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FIBRINOGEN LEVELS AMONGST PATIENTS SUFFERING FROM VASCULOPATHY-IHD/STROKE/DVT: A NOVEL RISK FACTOR

Dr. Sunil Agarwal[1], Dr. Deepak Kamat[2], Dr. Pooja Shah[3], Dr. Rahul Kunkulol[4]
[1] Assistant Professor, MIMER Medical College, Talegaon, [2] Associate Professor,[3] Resident, [4]Professor, Rural Medical College, Pravara Institute of Medical Sciences (Deemed to be University)

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Corresponding author
Dr. Deepak Kamat*

ABSTRACT

ORIGINAL RESEARCH ARTICLE

Recently, research is underway and many other factors are being identified to mention Fibrinogen (Fi) as a likely novel risk factor for vasculopathies. It is Likely that with higher fibrinogen levels in the blood, local deposition of fibrin may be more pronounced and fibrinolysis poorer so it helps in thrombosis. Hence, this study was undertaken to study the prevalence of new risk factor (Fibrinogen) in the general population (both young and old) and also to find out the difference in prevalence rates (if any) in the young (less than 45 years of age) and in the elderly (more than 45 years of age).

This was the case-control study done in the cardiology unit of Bharti Hospital, Pune. All the patients diagnosed as cases of vasculopathies especially IHD/ Stroke/ DVT (n=75) were enrolled as cases for the study and Healthy volunteers of the same age and gender-matched (n=75) were enrolled as the controls and subjected to the following inclusion and exclusion criteria. All cases and controls were assessed for their fibrinogen level at day 0 of the admission by using a Fibrinogen testing kit. The mean fibrinogen level of 357.5867 mg/dl (36.5218) in vasculopathy cases whereas 310.2800 mg/dl (27.6100) in controls with a statistically significant p-value by unpaired 't' and Mann- Whitney statistics.62% Cases had Fibrinogen level above 350mg/dl in comparison only 10% controls had levels above 350mg/dl. On comparing fibrinogen individual vasculopathy, it was found that fibrinogen was a more significant risk factor in stroke >DVT> IHD.

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INTRODUCTION:

Atherosclerotic disease involving the coronary, peripheral, and cerebrovascular systems continues to be a major health problem in the adult population both in developed and developing countries. The decline in the incidence of coronary artery disease in developed countries is due to control of conventional risk factors (e.g. smoking, lipids, alcohol consumption, diabetes mellitus, hypertension, obesity, etc).[1]However, despite aggressive control of risk factors in the

general population, it has not been possible to prevent or halt the progression of coronary artery disease or cerebrovascular stroke in all patients.

Although vasculopathy incidence rises with increasing age, vasculopathy in the young is important as it differs in etiology and management and plays a very important role in any country's progress, much more so in a developing nation like ours.[2] The cause of coronary artery disease in young adults is not known. Coronary artery disease in the young is defined as coronary artery disease that occurs in patients less than 45 years of age.[3] Of all the cases of coronary artery disease among Asian Indians, 12- 16% occurs in those below the age of 45 years, compared to only 2-5% of the inhabitants in the West from the same age group.[4] Young Asian Indians with coronary artery disease usually have a poorer prognosis because of extensive atherosclerosis and multivessel disease, a pattern hitherto seen only in the older population.[5]

Thus, there was a need to look beyond conventional risk factors. Recently, research is underway and many other factors are being identified to mention Fibrinogen (Fi). It has long been agreed that clotting factors and blood flow, as well as lipid infiltration, are important in the development of atherosclerosis and its clinical sequelae.[6] Fibrinogen is involved both in blood clotting and in the rheological characteristics of blood flow. Fibrinogen is a large paired molecule held together by disulfide bridges. It is Likely that with higher fibrinogen levels in the blood, local deposition of fibrin may be more pronounced and fibrinolysis poorer and so it helps in thrombosis.[7]

Hence, this study was undertaken to study the prevalence of new risk factor (Fibrinogen) in the general population (both young and old) and also to find out the difference in prevalence rates (if any) in the young (less than 45 years of age) and in the elderly (more than 45 years of age) Patients suffering from vasculopathy as mentioned above.

AIMS AND OBJECTIVES:

- To assess the prevalence of Fibrinogen levels in patients suffering from vasculopathy- IHD/stroke/DVT and compare with healthy controls concerning young age (<45 years) and the elderly (>45 years) pa

MATERIAL AND METHODS:

This was the case-control study done in the cardiology unit of Bharti Hospital, Pune. All the patients diagnosed as cases of vasculopathies especially IHD/ Stroke/ DVT (n=75) were enrolled as cases for the study and Healthy volunteers of the same age and gender-matched (n=75) were enrolled as the controls and subjected to the following inclusion and exclusion criteria.

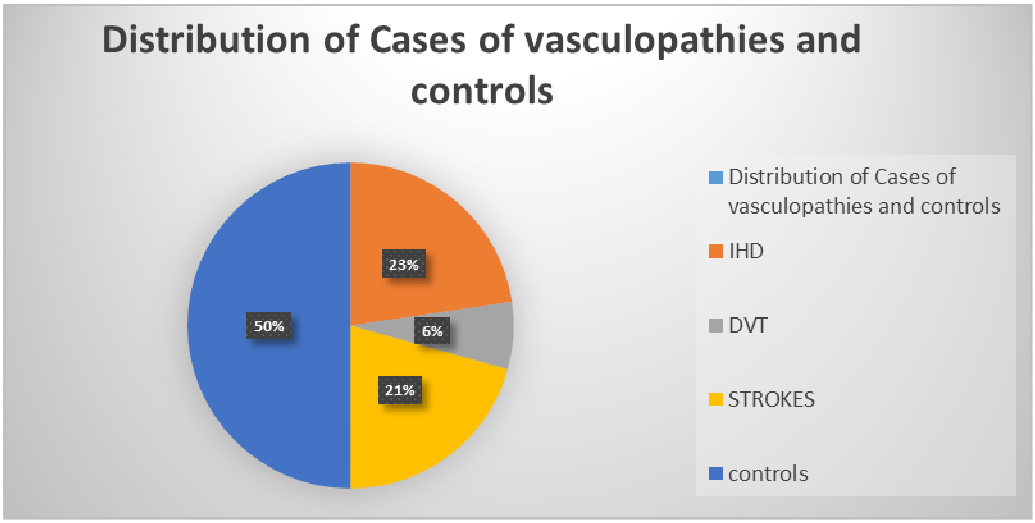
The adult patient above 20years of either gender diagnosed to have vasculopathies like IHD/ Stroke/ DVT ready to give written informed consent were included for the study as cases whereas Healthy individuals of either gender with no comorbidities with age 20 years and above were included as controls.

Patients suffering from cerebrovascular disease due to trauma, tumor, atrial fibrillation and hemorrhagic diathesis, pernicious anemia, hypothyroidism and Patients who are known cases of vasculopathies on antiplatelet, fibrinolytic, corticosteroids, and anticoagulants were excluded from the study. All the eligible cases and controls were assessed for the fibrinogen levels along with the routine protocol of history, general examination and systemic examination, and cases additionally were investigated as per the decided protocol for the type of vasculopathy. All cases and controls were assessed for their fibrinogen level at day 0 of the admission by using a Fibrinogen testing kit. A fibrinogen testing kit with reagent Organon Teknica, USA or Dade-Behring, USA was used and the test was processed on a semi-automated coagulation system, Coagulomate XM, by Organon Tekica

USA. The mean of fibrinogen was compared in both the cases and the controls and was subjected to unpaired 't' and Mann-Whitney test statistics.

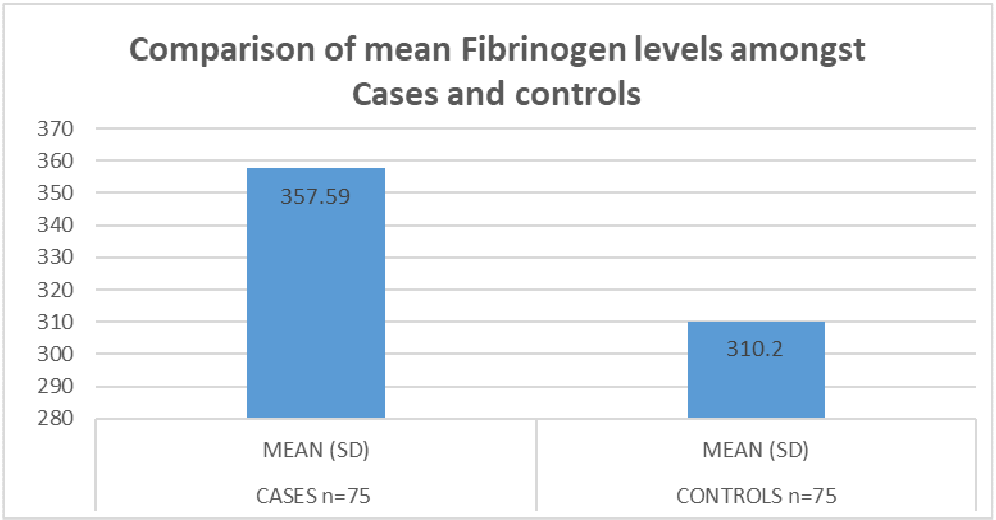
OBSERVATION AND RESULTS:

Graph: 1



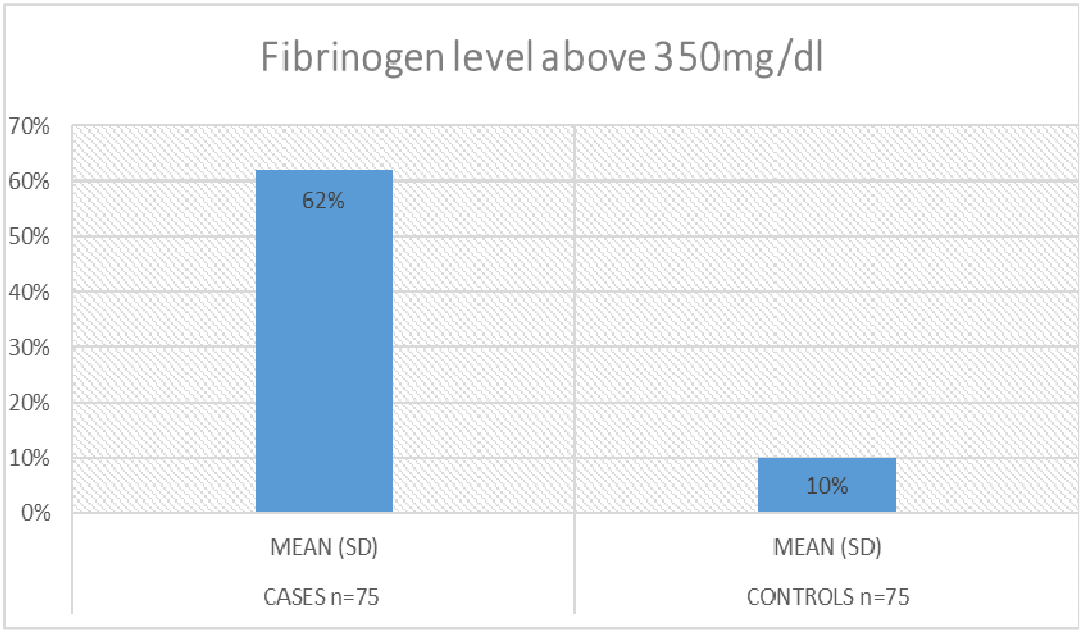
Graph 1: Total 75 patients of vasculopathies of which 31 had a stroke, 10 had DVT, and 34 had IHD whereas 75 healthy individuals were the controls.

Graph 2:



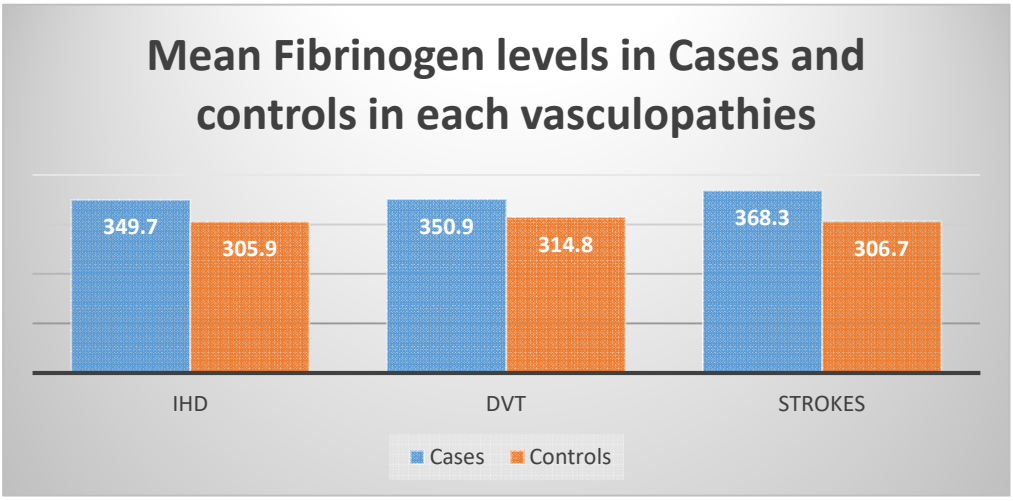
Graph 2: In the present study, the mean fibrinogen level of 357.5867 (36.5218) in cases vs 310.2800 (27.6100) in controls with a statistically significant 'p' value by unpaired 't' and Mann- Whitney statistics.

Graph no.3



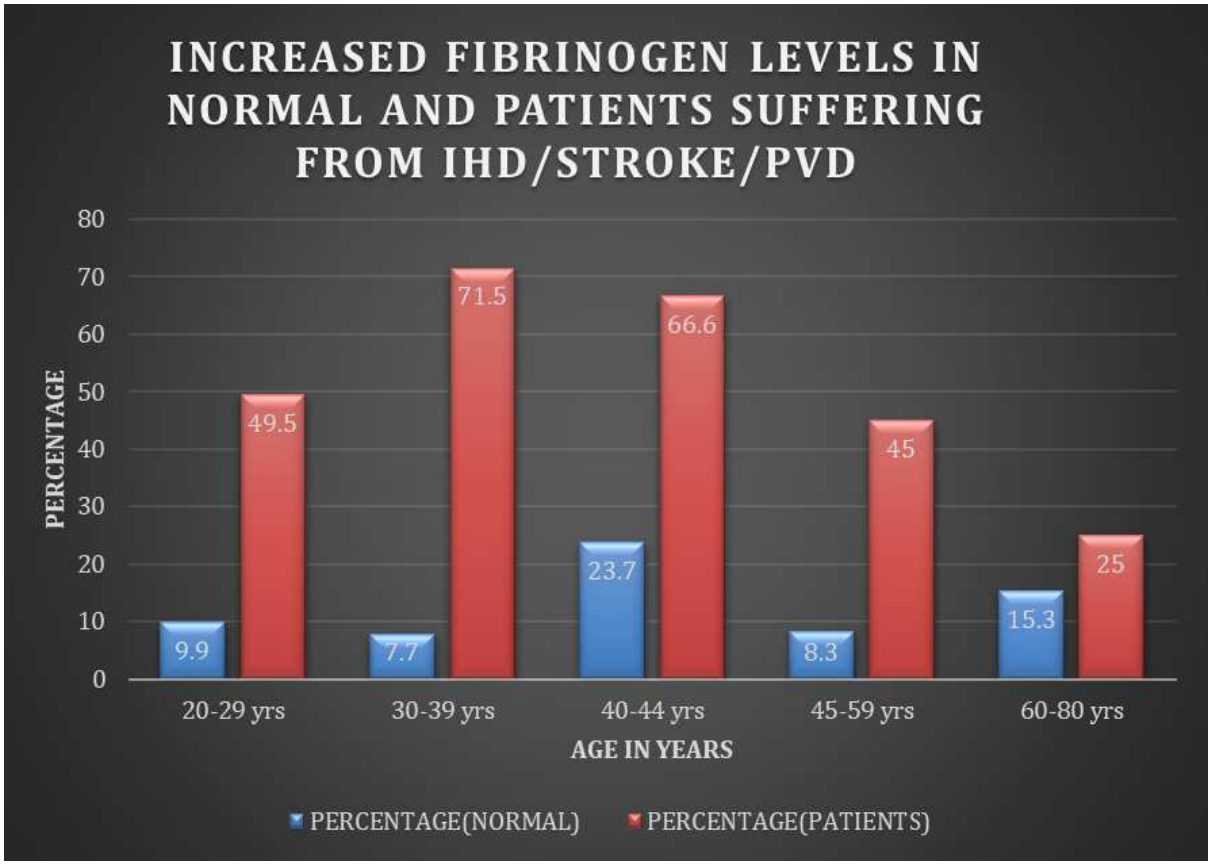
Graph no.3: 62% of Cases had Fibrinogen levels above 350mg/dl in comparison only 10% of controls had levels above 350mg/dl with a statistically significant p-value by unpaired 't' and Mann-Whitney statistics.

Graph 4:



Graph 4: On comparing fibrinogen individual vasculopathy, it was found that fibrinogen was a more significant risk factor in stroke >DVT> IHD.

Graph 5: Fibrinogen was compared in the different age groups in both the cases and the control group.



Graph 5: Fibrinogen was compared in the different age groups in both the cases and the control group and the study revealed that fibrinogen level was found elevated in all the age groups but more in age 30 to 44 years as compared to other age groups.

DISCUSSION

A total of 150 cases (75 patients + 75 controls) were included in this study. Of these 75 patients, 31 had a stroke, 10 had DVT, and 34 had IHD. In the 3 years between 2016 to 2020 most cases were of stroke and IHD signifying a high level of arterial thrombus as compared to DVT which was only 10 patients signifying the low level of venous thrombosis cases.

The mean fibrinogen level of 357.5867 mg/dl (36.5218) in vasculopathy cases whereas 310.2800 mg/dl (27.6100) in controls with a statistically significant 'p-value by unpaired 't' and Mann- Whitney statistics.62% Cases had Fibrinogen level above 350mg/dl in comparison only 10% controls had levels above 350mg/dl. On comparing fibrinogen individual vasculopathy, it was found that fibrinogen was a more significant risk factor in stroke >DVT> IHD.

A clinical Study by Indian workers, Panjaria A[8] · Khan and Rao[9] found that the occurrence of cerebrovascular diseases not equal in all age groups. Many studies showed that vasculopathy due to increased Hcy, LP(a) and Fibrinogen levels was more prevalent in the young age group[10]. In our study, it has been predominantly found that the levels of fibrinogen were consistently high in all the vasculopathy and the levels were found to increase in all the age group in cases than in

controls showing it to be a potential novel risk factor. In our study Fibrinogen was compared in the different age groups in both the cases and the control group and the study revealed that fibrinogen level was found elevated in all the age groups but more in age 30 to 44 years as compared to other age groups. (Graph 5). Levels of fibrinogen are increased in the events of arterial thrombus formation too and it becomes the predisposing factor for cerebrovascular, cardiovascular accidents amongst young adults.

Results of our study in patients of IHD are comparable with studies done by Lars Wilhelmsen et al[11] which showed mean fibrinogen level in cases and control 356.0/330.0, Smitha Gheye et al[12] 420.20/305.0, and our results showed levels of 349.73/305.88. All the above studies showed a similar increase in fibrinogen level although the values vary due to variation in sample size. Whereas in stroke patients the results of Lars Wilhmsen[11] 370.0/330.0 & our study 368.35/306.67 are almost similar.

A meta-analysis of six studies involving 4018 patients with the pre-existing vascular disease has suggested a consistently strong relationship between circulatory fibrinogen levels and coronary artery disease.[13,14]Fibrinogen levels correlate with severity of coronary artery disease, As higher fibrinogen levels have been found in three-vessel disease in contrast to single or two-vessel disease.[10,15] It is Likely that with higher fibrinogen levels in the blood, local deposition of fibrin may be more pronounced and fibrinolysis poorer so it helps in thrombosis.[15,16]

CONCLUSION:

The prevalence of Fibrinogen levels in patients suffering from vasculopathy-HD/stroke/DVT was found significantly higher as compared with healthy controls. Fibrinogen was a significant increase both in the younger (<45 years) and the elderly (>45 years' age) group Fibrinogen was their more important risk factor in STROKE> DVD > IHD. It can be very well concluded that fibrinogen levels can be the Novel risk factor for vasculopathies

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