

Original Research Article

Clinical profile of patients with inferolateral myocardial infarction: a comparison study

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ABSTRACT

Background: Patient with lateral wall changes in inferior wall myocardial infarction (MI) usually ignored most often. However above lateral MI changes in the clinical setting of inferior wall MI usually impact on final clinical outcome and prognosis of the patients. Our aim of the study is observe diversity in clinical profile of inferolateral MI in comparison to patient with inferior wall without any lateral wall MI changes.

Methods: Current study enrolled 405 patients admitted to cardiology emergency with inferior wall MI. Patients divided into three groups on the basis of ECG changes, inferolateral (group A), isolated inferior wall MI (group B) and inferior wall MI with RVMI (group C). Patients with RVMI (group C) excluded from the group. Clinical profile and outcomes compared between group A and B.

Results: Around 33.8% pts with inferior wall STEMI have ECG changes of lateral wall AMI. STEMI equivalent in lead V1, V2 which is the most common ECG presentation, seen in 65% inferolateral patients. 45.7% of population of inferolateral MI are above age group of 60 years. 66.2 % of the patients with inferolateral MI having two or more risk factors. Dyspnoea is one of common symptom seen in 29.9% patients. Statistically significant number of patients in inferolateral MI have clinical picture of LVF (crepitation, S3), higher Killip class as compared to inferior wall MI. Incidence of complications like LVF, MR, VT, death is significantly higher in this group.

Conclusions: Around 1/3rd patient with lateral MI changes seen in inferior wall MI patients. STEMI equivalent changes in anterior precordial leads are most common ECG presentation. More no patients are older and with multiple risk factors. Complication and death are higher in this group. So meticulous attention should be given to patients with lateral wall MI changes in inferior wall MI.

Keywords: Lateral wall MI, STEMI equivalent in anterior precordial leads, Dyspnoea, Mitral regurgitation, Left ventricular failure, Mortality

INTRODUCTION

It is commonly accepted that the heart is located in the thorax strictly in a posteroanterior position; However present day CMR imaging reveals that heart sits on diaphragm in a slightly oblique right-to-left line. So it is postulated that RS pattern in V1 is accounted for by lateral and not inferobasal myocardial infarction (MI) (classically posterior MI). At present newly revised AHA

definition of lateral wall MI includes prominent R wave in leads in V1, V2 along with ST elevation in lead I, avL and/or V5, V6. As a result, horizon of lateral wall expanded with new definition.^{1,2} However lateral wall MI ECG changes seen most commonly and most often ignored, when it has very dynamic impact on outcome of inferior wall MI. So study of clinical profile of patient of inferior wall MI with lateral wall changes is necessary in the above circumstance.

METHODS

Type, place and duration of study

Presented study is a case control study, conducted at VIMSAR, Burla from 23 September 2019 to 23 March 2020.

All patients with inferior wall STEMI were included in the study. Total 427 patients with inferior wall STEMI below 18 years admitted to VIMSAR, Burla were enrolled in the study. Baseline characteristics like age, sex, SES, risk factors like type 2 DM, HTN, smoking, family history, previous CAD were taken in to account. Out of 427 patients 22 patients having associated anterior wall AMI (old), congenital heart disease, valvular heart disease, malignancy, chronic kidney disease, chronic lung disease, chronic liver disease, severe anaemia and patients with age more than 80 years are excluded. Consent taken from the patients enrolled in the study.

Out of 405 patients, 137 patients have ST elevation (I, avl), (V5, V6), (V7, V8, V9) or Q wave equivalent with ST depression in V1, V2 (i.e. lateral wall MI) included in group A. 157 patients have ST elevation V3R, V4R (RVMI) associated with inferior wall MI were included in group C. 111 patients have inferior wall MI without lateral wall MI or RVMI ECG changes were included in group B. Patients RVMI (group C) were excluded from the study.

Clinical symptoms (like chest pain, dyspnoea, vomiting, pain abdomen, syncope), vitals, clinical signs (like raised JVP, canon wave, odema, hepatomegaly, crepitation, rhonchi, S3, S4, any murmur or abnormal heart sounds) duly noted in every patients enrolled. ECG done 6hrly in every patient or as per the requirement needed. Any ECG abnormality; arrhythmia (sinus node/AV node dysfunction, BB-block, tachyarrhythmia) are noted. Patient undergone with reperfusion therapy, types of reperfusion therapy, percentage of ST resolutions, and any complication during therapy noted. TIMI risk score, killip score, CkMB/troponin (quantitative) were estimated at the time of presentation. All patients routinely undergone echocardiography within 24 hour of admission. Complications like LVF, shock, MR, VSR, arrhythmia, death were noted.

Statistical analysis

Statistical analysis was done by determining p value derived by comparing proportions of patients in two groups, $p < 0.05$ was considered significant.

RESULTS

Out of 405 patients, it was seen 111 patients (27.4%) have isolated inferior wall MI, 137 patients (33.8%) had lateral wall MI associated with inferior wall MI, 157 patients (38.7%) had associated RVMI. Out of 137

patients with inferolateral wall MI, ST elevation in V5, V6 or I, avL seen in 48 (35%) patients, ST depression with Q wave equivalent seen in 63 (45.9%) patients and E.C.G changes in both group of leads found in only 26 (18.9%) patients. Most common pattern of ECG changes in V1, V2 with lateral wall MI (Figure 1).

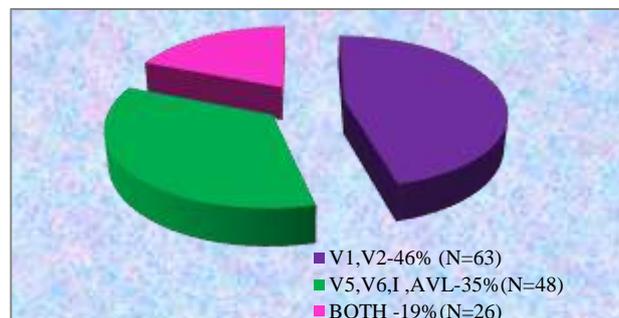


Figure 1: Distribution of lateral wall MI among ECG leads.

In group A, 21.1% patients are female and 78.9% patients are male, where as in group B 18% patients were female, 82% were male with no statistical significance. It was seen that, 45.7% of patients in inferolateral wall MI group were above 60 years of age as compared to 22.5% in group B with statistical significant $p = 0.00335$ (Table 1).

Table 1: Distribution of patients in inferolateral MI and inferior wall MI according to age.

Age (years)	IWM+LMI		IWMI		P value
	N	(%)	N	(%)	
18-30	5	3.6	10	9	Not significant
30-40	10	7.2	14	12.6	Not significant
40-50	24	17.5	24	21.6	Not significant
50-60	38	27.7	38	34.2	0.00105
60-70	48	35.5	16	14.4	0.00335
>70	14	10.2	9	8.1	

When patient's risk factors were taken in to account, most common risk factor found in both groups (A,B) was smoking i.e. 56% and 40% respectively with $p = 0.00204$. Besides smoking diabetes and hyperlipidemia were major risk factors in both the groups. It was also seen that around 66.2% (N=90) patients with inferolateral wall MI had 2 or more risk factor for CAD as compared to restricted inferior wall MI 37.8% (N=42) (Table 2).

In both groups of patients principal chief complain at the time of presentation was chest pain (66.4%, 72.9%) in group A and B respectively. However 29.9% patients in group A were presented with dyspnoea as compared to 9% in group B patients with $p < 0.0001$. Patients with inferolateral MI presents more with clinical sign of LVF like s3, fine crepitation as compared to inferior wall MI.

When complications during hospitalisation taken in to consideration, group A have comparatively more complications as compared to group B. complications like LVF, MR were significantly higher in group A as compared to group B (Table 3).

Table 2: Association of number of risk-factors in patients with inferolateral and inferior wall MI.

Number of risk factor	IWMI+LMI		IWMI		P value
	N	(%)	N	(%)	
No	11	7.9	14	12.6	<0.0001
One	36	25.9	55	49.5	
Two	46	33.7	23	20.7	<0.0001
>Two	44	32.5	19	17.1	

Table 3: Comparison of incidence of complication of inferolateral AMI and inferior-wall AMI.

Complication	IWMI+LMI		IWMI		P value
	N	(%)	N	(%)	
Shock	24	17.3	12	10.8	NS
LVF	36	26.2	-	-	0.0003
MR	11	7.9	1	0.9	0.001
VSR	1	0.72	1	0.9	0.0039

NS; not significant

There was no statistical significant difference in incidence of arrhythmia between two groups. Death occurred in 21 patients (15.3%) in group A during hospitalisation as compared 8 (7.2%) patients in group B with p=0.0482.

DISCUSSION

In current study, lateral wall MI present in 33.8% patients with inferior wall MI. ST depression with Q wave equivalent seen in V1, V2 in 46% patients, ST elevation in leads like I, avl and V5, V6 in 35% and lateral wall ECG changes in both group of leads i.e. V1, V2, V5, V6, I, avL seen in 19 % of patient with inferolateral MI. Peterson et al showed that ST depression in V1 & V2 with inferior wall MI is 38.9%.³ Whereas in current studies it was found out 36.2% (90/248). Adawi and Katar studied that, out of 119 inferior wall MI patients, 68 (57.2%) had inferior wall ECG changes only, and 51 (42.8%) had inferior and lateral wall involvement (leads I, AVL and/or V5-V6).

Among risk factor, smoking is the most common factor associated with inferolateral wall MI in comparison to inferior wall MI with statistical significance (p=0.0204). The mean age group in inferolateral MI in our study is 63±9.1 years as compared to restricted inferior wall MI is 58±10.2 years with p=0.0013. It was seen that around 45.7% of population of inferolateral MI were above age group of 60 years. The percentage of other risk factors like diabetes, dyslipidemia were also higher in patients with inferolateral MI without any statistical significance.

When 2 or more risk factor are taken in to consideration, inferolateral MI are more commonly associated increased number of risk factor as compared to inferior wall MI (i.e. 65 % vs. 37%) with significant p<0.0001. Maleki et al also found that, Q wave equivalent in ant leads more frequently associated with multiple cardiac risk factors & older age group.⁴ Increased number of risk factors like smoking, hypertension, diabetes, dyslipidemia increases the incidence of endothelial dysfunction, platelet activity, oxidised LDL damage, high risk plaque formation leading to more severe degree of CAD.

When clinical profile of patient with inferolateral MI compared with inferior wall MI, it is seen that in both groups chest pain was the principal chief complain. However around 29.9% patients of group A have chief complain of shortness of breath and dyspnoea as compared to group B (4.5%) with p<0.001.

26.2% of patients in inferolateral MI have shown clinical picture of LVF (crepitation, S3), higher killip class as compared to 2.7% patients in restricted inferior wall MI with statistical significance.

In current study it is seen that, inferolateral MI have more incidence of mitral regurgitation with statistical significance (p<0.001). Adawi et al also found higher incidence significant MR in posterior wall MI with ECG changes in anterior leads.⁵ The cause of MR may be due to more incidence of posteromedial papillary muscle rupture or dysfunction as a result of single blood supply to it. As more area of myocardium are jeopardised in LMI group leading to abnormal contraction pattern, LV dilation and subsequently papillary muscle are displacement, which may be an explanation for MR. Mitral regurgitation and LV dysfunction may be a cause for dyspnoea in inferolateral group.

However, it is seen that, patients with lateral wall MI have comparatively non significantly lower rate of ST resolution, which may be due to higher thrombus burden as a result of more number of risk factor like smoking, hypertension and impaired plasminogen mechanism in older age group

When mortality taken into considerations, mortality in inferolateral MI group is 15% in comparison 7% in inferior MI group with statistically significant p=0.0482. Patel et al, studied the patients with lateral wall MI after surgical restoration and concluded that, three year Kaplan-Meier survival for lateral wall MI was 67% in comparison to 83% patients without lateral wall MI. Patients with lateral wall MI involving >50% of lateral wall myocardium is a significant predictor of mortality (odd ratio=8.3, CI=1.3, p=0.03).⁶ Maleki et al from Iran university of medical science, Tehran had also found out that patients with tall R wave in V1, V2 with inferior wall MI have more complications, lower EF and increased in hospital mortality.⁴ Matetzky found that, patient with posterior wall motion abnormality on radionuclide

angiography have high peak creatinine kinase (with p value less than 0.02), lower LVEF at hospital discharge ($p < 0.008$)⁷. Birnbaum et al, who found that, ST-depression in anterior precordial leads in inferior wall MI are associated with more incidence of multivessel disease.⁸ Also Berger et al found multivessel disease in 25 patients out of 53 patients in acute inferior infarction accompanied by lateral wall changes in anterior leads.⁹ Complication like LVF, dreadful arrhythmia, cardiogenic shock are more common in inferolateral MI. complications arises in inferolateral MI due to multiple factors. LV dysfunction, association of old age and other cardiac risk factor, mitral regurgitation, impaired resolution, multivessel involvement may be responsible for higher mortality.

CONCLUSION

Around 1/3rd patients with inferior wall STEMI have ECG changes of lateral wall AMI. STEMI equivalent in lead V1, V2 which constitute most common entity in inferolateral MI. Most of the patients with inferolateral MI are older and having more than 2 risk factors. Among the risk factors smoking is more prevalent. Around half patients have LV systolic dysfunction. Incidences of complications like LVF, MR, VT, death are significantly higher in this group. So meticulous attention should be given towards lateral MI ECG presentation in inferior wall MI for early effective emergency management strategy

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