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"Clinical Study of ST Segment Elevation Myocardial Infraction in Metabolic Syndrome Patients"

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Abstract:-

- ***Aims and Objectives***

To study parameters of Metabolic Syndrome and their co-relation with STEMI and Clinical study of STEMI patients in Metabolic syndrome.

- ***Methods and Results***

Among the 80 patients STEMI in MS Prevalence of MS was higher in male 62.5% than female 37.5%, smoking risk factor associated with STEMI in patients 70%, presence of 4 components(50%) of metabolic syndrome is maximum in patients, AWMI was the most common with the incidence of 37.5%, total 16.25% patients deceased during the course of management,, Mean value of SBP in males was 139.84 mm hg, while in females it was 134.40 mm hg, Mean value of DBP in males was 87.96 mm hg, while in females it was 84.06 mm hg, Mean value of WC in males was 94.02 cm, while in females it was 96.86 cm, Mean value of HDL in males was 40.26 mg/dl, while in females it was 47.53 mg/dl, Mean value of TG in males was 149.54 mg/dl, while in females it was 148.80 mg/dl, Mean value of FBS in males was 116.88mg/dl, while in females it was 116.63 mg/dl.

- ***Conclusion***

The prevalence of FBS is 83.8%. TG is 56.3%, hypertension is 67.5 %, WC (males and females 80%), HDL (female 73.33%), HDL (males 76%), severity of STEMI in MS increases with increase in number of components involved in metabolic syndrome.

Keywords:-

- *STEMI - ST Segment Myocardial Infraction*
- *AWMI - Anterior wall Myocardial Infraction*
- *IWMI - Inferior wall Myocardial Infraction*
- *LVEF - Left Ventricular Ejection Fraction*
- *FBS - Fasting blood sugar*
- *MS - Metabolic Syndrome*
- *WC - Waist circumference*
- *TC - Total cholesterol*
- *TG - Triglyceride*

I. INTRODUCTION

Metabolic syndrome (MS) refers to a grouping of metabolic risk factors including central obesity, glucose intolerance, low HDL cholesterol, high triglycerides and dyslipidemia, hypertension, a proinflammatory state and excess weight, particularly abdominal adiposity[1]Individuals with MS are at increased risk for CVD and at increased risk of mortality from CVD because inflammatory and thrombotic tendencies are part of this syndrome, the clinical outcome of foremost significance is atherosclerotic CVD. [2] MS may be an advanced net of metabolic factors that may be related to a 2-fold risk of CVD. Individuals with MS have a 30%–40% probability of developing CVD within 20 years, depending on the number of components present [3]. Rapid urbanization is speculated to be the social engine of the increasing burden of cardiovascular disease (CVD) in India which predisposes to higher levels of body weight, blood cholesterol and glucose in urban populations, along with a decrease in insulin sensitivity. [4]

The risk for ASCVD accompanying the MS is approximately doubled compared with an absence of the MS. [5] People with MS are twice as likely to die from, and three times as likely to develop, myocardial infarction [6]Recently, the International Diabetes Federation (IDF) Consensus group has come out with another definition [7] . The new IDF definition talks about both clinical and research needs, which provides an accessible, diagnostic tool which can be a worldwide use. The aim of the present study is to study the clinical profile of ST segment elevation myocardial infraction in metabolic syndrome and to study the impact of parameters of metabolic syndrome on STEMI utilizing the new "obesity-centric" IDF criteria.

II. MATERIAL AND METHODS

The current study was a observational descriptive study of 80 Patients with STEMI in MS. A final diagnosis of MI was made in the presence of serial increases in serum biochemical markers of cardiac necrosis, associated with typical electrocardiographic changes and/or typical symptoms [12]. Patients with STEMI ≥1 mm in ≥2 extremity electrocardiographic leads or ≥2 mm in ≥2 contiguous precordial leads or new left bundle branch block on the admission electrocardiogram were defined as having STEMI. We analyzed baseline demographic and clinical characteristics, and relevant laboratory results.

Echocardiography was performed in all patients. All patients were followed until hospital discharge.

A. Definition of the MS

IDF released a global consensus definition for MS, along with race- and gender-specific WC cutoffs. This definition identified central obesity as an essential component of MS and defined MS as central obesity (based on race- and gender-specific WC cutoffs) for INDIANS WC cutoff is male≥90cm and females≥80cm plus, any two of the following four parameters:

- Raised TG, ≥150 mg/dl (1.7 mmol/l) or history of specific treatment for this lipid abnormality
- low HDL cholesterol, < 40 mg/dl (1.03 mmol/l) in men, and < 50 mg/dl (1.29 mmol/l) in women or history of specific treatment for this lipid abnormality
- Raised BP, SBP ≥130 mmHg or DBP ≥85 mm Hg or on treatment for previously diagnosed hypertension
- Raised FBS ≥ 100 mg/DL or diagnosed previously type 2 DM. [32]

*If FBS is >5.6 mmol/L or 100 mg/dL, an additional oral glucose tolerance test is must, not necessary to define presence of the syndrome.
**If BMI is >30 kg/m², central obesity is assumed and WC not to be measured.

The underlying principle behind the ethnic-specific thresholds was that for a given waist circumference, Asians, Blacks, Caucasians show completely different levels of intraabdominal adiposity, putting the subjects at completely different risk levels of cardiovascular disease and diabetes.

B. Statistical Analysis

The results were reported as mean ± standard deviation for the quantitative variables and percentages for the categorical variables. The groups were compared using the Student's t-test for the continuous variables and the Chi square test for the dichotomous variables. P < 0.05 were considered as statistically significant. All calculation done by IBM SPSS PASW 17 software.

III. OBSERVATIONS AND RESULTS

Metabolic Syndrome	Gender				Total	
	Females [n=30]		Males [n=50]		Mean	Std. Deviation
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Std. Deviation
SBP	134.40	14.78	139.84	10.95	137.80	12.60
DBP	84.06	6.07	87.96	4.07	86.5	5.07
WAISTCIRCUMFERENCE	96.86	13.53	94.02	5.42	95.08	9.35
HDL	47.53	12.70	40.26	12.20	42.98	12.81
Triglycerides	148.80	23.24	149.54	18.17	149.26	20.08
FBS	116.63	20.45	116.88	21.92	116.78	21.252

Table 1: Descriptive Statistics of Components of Metabolic Syndrome

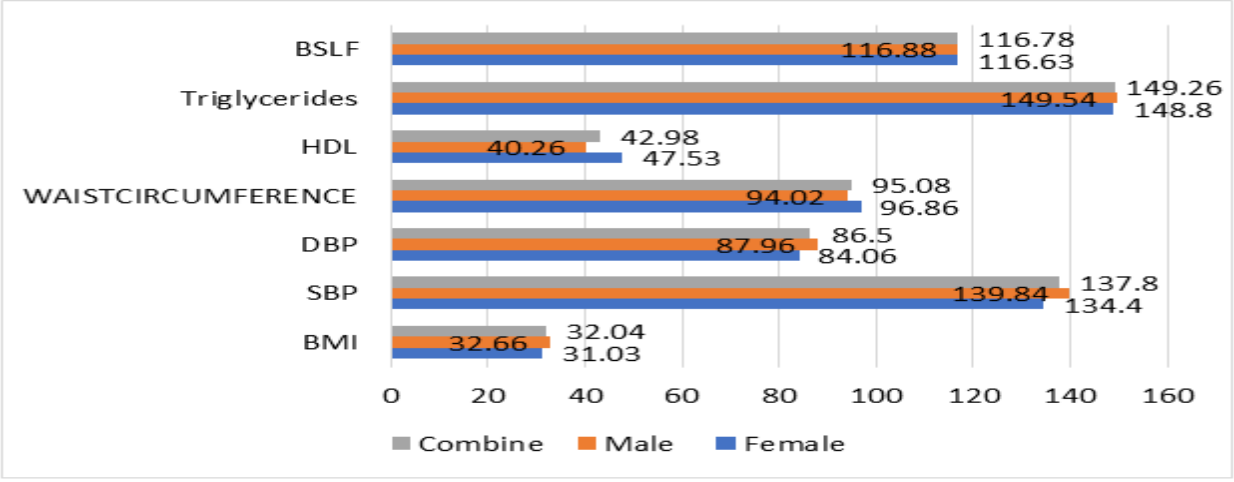

Fig 1

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In our present study of 80 patients of STEMI in metabolic syndrome, Mean value of SBP in males was 139.84 mm hg, while in females it was 134.40 mm hg, Mean value of DBP in males was 87.96 mm hg, while in females it was 84.06 mm hg, Mean value of WC in males was 94.02 cm, while in females it was 96.86 cm, Mean value of HDL in males was 40.26 mg/dl, while in females it was 47.53 mg/dl, Mean value of TG in males was 149.54 mg/dl, while in females it was 148.80 mg/dl, Mean value of FBS in males was 116.88mg/dl, while in females it was 116.63 mg/dl,

Parameters	**Men (n=63)**	**Women (n=25)**	**t value**	**Sig. (2tailed)**
Age (Years)	49.6±8.5	48.5±10.0	.538	.592
BMI	32.65±3.81	31.03±4.1	-1.759	..083
HB	13.29±1.00	13.44±1.35	.556	.580
POST PRANDIAL BSL (mg/dl)	199.42±40.5	214.86±40.51	1.721	.090
HBA1C	6.92±0.53	6.78±0.54	-1.165	0.248
TC/HDL ratio	5.23±1.77	4.34±1.44	-2.38	0.020
HDL/LDL	0.228±0.10	0.34±0.11	2.274	0.026
VLDL	57.78±7.39	55.40±5.69	-1.56	0.123
BUN	28.50±15.61	28.70±23.33	0.04	.965
Sr. creatinine	1.17±0.44	1.10±0.45	-.64	.520
LVEF	39.30±9.47	41.00±9.59	0.77	0.443
TAPSE	15.12±1.68	15.26±1.77	.366	.715
IVC size	20.54±3.57	20.23±3.23	-.39	.698

Table 2: - comparison of different parameters of patients STEMI in Metabolic syndrome.

In our present study of STEMI in Metabolic syndrome, there was statistically significant ($p<0.05$) mean difference of HDL, HDL/LDL ratio, TC/HDL ratio according to gender and there was statistically no significant ($p>0.05$) mean difference of age, BMI, triglycerides, WC, LDL, FBS.

Thrombolysed	OUTCOME of patients [n]		Total	OUTCOME of patients %		Total
	Death	Survive		Death	Survive	
Yes	9	39	48	11.25	48.75	60
N	4	28	32	5	35	40
Total	13	67	80	16.25	83.75	100

Table 3: - STATUS OF THROMBOLYSIS WITH OUTCOME OF PATIENTS

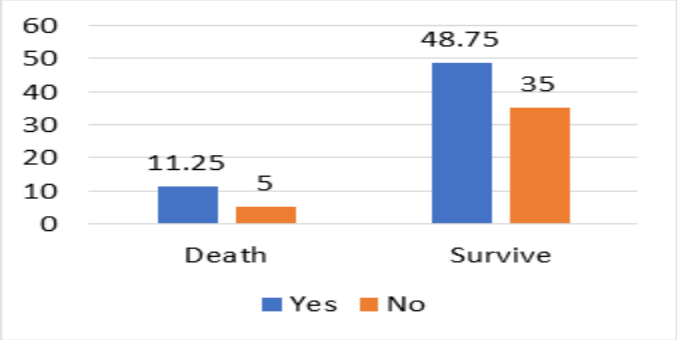

Fig 2

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In our present study of 80 patients STEMI in metabolic syndrome 60% patients who were thrombolysed, 49% patients had better outcome while 11% patients died.

Site of Infraction					P value
	AWMI [n]	ILMI [n]	IWMI [n]	LWMI [n]	
	30	2	28	20	
BMI ≥30 kg/m^2	24	0	18	18	0.015
FBS≥100mg/dl	24	2	23	18	0.723
TG≥150mg/dl	19	1	13	12	0.603
SBP≥135mmhg	21	2	22	13	0.586
DBP≥85mmhg	23	2	25	12	0.462
HDL-M<40mg/dl	12	1	15	10	0.329
HDL-F<50mg/dl	10	0	9	3	0.042
WC-M≥90cm	15	1	16	8	0.161
WC-F≥80	8	1	10	4	0.371
No. of patient died	7	1	3	2	0.263
Smokers	23	1	19	13	0.726

Table 4:- comparison of parameters of metabolic syndrome with site of infraction

In our study of 80 patients, STEMI in metabolic syndrome, patients whose BMI is ≥30 kg/m ,24[30%] patients having AWMI , while 18[22.5%]patients having IWMI and LWMI. Patients whose FBS is ≥100 mg/dl, 24[30%] has AWMI, while 23[28.5%] has IWMI and 18[22.5%] has LWMI. Patients whose TG is ≥150 mg/dl , 19[23.75%] has AWMI, while 13[16.25%] has IWMI and 12[15%] has LWMI. Patients SBP ≥135 mmhg, 21[26.25%] has AWMI, while 22[27.5%] has IWMI and 13[16.25%] has LWMI. Patients whose DBP is ≥85 mmhG, 23[28.5%] has AWMI, while 25[31.25%] has IWMI and 12[15%] has LWMI. Male Patients HDL <40 mg/dl , 12[15%] has AWMI, while 15[18.75%] has IWMI and 10[12.5%] has LWMI. Female Patients whose HDL is <50 mg/dl , 10[12.5%] has AWMI, while 9[11.25%] has IWMI and 3[3.75%] has LWMI. Male Patients whose WC is ≥90 mg/dl , 15[18.75%] has AWMI, while 16[20%] has IWMI and 8[10%] has LWMI. Female Patients whose WC is ≥80 mg/dl , 8[10%] has AWMI, while 10[12.5%] has IWMI and 4[5%] has LWMI. Out 0f 30 AWMI 7 died, whereas out of 28 IWMI patients 3 died and out of 20 LWMI 2 died. In our study 23 smokers had AWMI.

IV. DISCUSSION

In this study STEMI was most commonly observed in the age group of 51-60 years which was 46% which was similar in Virendra Dhakhada,et.al,2013.[8] In our study 63% were males and 37% were females which was similar in Virendra Dhakhada,et.al,2013[8]. In our study 38% had hypertesion which was similar to N.S Neki et al 2017 ,[9]. In present study history of diabetes mellitus was found in 22% of patients which was according to Mohammad azizul karim et al 2015,[10] 34% patients have sedentary lifestyle which was found in ADNAN NASIR,et al.2017[11]. 70% of patients had smoking as a risk factor.which was similar to study done by Santosh kumar sinha et al 2017 [12].

Prevalence of FBS in our study is 83.8 % which is in concordant with jover et al [13],hamrani et al[14]. Prevalence of TG in our study is 56.3% which is in concordant with pandit et al [15], kuk et al [16].Prevalence of HDL in our study is males 76% and female 73.33% which is in concordant with pandit et al [15], jover et al [13]. Prevalence of WC in our study is males 80% and female 80% which is concordant with Lee ,et al [17] ,Saukkonen et al [18].Prevalence of HTN in our study is 67.5% which is in concordant with pandit et al [15],kuk et al [16], Lee et al [17].

50% smokers have HDL value <40 mg/dl, which was found in study done by VENKATESAN,et al.2006 [19]. In our study cardiogenic shock was present in 8%Patients which was according to Krishnaraj S Rathod et al 2016[20]. 60% STEMI patients recived thrombolysis therapy out of which 49% patients had better outcome while 11% of the patients died inspite of receiving thrombolytic therapy which was in concordant with FTN Malik et al 2016 [21]

AWMI Patient has mean EF of 29% and IWMI patients has mean EF of 46% which was in concordant with McClements BM ,et al.2000 [22]. AWMI was found in 38% of patients with STEMI which was similar to study by Edward L Callachan et al 2017 [23] IWMI was observed in 35% patients with STEMI which was similar to study done by N.S Neki et al 2017 [9]

In the present study, mortality rate was 16.25%, maximum mortality among patients who had anterior wall myocardial infarction 7 patients, Maximum patients were in Killip Class II 38 patients,There were maximum deaths

among the STEMI patients in Killip class II ,6 patients, which was similar to study done by FTN Malik etal 2016[21], Hajizaden R et al 2016[24],Hirokazu Konishi et al 2014[25]

V. CONCLUSION

In our present study AWMI was most commonly seen in 37.5% patients and mean LVEF in AWMI is decreased than IWMI. The prevalence of FBS is 83.8%. TG is 56.3%, hypertension is 67.5 %, WC (males and females 80%), HDL (female 73.33%), HDL (males 76%), mean HDL in males is lower than mean HDL of females while HDL in females shows statistical significance with site of infraction. In our present study high TG level, raised total cholesterol and low HDL are positively corelated. Mortality rate was 16% in the present study with maximum mortality among patients who presented with AWMI (9%.), severity of STEMI in MS increases with increase in number of components involved in metabolic syndrome.

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