Original Article

Association between Myocardial Performance Index (Tei-Index) and Severity of Coronary Artery Disease in Patients with Non-ST Segment Elevation Acute Coronary Syndrome

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Abstract:

Background and objectives: Evaluation of ventricular systolic and diastolic functions is an essential part of echocardiographic evaluation in a patient of acute coronary syndrome (ACS). Myocardial Performance Index (MPI), also known as the Tei index, reflects both systolic and diastolic function of the left ventricle. The aim of this study was to see the association between myocardial performance index and severity of coronary artery diseases assessed by the gensini score (GS) in patients with non-ST segment elevation acute coronary syndrome. Methods: This cross-sectional study included a total 135 patients with NSTE ACS who underwent coronary angiography. MPI was measured using Pulse-Wave Doppler in all patients before coronary angiography. The patients were divided into three groups according to the Gensini score (GS); low GS < 19 (n=23); mid GS ≥19 and ≤96 (n= 76); high GS > 96 (n=36) on CAG. Baseline characteristics, MPI parameters & GS were then compared between the three groups. Results: MPI was obtained successfully in 135 patients. MPI parameter was significantly increased with increased GS. MPI was positively correlated with the GS (r = 0.40, p < 0.001) Binary logistic regression analysis showed that MPI was strongly associated of severity of coronary artery disease assessed by GS (β = 3.766, p < 0.001). Conclusion: Patients with NSTE-ACS with severe coronary artery disease may be identified by means of MPI measurement. Key words: Tei Index, Gensini Score, Non-ST Segment Elevation Acute Coronary Syndrome, Coronary Angiogram.

Key Words: **Tei-Index, Gensini score, NSTEACS**

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Introduction:

Ischemic heart disease is a major public health problem associated with high morbidity and mortality. Acute coronary syndrome is a common presentation of ischemic heart disease[1]. It is also the single largest cause of death in developed countries as well as developing countries[2]. Cardiovascular diseases (CVD) are a worldwide health epidemic[3] and a major barrier to sustainable human development[4]. Coronary artery disease (CAD) is leading cause of mortality worldwide and by the year 2020, will be first in the leading causes of disability[5].

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ACS remains a leading cause of mortality and morbidity in the Asia Pacific region. While much effort has been made over the last decade to improve disease management, high variability in management practices and outcomes between countries and regions is still prevalent[6].

Bangladeshis are unduly prone to develop CAD, which is often premature in onset, follows a rapidly progressive course and angiographically more severe[7]. The burden of CHD is emerging as a public health concern in developing countries like Bangladesh[8]. Acute Myocardial Infarction (AMI) is the leading cause of death in Bangladesh in the fourth decade of life and even in the younger individuals pointing to the serious health hazard as well as economic burden[9]. The exact prevalence of CAD in Bangladesh is not known. Probably the prevalence of IHD was first reported in 1976, which was 0.33%[9]. The prevalence of IHD was 3.3/1000[9]; 3.38/1000[10]; 13/1000[11]. As a result of socioeconomic transition, lifestyle, as well as, the dietary pattern is changing in Bangladesh. Increasing prevalence of obesity, tobacco use, high intake of processed foods and less physical activity accompany the transition[7].

The acute coronary syndrome (ACS) encompasses three disorders of related etiology. These are ST segment elevation Myocardial Infarction (STEMI), Non-ST segment Elevation Myocardial Infarction (NSTEMI) and Unstable Angina (UA). The pathogenesis of UA/ NSTEMI involves five non-exclusive causative factors of nonocclusive thrombus on pre-existing plaque, dynamic obstruction, progressive mechanical obstruction, inflammation, and secondary unstable angina associated with increased cardiac work load[12].

An invasive strategy in UA/NSTEMI results in a significant 33% relative risk reduction for both the end-points of refractory angina and rehospitalization at 6 to 12 months while a two fold increase in the risk of peri-procedural myocardial infarction. Now the challenge is early and non-invasive prediction of presence or absence of significant CAD to guide for choosing invasive modality so that more cardiac muscle can be salvaged or early discharge to reduce hospital burden[13].

Although conventional echocardiography is considered to be reliable for ventricular wall motion analysis, there is high interobserver and intraobserver variability[14]. In addition, poor temporal resolution of the human eye creates limitations for the accurate visual assessment of the longitudinal myocardial motion in detail[15]. Ventricular function is the best predictor of death after an acute coronary syndrome. It serves as a marker of myocardial damage, provides information on systolic function as well as diagnosis and the prognosis[16, 17].

Myocardial performance index (MPI) is a numeric value, which could be obtained by using cardiac time intervals. This numeric value is defined as the sum of isovolumetric contraction time (ICT) and isovolumetric relaxation time (IRT) divided by ejection time (ET) and could be calculated for each ventricle individually. Myocardial performance index has been described as a Doppler index of combined systolic and diastolic myocardial performance in patients with primary myocardial systolic dysfunction. It is considered as a reliable parameter to assess global left ventricular function[18]. Normal value of MPI is d" 0.4[19]. The Tei index evaluates the LV systolic and diastolic function in combination and correlates well with invasive measures of systolic and diastolic LV function, and has been reported to correlate better with patient outcome than conventional echocardiographic parameters in various myocardial diseases[20]. The Tei index appears to have close correlation with the widely accepted systolic and diastolic hemodynamic parameters[21] as well as potential for clinical application in the assessment of overall cardiac performance[20, 21, 22] .

Echocardiography is a unique and sensitive tool for early detection of myocardial ischemia. Evaluation of ventricular systolic and diastolic functions is an essential part of echocardiographic evaluation in a patient of acute coronary syndrome. It is a reliable index of myocardial performance (The Tei Index/ Myocardial Performance Index) is a reliable index for evaluation of LV systolic and diastolic performance in acute coronary syndrome[23]. Ejection fractions, the most reliable estimator of systolic function, are prone to significant inaccuracies when the elliptical cardiac chamber is transformed to a spherical one. On the other hand, transmitral flow, which is the most frequent method for evaluation of diastolic function, is dependent on age, heart rate, as well as loading conditions[24].

It is more reflective of overall cardiac function than systolic or diastolic function alone, and applied to independently assess the myocardial performance of left and right ventricles[22, 25, 26]. MPI has since been studied in several other cardiac disorders including heart failure, myocardial infarction (MI), systemic hypertension (HT), and diabetes mellitus (DM) and found to predict both worsened morbidity and mortality[24,27] .

Therefore, in this study my aim was to evaluate whether myocardial performance index (MPI) measured by conventional Doppler method is associated with severity

of coronary artery disease in NSTE ACS. This modality of noninvasive imaging has not been evaluated for coronary artery disease (CAD) especially NSTE ACS population of Bangladesh. Hopefully, the findings of myocardial performance index (MPI) will help us to diagnose CAD noninvasively in an appropriately selected patient for planning further management.

Materials and Methods:

This cross sectional study was carried out at the Department of Cardiology of the National Heart Foundation Hospital and Research Institute, Mirpur, Dhaka from August, 2017 to July, 2018. Study Population was patients with NSTE-ACS who were get admitted at National Heart Foundation Hospital and Research Institute. Considering inclusion and exclusion criteria a total of 135 consecutive patients were considered with NSTE-ACS. Patients were divided into three groups on the basis of Gensini score.

In Group I (Low-GS,<19): 23 Patients were enrolled.

In group II (Mid-GS, ≥19 to ≤96): 76 Patients were enrolled.

In Group III (High-GS,>96): 36 Patients were enrolled.

Enrolment of Subjects:

Inclusion Criteria:

1. Clinical diagnosis of NSTE-ACS.
2. Patient who underwent coronary angiography.

Exclusion Criteria:

1. Age< 18 years,
2. Severe valvular heart disease or congenital heart disease,
3. Past History of old myocardial infarction and PTCA or CABG,
4. Atrial fibrillation with heart rate > 100 beats/min or other continuous arrhythmia,
5. NYHA class-III / IV Heart failure or haemodynamically unstable patients,
6. Inadequate echo window for analysis of myocardial Performance Index (Tei-Index),
7. Patient who did not give consent.

Methodology:

135 patients who were admitted at National Heart Foundation Hospital & Research Institute, Dhaka for Non ST Elevation Acute Coronary Syndrome (Unstable angina, NSTEMI) were included in the study after fulfilling the inclusion and exclusion criteria. Informed consent was taken from each subject before enrolment. Meticulous history was taken and detailed clinical examination was performed in each patient. Demographic data such as age, sex, height (cm), weight (Kg) were noted. Risk factors were recorded for all patients. Patients baseline 12 lead ECG was performed. Blood sample was taken for all Haematological and Biochemical parameters. Echocardiographic assessment was done. CAG was performed. After performing CAG according to the Gensini scoring system, the degree of coronary stenosis was classified as follows: mild lesions, one to six points; moderate lesions, seven to 13 points; and severe lesions, >13 points. Patients were divided into tertiles according to the GS: low GS <19; mid GS ≥19 and ≤96; and high GS > 96 points.

Data collection:

Data were collected in a predesigned data collection form.

Statistical analysis:

After processing of all available data, statistical analysis of their significance was done. Obtained data were expressed in frequency, percentage, mean and standard deviation as applicable. Comparison between groups was done by Student's t-test for continuous variables. Categorical data were analyzed by chi-square test. Analysis of variance (ANOVA) was performed to test if the MPI varied with increasing severity of CAD defined by Gensini Score. Logistic regression was performed in order to adjust for baseline characteristics (Age, Family H/O IHD, Diabetes Mellitus, Hypertension, Smoking, Dyslipidaemia, and increased BMI) for the assessment of the independency of MPI parameters associated with CAD. The whole analysis was done with the help of computer based SPSS (Statistical Programme for Social Science) Programme version 16. P-value of <0.05 was considered significant

Observation and Results

The main objective of the study was to assess the association between the MPI severities of CAD patient with NSTE acute coronary syndrome. Considering inclusion and exclusion criteria a total of 135 consecutive patients were considered with NSTE-ACS were studied. Observation and results were presented in different tables and diagrams.

Age Distribution of Patients (n=135).

Table-I
Age Distribution of Study Population (n=135).

Age group (years)	Frequency	Percent%
25 – 40	18	13.3
41 – 50	39	28.9
51– 60	55	40.7
61 – 78	23	17.0
Mean±SD	52.5±.9.9	

Table-I showing, this study population had predominance of age group of 51 to 60 years. Mean age was 52.5 ± 9.9 years.

Sex Distribution of Patients (n=135).

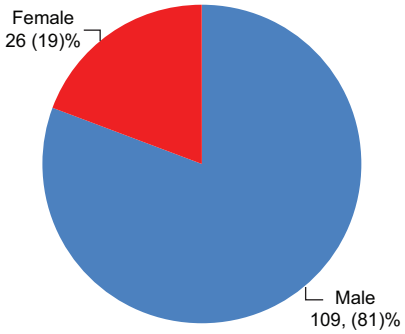

Fig.-1: *Sex Distribution of study population*

This study was male predominant, of all patients, 80.7 % was male and 19.3 % was female.

Pattern of Risk Factor of study population.

Table-II
Pattern of Risk Factor of study population (n=135).

	N	Percent %
Hypertension		
Yes	83	61.5
Diabetes Mellitus		
Yes	68	50.4
Dyslipidaemia		
Yes	46	34.0
Smoking		
Nonsmoker	59	43.7
Smoker	39	28.9
Ex-smoker	31	23.0
Tobacco	6	4.4
Family History of IHD		
Yes	29	21.5
Grouping according to BMI(kg/m2)		
Under weight(≤18.50)	1	0.8
Normal range (18.50 - 24.99)	61	45.2
Overweight (≥25.00 - 29.99)	60	44.4
Obese (≥30.00)	13	9.6

Table-II showing, among risk factors for ischemic heart diseases, this study found diabetes mellitus in 50.4%, dyslipidaemia in 34.0%, and hypertension in 61.5% of study population. 56.3 % had ever history of smoking and 54.0% had BMI more than that of normal range.

Specific diagnosis of NSTE ACS (n=135).

Table-III
Confirmed Diagnosis of study population (n=135).

Diagnosis	Frequency	Percent %
NSTEMI	84	62.2
UA	51	37.8

Table-III showing, of all study patients with clinical diagnosis of NSTE ACS, 62.2% had confirmed NTSEMI and 37.8% had Unstable Angina.

Echocardiographic Findings

Presence of Regional Wall Motion Abnormality (RWMA) (n=135).

Table-IV
Presence of RWMA in study population

RWMA	Frequency	Percent %
Yes	86	63.7

Table-IV showing, among the study population, 63.7% of all study patients had wall motion abnormalities.

Tei-Index according to the age groups (n=135).

Table-V
Tei Index of age groups in study population

Age groups in years	Tei-index		p value
	Mean	SD	
25 – 40 (n=18)	0.59	0.15	
41 – 50 (n=39)	0.62	0.15	
51– 60 (n=55)	0.63	0.20	0.41^{NS}
61 – 78 (n=23)	0.69	0.19	
Mean±SD	0.63±.0.18		

Anova test was done.

S = Significant; NS=Not significant (p>0.05).

Table-V showing, Myocardial Performance Index (Tei-Index) of specific age group of this study population with mean Tei Index was 0.63± 0.18.

Coronary Angiogram

Gensini Score according to the age groups (n=135).

Table-VI

Gensini Score of age groups in study population

Age groups in years	Gensini Score		p value
	Mean	SD	
25 – 40 (n=18)	66.6	63.4	0.24^{NS}
41 – 50 (n=39)	90.7	63.9	
51– 60 (n=55)	69.8	50.0	
71 – 78 (n=23)	88.0	63.9	
Mean±SD	78.54±58.79		

Anova test was done.

S = Significant; NS=Not significant (p>0.05).

Table-VI showing, Gensini Score was divided among the study population with mean value of the Study and mean Gensini score was 78±58.79.

Distribution of the study population by Gensini Score (n=135).

Table-VII

Group distribution according to Gensini Score in study population

Gensini Score	Frequency	Percent%
Low-GS (<19)	23	17.0
Mid-GS (≥19 to ≤96)	76	53.3
High-GS (>96)	36	26.7
Mean±SD	66.4±53.8	

Table-VII showing, The study population was divided in to three groups according to the Gensini Score and found that highest population in Mid-GS (e”19 tod” 96) group with mean GS was 66.4±53.8.

Comparison of baseline parameters within angiographically allocated groups.

Table-VIII

Age distribution of the study population according to Gensini score (n = 135).

Age groups	Gensini Score group			P value
	Low-GS(<19) (n=23) No. (%)	Mid-GS (≥19 to ≤96) (n=76) No. (%)	High-GS(>96) (n=36) No. (%)	
	No. (%)	No. (%)	No. (%)	0.13^{NS}
25 – 40 (n=18)	7 (30.4)	6 (7.9)	5 (13.9)	
41 – 50 (n=39)	6 (26.1)	20 (26.3)	13 (36.1)	
51– 60 (n=55)	7 (30.4)	36 (47.4)	12 (33.3)	
61 – 78 (n=23)	3 (13.0)	14 (18.4)	6 (16.7)	

Anova test was done.

S = Significant; NS=Not significant (p>0.05).

The above table depicts that the patients having high Gensini Score belonged to the higher age range of years but the association did not reach the statistical level of significance (p=0.13).

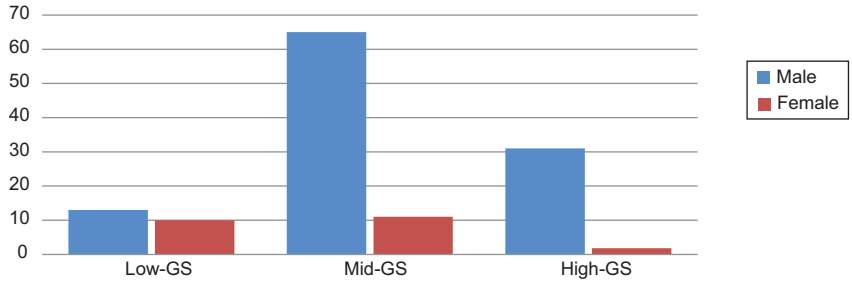

Fig.-2: *Sex distribution of the study population according to Gensini score (n = 135).*

Chi Square test was done.

S= significant (p<0.05); NS=Not significant.

The graph shows that the male patients having high Gensini Score were more than that of female patients and the association reached the statistical level of significance (p=0.005).

Table-IX

Distribution of the study population according to diagnosis (n = 135)

Diagnosis	Gensini Score group			P value
	Low-GS(<19) (n=23) No. (%)	Mid-GS (≥19 to ≤96) (n=76) No. (%)	High-GS(>96) (n=36) No. (%)	
NSTEMI (n=84)	16 (26.1)	53 (69.7)	25 (69.4)	<0.001^{S}
UA (n=51)	17 (73.9)	23 (30.3)	11 (30.6)	

Chi Square test was done.
S= significant (p<0.05); NS=Not significant.

Table-X

Summary of risk factors distribution in between groups (n = 135)

Risk Factors	Gensini Score group			P value
	Low-GS(<19) (n=23) No. (%)	Mid-GS (≥19 to ≤96) (n=76) No. (%)	High-GS(>96) (n=36) No. (%)	
Hypertension (n=83)	12 (52.2)	47 (61.8)	24 (66.7)	0.53^{NS}
Smoking (n=76)	12 (52.2)	38 (50.0)	26 (72.2)	0.07 ^{NS}
Diabetes mellitus (n=68)	10 (43.5)	43 (56.6)	15 (41.7)	0.26 ^{NS}
F/H of IHD (n=29)	4 (17.4)	15 (19.7)	10 (27.8)	0.54 ^{NS}
Dyslipidaemia (n=8)	10 (43.4)	28 (36.8)	8(22.2)	0.54 ^{NS}
BMI (Mean±SD)	26.4±4.2	25.7±3.3	25.4±2.9	0.53 ^{NS}

Chi Square and ANOVA test were done.
S = Significant; NS=Not significant (p>0.05).

Table-XI

Distribution of the study population according to RWMA (n = 135)

RWMA	Gensini Score group			P value
	Low-GS(<19) (n=23) No. (%)	Mid-GS (≥19 to ≤96) (n=76) No. (%)	High-GS(>96) (n=36) No. (%)	
Yes (n=86)	4 (17.4)	52 (68.4)	30 (83.3)	<0.001^{S}
No (n=49)	19 (82.6)	24 (31.6)	6 (16.7)	

Chi Square test was done.
S= Significant (p<0.05); NS=Not significant.

The above table shows that the patients with NSTEMI belonged to more higher Gensini Score than that of patients with UA with statistically significant association (p<0.001).

The above table projects that there were no significant association/difference between risk factors and the severity of CAD in terms of grouping of Gensini Score (p>0.05).

The above table indicates that the patients with RWMA belonged to higher Gensini Score and the association reached the statistical level of significance (p<0.001).

Table-XII

Mean Tei-index of the study population by Gensini Score (n=135).

Parameters	Gensini Score			P value
	Low-GS(<19) (Mean±SD)	Mid-GS (≥19 to ≤96) (Mean±SD)	High-GS(>96) (Mean±SD)	
MPI(Tei Index) Mean±SD	0.58±0.17	0.61±0.16 0.63±0.18	0.71±0.19	0.006 S

ANOVA test was done.
S= Significant (p<0.05); NS=Not significant.

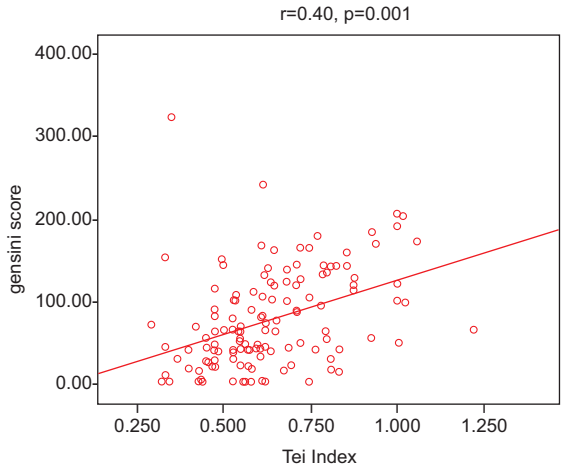

Fig.-3: *Scatter diagram showing correlation between Tei-index and Gensini score (n=135).*

Table-XIII

Binary logistic regression analysis for CAD severity (Gensini Score) with confounding factors (n=135).

Variables of interest	Constant (B)	Standardized coefficient (β)	Odds Ratio (OR)	95% CI of OR	p value
Age (>50 years)	- 4.889	0.124	1.107	0.072 – 1.718	0.17NS
Smoking		0.948	2.58	1.027 – 6.498	0.04S
Hypertension		0.228	1.256	0.504 - 3.130	0.62NS
Diabetes mellitus		-0.813	0.44	0.176 – 1.117	0.08 NS
Family H/O IHD		0.334	1.39	0.488 – 3.990	0.53NS
Dyslipidemia		0.896	2.45	0.429 – 14.057	0.31NS
Increased BMI		0.001	0.99	0.875 – 1.142	0.99 NS
RWMA (Present)		1.345	3.84	1.365 – 10.805	0.01S
Increased MPI		3.766	43.20	3.444 – 542.030	0.004S

S= Significant (p<0.05); NS=Not significant (p>0.05).

The above table displays that Tei-index is increasing as well as Gensini score is also increasing with statistically significant difference (p=0.006).

The figure shows that there is a moderate positive correlation between Myocardial Performance Index (Tei-index) and coronary artery disease severity in terms of Gensini score (r=0.40). It was observed that the Pearson's correlation statistically significant (p=0.001) by correlation t-test.

The above table provides the binary logistic regression analysis of Odds Ratio for characteristics of the subjects

likely to develop Coronary Artery Disease. The above mentioned variables of interest are all entered into the model directly as confounding independent exposures for the developing CAD (dependent variable). The variables smoking, RWMA and increased MPI were found to be significantly associated with CAD severity with the ORs being 2.58, 3.84 and 43.20 respectively.

Discussion:

To our knowledge, this study is the first to evaluate Myocardial Performance Index (Tei Index) as an early method to identify patients with significant coronary artery stenosis in a population with NSTE-ACS in Bangladeshi population.

In present study mean age of patients were 52.5 ± 9.9 years. The commonest age group of study patients was 51 to 60 years in all groups with or without severity of CAD. [30.4%, 47.4% and 33.3% in group I (Low-GS) group II (Mid-GS) and group III (High-GS) respectively]. Mean age difference was not statistically significant (p=0.33). Nearly similar pattern of age distribution was reported by in a study in Bangladesh[28]. But there was difference in mean age with different studies done in home and abroad, 45.5±26.1years[29], 48.96±7.30years[30], 60.1±11years[31], 57.3±6.2years[32]. Most probably this was due to the late onset of atherosclerotic coronary artery disease in developed countries than that of a third world country population.

Most of the patients (80.7 %) were male and (19.3 %) patients were female in this study. Male & female ratio was 4.2:1 in the whole study population, which indicates that male patients were predominant in this study. In Bangladesh & abroad, the various studies showed, the female patients formed a small percentage, 20 percent[32], 30 percent[31], 49 percent[30] female patients in their respective studies. The present study showed that, the male patients having high Gensini Score were more than that of female patients and the association reached the statistical level of significance (p=0.005) [male vs female, 56.5% vs 43.5% in group-I (Low-GS), 85.5% vs 14.5% in group-II (Mid-GS) and 86.1% vs 13.9% in Group III (High-GS)].

There was significant difference in clinical presentation. NSTEMI was the predominant presentation (69.7%) in Group – II (Mid-GS) and (69.4%) in Group III (High-GS), but unstable angina was main presentation (73.9%) in group I (Low-GS) (p<0.001).

There were similar type of risk factors like diabetes, hypertension, smoking, dyslipidaemia, obesity and family history of IHD in all three groups. Overall prevalence of DM was 50.4 % [43.5% in group-I (Low-GS), 56.6% in group-II (Mid-GS) and 41.7% in Group III (High-GS)].

Hypertension, present in 61.5% of total study population [52.2%, 61.8%, 66.7% group-I (Low GS), group-II (Mid-GS), group III (High-GS) respectively]. Dyslipidaemia, present in 34.0% of total study population [43.4%, 36.8%, 22.2% group-I (Low GS), group-II (Mid-GS), group III (High-GS) respectively]. Positive history of smoking, present in 56.3% [52.2% in group-I (Low-GS), 50% in group-II (Mid-GS) and 72.2% in Group III (High-GS)]. Obesity [BMI was 26.4 ± 4.2 kg/m^2 in group-II (Mid-GS), 25.7±3.3 kg/m^2 in group-II (Mid-GS), 25.4±2.9 in group III (High-GS)] and family history of CAD [17.4%in group-II (Mid-GS), 19.7%in group-II (Mid-GS), 27.8% group III (High-GS)]. It was found no statistical significance difference of risk factors among three groups[33].

MPI, also known as the Tei index, reflects both systolic and diastolic function of the left ventricle. MPI is calculated using the formula: (IVCT + IVRT) " ET[23]. During the acute phase of an AMI, IVCT and IVRT increase, and when clinical heart failure becomes apparent, the ET decreases. As a result, MPI increases[34].

Abaci, et al., (2017) denoted that, There are two treatment strategies for patients with NSTEMI: invasive and conservative. Determination of the number of diseased coronary arteries is important in the decision-making process when selecting the course of treatment. The severity of coronary artery disease is associated with mortality in patients with acute coronary syndromes. In the early period of NSTEMI, measurement of MPI may be useful in the decision making process, for selecting the course of treatment and risk stratification[33]. Echocardiographic assessment of LV systolic function plays pivotal role in the diagnosis, risk stratification and therapeutic guidance of proven medical and interventional therapy in patient with suspected or known cardiac disease[35]. EF has been widely used for decades for overall ventricular systolic function and has a central role in many guidelines. EF has a number of important limitations. Some of these such as the calculation of ejection fraction using a variety of geometric assumptions, as well as the error introduced by tangential to mographic planes, generally pose a greater problem to the evaluation of LV volumes than EF[36].

In this study, the mean Tei-Index of study population was 0.63±0.18 [0.58±0.17 in group-I (Low-GS), 0.61±0.16 in group-II (Mid-GS) and 0.71±0.19 in Group III (High-GS)] showing that Tei-index is increasing as well as Gensini score is also increasing with statistically significant

difference (p=0.006). On the other hand in two studies, they found the mean MPI was 0.45 ± 0.106[37] and 0.48 ± 0.09[38] respectively, which is lesser with the current study. This apparent discrepancy may be explained by the homogeneity of the studied population.

In the present study, Correlation analysis was performed to investigate the relationship between the MPI, and GS. MPI was positively correlated with GS(r=0.40. p=0.01). Similarly MPI was positively correlated with GS(r = 0.47, p < 0.001)[33]. Binary logistic regression analysis for CAD severity (Gensini Score) with confounding variables was done in this study. Age, Smoking, Hypertension, Diabetes Mellitus, Family H/O IHD Dyslipidaemia, Increased BMI, RWMA (Present), MPI, variables of interest are all entered into the model directly as confounding independent exposures for the developing CAD (dependent variable). It denotes that the MPI were found to be significantly associated with CAD severity with the ORs was 43.20(ß=3.766. p=0.004).

Conclusion:

The present study showed that MPI (Myocardial Performance Index) was strongly associated with GS (Gensini Score) in patients with NSTE-ACS. MPI is significantly increased with significant CAD in patients presenting with NSTE-ACS patients. MPI measurement can be effective in assessing the severity of CAD patients with NSTE-ACS and planning strategies for their treatment like early revascularization or early hospital discharge as well as risk stratification. Therefore, MPI measured by conventional spectral Doppler method might play a role in the initial triage of patients with NSTE- ACS.

Study Limitations

Although the result of this study supports the hypothesis, there were some limiting factors which might have an effect on the results:

- This study was conducted in only one center (Department of Cardiology of the National Heart Foundation Hospital and Research Institute, Mirpur, Dhaka).
- The majority of study population was male. Thus, these results need to be re-evaluated in other health care center by inclusion of male and female in large numbers.
- The study period was short.

Recommendations

- In our country perspective, Doppler derived Myocardial Performance Index (MPI) is a commonly available tool that helps for evaluation and to see prognosis in acute MI patients. MPI have an impact over left ventricular systolic function as well as in diastolic function in patients with Non-ST elevation myocardial infarction. MPI can give a warning about the outcomes of the patients after NSTEMI. Very few studies were conducted regarding Non-ST elevation myocardial infarction. As, left ventricular systolic and diastolic function was correlated well with MPI level; So, MPI alone can serve dual purpose – for both diagnosis and prognosis of NSTEMI Patients.
- The study also recommends that aggressive treatment strategy including early PCI and closer surveillance should be offered to NSTEMI patients with high MPI levels, as these patients are more prone to develop long term complications like heart failure, arrhythmia and even sudden cardiac death.
- The result of this study needs further confirmation in a randomized large scale, multicenter prospective cohort study.

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