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A study of plasma fibrinogen and cardiovascular risk factors in STEMI subjects

Ankita Sharma[1], Neetesh Kumar Gupta[2*], Sarla Mahawar[3], Deepa Thadani[4], GG Kaushik[4]
[1] Assistant Professor, J. L. N. Medical College, Ajmer, Rajasthan, India
[2] Biochemist, Department of Biochemistry, J. L. N. Medical College, Ajmer, Rajasthan, India
[3] Professor and Head, Department of Biochemistry, J. L. N. Medical College, Ajmer, Rajasthan, India
[4] Senior Professor, Department of Biochemistry, J. L. N. Medical College, Ajmer, Rajasthan, India

Abstract
The aim of this study was to examine the levels of plasma Fibrinogen and their association with cardiovascular risk factors in STEMI subjects. 110 STEMI subjects and 110 helthy controls of either gender were included in the study and found that Fibrinogen was associated with traditional cardiovascular risk factors. Elevation of fibrinogen may provide a mechanism for risk factors to exert their effect. Also, fibrinogen levels were higher among subjects with cardiovascular disease compared with those without disease. In addition, these outcomes and different perceptions from ongoing investigations recommend that assessment of the fibrinogen level during MI could be valuable for recognizing patients at higher danger for future intense cardiovascular occasions.

Keywords: STEMI, BMI, SBP, DBP

Introduction
Fibrinogen was delegated a sinewy protein with 340 kDA glycoprotein which needed for hemostasis, wound mending, aggravation, angiogenesis and other body capacities. This is a dispersible macromolecule however when respond with thrombin convert into fibrin which isn't dispersible and acted by an enzymatic pathway. The fibrin coagulation is important to forestall blood misfortune and wound recuperating. Fibrinogen is additionally essential for hemostasis in which platelet aggragation occour at the site of injury [1]. Numerous explores propose that apoplexy, endothelial brokenness and aggravation are identified with heart sicknesses. 'Northwick Park Heart Study' revealed that expanded degrees of fibrinogen, factor VII, factor VIII and von Willebrand factor (vWf) anticipated future coronary illness [2]. Cardiovascular illnesses caused around 33% passings worldwide [3] in which ischemic coronary illness is generally boundless. [4] In 21st centuary this infection became significant danger factor. [5] Numerous individuals live with nondestructive ischemic coronary illness and weakened personal satisfaction. [6] Generally 70% of patients have various danger factors for IHD and 2-7% has no danger factors [7].

Materials and Methods
Subjects
The current examination was led on patients of Ischemic Coronary Disease (STEMI) conceded or going to in Department of Cardiology, J.L.N. Medical College, Ajmer. Conclusion of Ischemic Coronary illness was confirmed after assessment of ST section in Electrocardiogram (ECG) by experienced cardiologists. The subjects remembered for the examination were 110 patients experiencing ST segment elevated myocardial infarction. 110 healthy control subjects of same age gathering of either gender were chosen for the examination. Consent from every one of the subjects was taken for the investigation. Perplexing variables which could meddle in the biochemical investigation of study subjects and change the outcomes were taking anti-hypertensive medications particularly mitigating drugs, subjects with past history of Ischemic Coronary Illness, subjects on oral anticoagulants, subjects with Kidney and Liver illnesses, patients experiencing Diabetes Mellitus, Malignant growth and Thyroid illness, women on chemical substitution treatment, subjects with some other Immune system illnesses and pregnant ladies etc. were excluded from the study.

Measurements
People who were able to get subject of this examination were told about the pre insightful factors. Venous blood sample was taken by aseptic method and gathered in tubes containing Potassium Ethylene Di-amine Tetra Acidic Acid (2% K2 – EDTA) as anticoagulant for plasma separation. Plasma was isolated by centrifugation at 2500 RPM for 10 minutes. Aliquots of tests were set up by moving them into independent plain vials. These were marked appropriately and put away at – 20^0C until measured. Plasma Fibrinogen were measured by ELISA technique[8] using Biorad ELISA reader.

Data analysis
The results were presented as Mean ± SD for all quantitative parameters. Correlations between variables were tested using the Pearson's correlation test. Statistical analysis was considered to be statistically significant at $p < 0.05$.

Results
In the present study we found increased BMI (27.2 ± 1.14), SBP (162 ± 8.03), DBP (110 ± 3.25) and plasma Fibrinogen (530 ± 32.3) levels in STEMI subjects when compared to healthy control

subjects (Table-1).

Table 1: Various parameters of Cases and Controls.

S. No.	Parameter	Control subjects [Mean ±S.D.]	STEMI subjects [Mean± S.D.]
1.	Weight (in Kg)	65 ± 2.57	75.6 ± 2.72
2.	Height (in cm)	168 ± 2.58	165 ± 2.88
3.	BMI (Kg/m^2)	23.1 ± 1.05	27.2 ± 1.14
4.	SBP (mmHg)	116 ± 7.35	162 ± 8.03
5.	DBP (mmHg)	82.7 ± 7.79	110 ± 3.25
6.	Fibrinogen (mg/dL)	278 ± 48.6	530 ± 32.3

Table 2: shows a positive significant correlation of Plasma Fibrinogen with SBP (0.35), DBP (0.48) and BMI (0.63) in STEMI subjects (Figure 1, 2, 3).

Parameters	r-value	p-value	Significance*
SBP	0.35	<0.0001	HS
DBP	0.48	<0.0001	HS
BMI	0.63	<0.0001	HS

Table 2: Correlation of Plasma Fibrinogen with various parameters in STEMI subjects

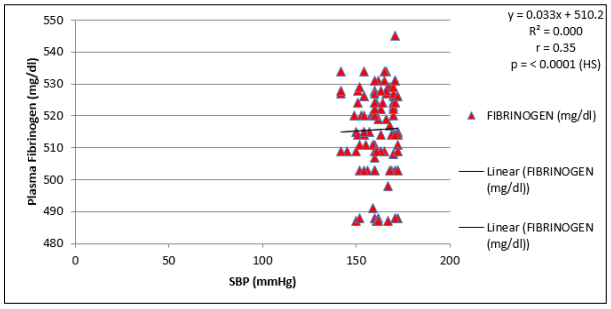

Fig 1: Correlation between Plasma Fibrinogen and SBP in STEMI subjects

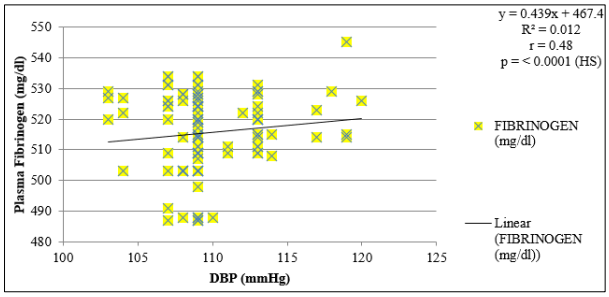

Fig 2: Correlation between Plasma Fibrinogen and DBP in STEMI subjects

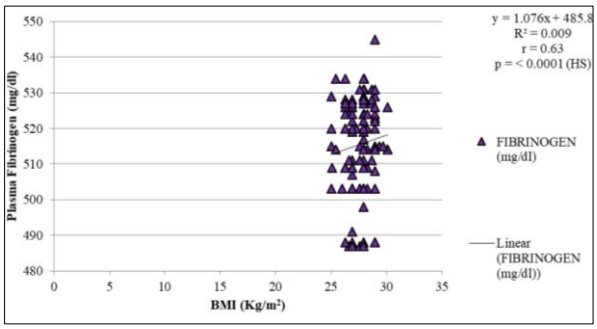

Fig 3: Correlation between Plasma Fibrinogen and BMI in STEMI subjects

Discussion

Ischemic coronary illness additionally called as coronary illness or coronary artery sickness, utilized for heart issues because of limited coronary courses that supply blood to the heart muscle. It could be occour by blood clump or tighting of arteries, routinely it is a development of plaque, which is called atherosclerosis. At the point when the blood supply to the heart muscle is totally impeded, the heart muscle cells dies which named as Myocardial Infarction.

It is accounted for in the current examination that BMI was fundamentally higher in STEMI subjects contrasted with control subjects. Profoundly Significant distinction (p=0.0001) was found between STEMI group when contrasted with controls. Whereas [9]Gin J et al (2020) reported that NSTEMI was more predominant across all BMI bunches contrasted with STEMI. NSTEMI was more common (STEMI less predominant) in both the obese and overweight gatherings when contrasted with the ordinary BMI bunch. There was no significant distinction in the commonness of NSTEMI or STEMI among obese and overweight BMI classes.

Present study revealed that SBP was higher in STEMI subjects contrasted with control subjects. Exceptionally significant level (p=0.0001) was found between STEMI gathering contrasted with controls. As we estimated DBP, found fundamentally higher in STEMI compared with control subjects. A significant distinction (p=0.0001) was found between STEMI group and controls. Despite the fact that hypertension is a chief danger factor for cardiovascular end focuses, proof in regards to its position in the assessment of patients with ACS has not given clear-cut results. Apparently hyper-tension may act in a cardioprotective manner at times, for example, the intense period of a MI when hypertensive patients seem to have better in-hospital anticipation. It very well might be hypothesized that an affirmation systolic BP more than 110 mm Hg and a diastolic BP not <70 mm Hg preceding release are related with better long-term guess of these patients. Regardless, it ought to be brought up that great long-term BP control undeniably started preceding release and is expected to lessen resulting occasions [10].

In the current evaluation plasma Fibrinogen levels were totally higher in STEMI subjects contrastingly comparable to control subjects. An essential significance (p=0.0001) of plasma Fibrinogen levels was found between the considered investigation group. Fibrinogen levels assume a basic part in both blood cluster arrangement and vascular divider inflammation while hereditary heterogeinity between people further decides defenselessness to CAD [11, 12]. In the Northwick Park Heart Study [2], fibrinogen had all the earmarks of being pretty much as viable as total cholesterol in foreseeing future danger of coronary illness. In the European Concerted Action on Thrombosis and Disabilities Angina Pectoris Study, [13] more elevated levels of fibrinogen anticipated resulting intense coronary conditions while lower levels, regardless of raised cholesterol levels, were related with lower dangers of intense coronary conditions.

As such in STEMI subjects a positive significance relationship of plasma Fibrinogen with BMI (p=0.0001), SBP (p=0.011), DBP (p=0.0011) was found in our assessment. A few examinations have discovered fibrinogen to be an autonomous danger factor for coronary supply route sickness [14, 15].

Conclusion

Fibrinogen was associated with traditional cardiovascular risk factors. Elevation of fibrinogen may provide a mechanism for risk factors to exert their effect. Also, fibrinogen levels were higher among subjects with cardiovascular disease compared with those without disease. In addition, these outcomes and different perceptions from ongoing investigations recommend that assessment of the fibrinogen level during MI could be valuable for recognizing patients at higher danger for future intense cardiovascular occasions. This may have clinical and down to earth suggestions on the administration of MI in the population and further examinations are justified in this specific situation.

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