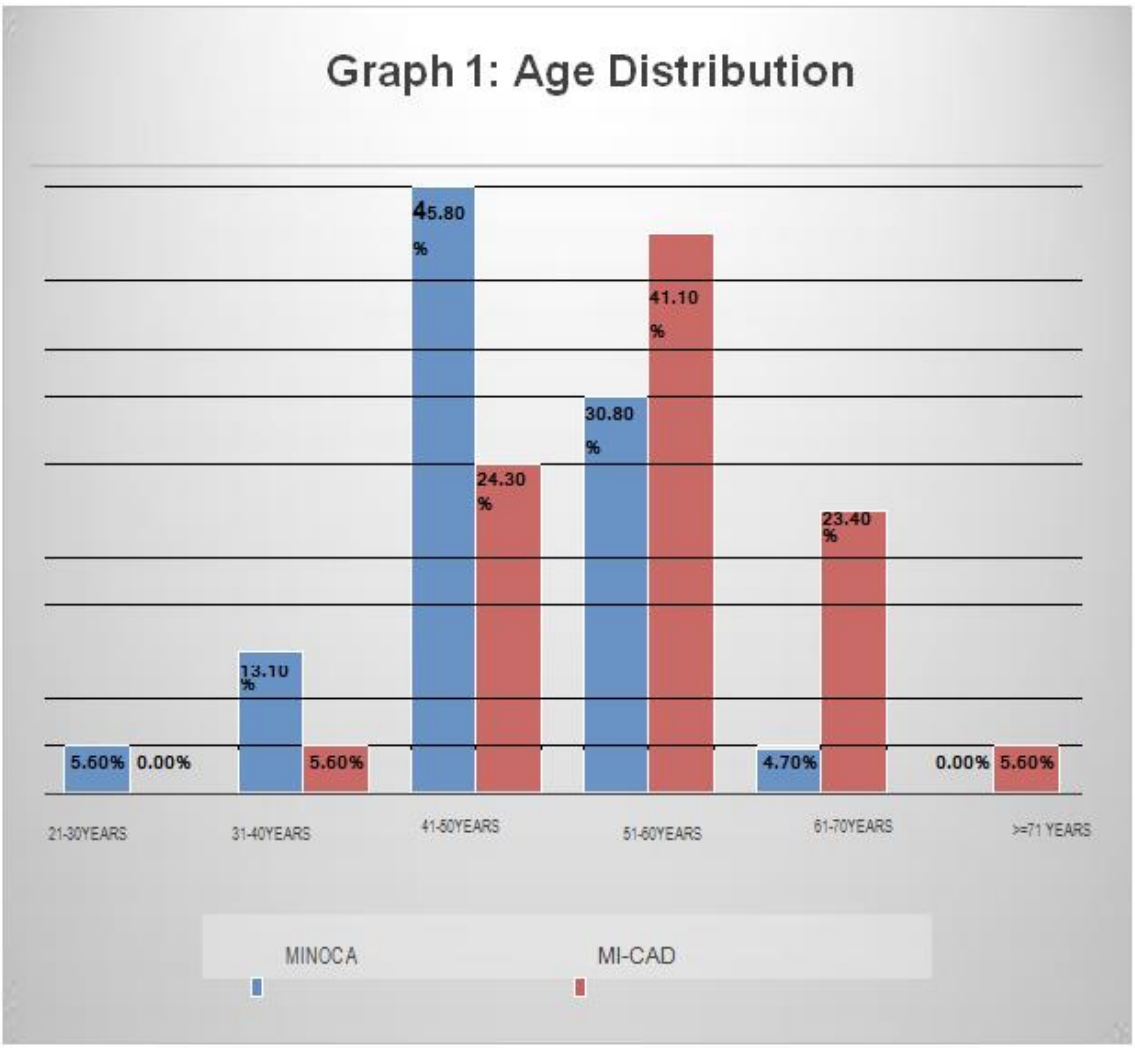
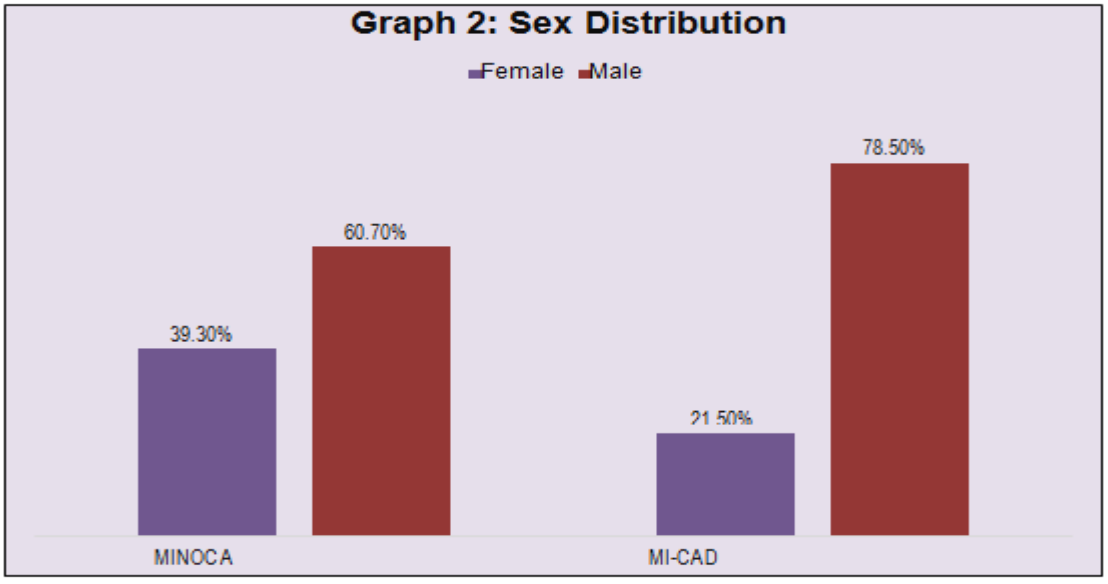


In our study patients with MINOCA were younger with mean age of 47.94 ±9.02years then those with MICAD with mean age of 56.50±9.07 years (p=0.000).Most prevalent age group being 41years-50years and 51years – 60 years in patient with MINOCA and MICAD respectively.

Comparison between Patients with MINOCA and MICAD based on Sex distribution



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In our study among patients with MINOCA Males were more common then females (60.7%vs39.3%). Majority of patients in both groups were males that was (60.7% and 78.5%) respectively among patients with MINOCA and MICAD. Among patients of MINOCA prevalence of females were significantly higher as compared to patient with MICAD (39.3% vs 21.5%) and the difference was statistically significant (p=0.005).

Table 1-Comparison between patients with MINOCA and MICAD based on ECG findings

ECG	MINOCA	MICAD	PValue (p<0.05-significant)
STEMI	35.50%	55.10%	0.004
NSTEMI	64.50%	44.90%	0.004

In our study the Non ST segment elevation MI(NSTEMI)was more common among patients with MINOCA(64.5%) as compared to patients with MICAD (44.9%) and the difference was statistically significant(p=0.004) and vice versa for STEMI(35.1% VS 55.1%)

Table-2 Comparison between patients with MINOCA and MICAD based on Ejection fraction Levels.

EJECTION FRACTIONLEVEL	MINOCA	MICAD	PValue (p<0.05-significant)
Abnormal(<55%)	27.1%	74.80%	0.000
Normal(>55%)	72.90%	25.20%	0.000
Mean Ejection Fraction level	56.11%±8.82	48.01%±9.56	0.000

In our study the mean ejection fraction was higher among patients with MINOCA that was (56.11%±8.82) when compared to patients MICAD that was (48.01%±9.56) and the difference was statistically significant(p=0.00).

The prevalence of patients with reduced ejection fraction (<55%) or with left ventricular dysfunction was significantly lower among patients with MINOCA (27.1%) as compared to patients with MICAD(74.8%).

Table 3 -Comparison between patients with MINOCA and MICAD based on risk factors

RISK FACTORS	MINOCA	MICAD	PValue (p<0.05-significant)
Family History of CAD	38.3%	29.9%	0.194
Smoking	19.6%	36.4%	0.006
Alcohol Intake	15%	26.2%	0.042
Obesity	5.6%	16.8%	0.015
Hypertension	20.6%	35.5%	0.015
Diabetes Mellitus	9.3%	29.9%	0.000
Dyslipidemia	22.4%	40.2%	0.005

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Conventional cardiovascular risk factors such as Smoking (19.6% vs 36.4%),Diabetes (9.3% vs 29.9%) ,hypertension (20.6% vs 35.5%,),obesity (5.6% vs 16.8%),dyslipidemia (22.4% vs 40.2%)were less prevalent in patients with MINOCA and MICAD respectively.There was no significant difference in prevalence of patients with family history of Coronary artery disease between both groups ie(38.3% vs 29.9%) .

Discussion

In our study patients with MINOCA were younger with mean age of 47.94 ±9.02years then those with MICAD with mean age of 56.50±9.07 years (p=0.000).Most prevalent age group being 41years-50years and 51yrs – 60 yrs in patient with MINOCA and MICAD respectively. Results were in line with study by **Routray SN et al**[14](46.1 years vs 61.3 years), **Iqbal MN et al**[15](54 years vs 58 years), **Safdar et al**[16](46years and 48 years) in patients with MINOCA and MICAD respectively.

Among patients with MINOCA Males were more common then females (60.7%vs39.3%). Majority of patients in both groups were males that was (60.7% and 78.5%). Among patients of MINOCA prevalence of females were significantly higher as compared to patient with MICAD (39.3% vs 21.5%) and the difference was statistically significant (p=0.005).

Similar findings were observed in study by **Salih K et al**[17] (45% vs 28.2%) **,Routray S.N. et al**[14] (42.5% vs 18.7%),**Iqbal MN et al**[15] (24% vs 15.8%) where among patients with MINOCA prevalence of females were significantly higher as compared to patients with MICAD.

In our study the Non ST segment elevation MI(NSTEMI)was more common among patients with MINOCA(64.5%) as compared to patients with MICAD (44.9%) and the difference was statistically significant(p=0.004) and vice versa for STEMI(35.1% VS 55.1%)

Similar observations were made by **Safdar et al**[16] (78.6% vs 47.9%) and**Rakowski T et al**[18](78% vs51.1%).

The mean ejection fraction was higher among patients with MINOCA that was (56.11%±8.82) when compared to patients MICAD that was (48.01%±9.56) and the difference was statistically significant(p=0.00). Our Results were in line with study by **Salih K et al**[17]where the mean ejection fraction was (60% vs 50%) in both group respectively.

The prevalence of patients with reduced ejection fraction (<55%) or with left ventricular dysfunction was significantly lower among patients with MINOCA (27.1%) as compared to patients with MICAD(74.8%).

In our study there was no significant difference in prevalence of patients with family history of Coronary artery disease between both groups that was (38.3% vs 29.9%) in patients with MINOCA and MICAD respectively. Similar findings were observed in study by **PasupathyS et al**[19] (21% vs 27%), **Iqbal MN et al**[15](28.1% vs 24.6%) ,**Jamil S et al**[20] (22.7% vs 25.6%)in both group respectively.

Among patients with MINOCA the prevalence of smokers was lesser as compared with patients with MICAD (19.6% vs 36.4% ,p=0.006).Similar observations were found in study by **Iqbal M N et al**[15](5.4% vs18.4%) , **Rakowski T et al**[18](15.1% vs 25.2%) respectively in both groups.

In our study among patients with MINOCAprevalence of alcoholics (15%) were lesser then the prevalence of chronic alcoholics in patients with MICAD (26.2%) and the difference was

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statistically significant. Observations made by **Salih K et al[17]** found no significant difference in the prevalence of alcoholics between patients with MINOCA (11.3%) and MICAD(11%).
In our study among patients with MINOCA the prevalence of hypertension was lesser as compared to patients with MICAD (20.6% vs 35.5%, p=0.015) and the difference was statistically significant.Similar observations were made by **Routray S.N. et al[14]** (17.3% vs 37.7%),**Salih K et al[17]**(30.3% vs 49.0%) respectively in both groups.
The prevalence of diabetes among patients with MINOCA was 9.3% that was lower then patients with MICAD(29.9%, p=0.000) and the difference was statistically significant. Our observations were in line with studies by **Rakowski T et al[18]**(13.1% vs 22.2%) , **Salih K et al[17]** (18%vs 30.5%),**Jamil S et al[20]** (16.7% vs 28.3%)in both groups respectively.
Dyslipidemia was present in fewer patients with MINOCA (22.4%) as compared to patient with MICAD (40.2%) and the difference was statistically significant (p=0.005). Results were comparable with study by **PasupathyS et al[19]**(21% vs 32%),**Jamil S et al[20]**(17.5% vs 28.2%),**Salih K et al[17]** (18.3% vs 31.5%) in both groups respectively.

Conclusion

- Patients with MINOCA were younger as compared to patient with MICAD .Among patients with MINOCA males were more common then females.Prevalence of females were significantly higher among patients with MINOCA as compared to patient with MICAD.
- Among patients with MINOCA NSTEMI was more common thenSTEMI.In comparison to patients with MICAD patients with MINOCA more commonly presents with NSTEMI .Left ventricular dysfunction was less common among patients with MINOCA as compared to patients with MICAD.

- Conventional cardiovascular risk factors such as smoking, alcohol intake, obesity ,hypertension, diabetes mellitus and dyslipidemia were less prevalent among patients with MINOCAas compared to patients with MICAD.

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