ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Prevalence of Hyperhomocystenemia In Deep Vein Thrombosis

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ABSTRACT

Hyperhomocystenemia is a known risk factor for the development of deep vein thrombosis. According various studies conducted in western countries, the prevalence of hyperhomocystenemia in patients with DVT varies from 10-25%. According to some studies, the prevalence of Hyperhomocystenemia is higher in the Indian population. Hence the aim of this study was to determine the prevalence of Hyperhomocystenemia in cases of DVT in our population and also to statistically analyse association of Hyperhomocystenemia with risk factors like age, sex, Diabetes mellitus, hypertension, smoking, ischaemic heart disease, immobilization and anaemia. To estimate the prevalence of Hyperhomocystenemia in cases of Deep Vein Thrombosis and to statistically analyse association of hyperhomocystenemia with risk factors like age,sex, Diabetes mellitus, hypertension, smoking, ischemic heart disease, immobilization and anaemia. Prospective cross sectional study. A total of 50 patients were included in the study. DVT was confirmed by Doppler examination. Serum homocysteine was measured and the data was analysed. Statistical significance was calculated using Chi-square test. A total of 50 patients were studied. The prevalence of hyperhomocystenemia in cases of deep vein thrombosis in our population was 600 per thousand cases. There was a statistically significant association between Hyperhomocystenemia and immobilization, smoking and anemia. The prevalence of hyperhomocystenemia in cases of deep vein thrombosis in our population was 600 per thousand cases. There was a statistically significant association between hyperhomocystenemia and age, gender, IHD, HTN, DM and obesity in our study.

Keywords: Hyperhomocystenemia, vein, thrombosis.

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ISSN: 0975-8585

INTRODUCTION

Deep Vein Thrombosis (DVT) is a common but elusive illness that can result in suffering and death if not recognized and treated early. The venous thrombi can break off and form pulmonary emboli, obstructing the arteries of the lung and causing death. Though DVT and pulmonary embolism (PE) usually complicate the course of sick and hospitalized patients, they may also affect ambulatory and otherwise healthy persons.

Since venous thrombosis is difficult to recognize clinically, these hospitalized cases probably represent the tip of the iceberg. Unfortunately, the death rate from PE and DVT is substantial, and the probability of survival in affected is decreased when compared with unaffected ones.

The association between the risk for thromboembolism and a hypercoagulable state has been well known. Recent advances thrombosis research and laboratory medicine have provided an ever expanding list of specific laboratory anomalies that may predispose people to venous thromboembolism.

Mild Hyperhomocysteinemia is an established risk factor for atherosclerosis[1,2]and vascular disease.[1,2] In classic homocystinuria, half the vascular complications are of venous origin,[3] but until recently it has been unclear whether mild Hyperhomocysteinemia is also a risk factor for venous thrombosis.[2,4,5]

In a case-control study, Falcon et al. found that Hyperhomocysteinemia was a risk factor for thrombosis in people younger than 40 years of age.[6] Recently, Hyperhomocysteinemia was found to be a risk factor for recurrent venous thrombosis in patients between 20 and 70 years of age, as compared with controls from the general population.[7] Although the results of these studies support the hypothesis that mild Hyperhomocysteinemia is a risk factor for venous thrombosis, the studies were not designed to estimate the risk in general population.

Although, studies are available which gives us the prevalence of Hyperhomocysteinemia in patients with Deep Vein Thrombosis in the western population, no studies are mentioned in literature regarding the prevalence of Hyperhomocysteinemia in patients with DVT in the Indian population.

Thus, the present study was undertaken to detect the prevalence of Hyperhomocysteinemia in patients with DVT coming to our hospital.

MATERIALS AND METHODS

SOURCE OF DATA

All patients admitted in KIMS, Karad with symptoms of DVT confirmed by Doppler study during the period from June 2015 – June 2016 were selected for the study. The plasma homocysteine of all the subjects were estimated.

SAMPLING

Type of study - cross- sectional study

Time period of study—September 2015 to June 2016.

50 patients were included in the study and their blood levels of homocysteine was estimated. With incidence rate of DVT 1 case per 1000 population i.e 0.1% , at 95% confidence interval and +/- 1 margin of error, the calculated sample size is 38 using the formula

$$N = \{(1 - 96)2 * p(l-p)\}/d2$$

INCLUSION CRITERIA

All diagnosed cases of DVT confirmed by doppler ultrasound with risk factors like

ISSN: 0975-8585

- Prolonged immobilization
- Smoking
- Anaemia
- Diabetes mellitus
- Hypertension
- Ischaemic heart disease
- Post menopausal state

EXCLUSION CRITERIA

There was no exclusion criteria

METHODOLOGY

- All cases of DVT confirmed by Doppler study were taken up for study. A detailed history was taken. Overnight fasting venous blood sample was collected from cubital vein in plain bulb and sent for serum homocysteine estimation.
- Estimation of serum homocysteine was done using photometry method.
- Reference Range :

  Adult Male : 6-15 mmol/L
  Adult Female : 3-12 mmol /L
  Elderly : 15-20 mmol/L

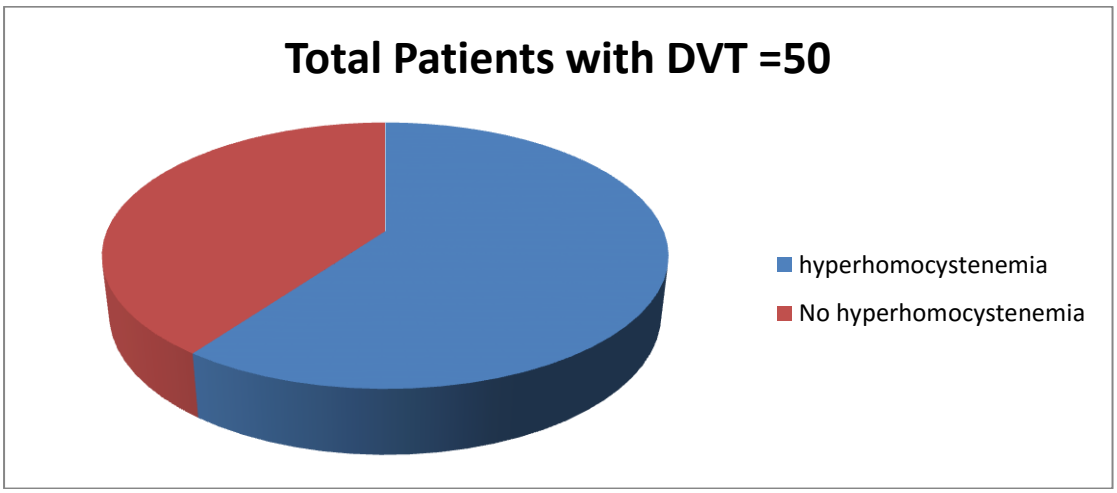
- Prevalence was calculated using the formula

Prevalence = number of patients with DVT and homocystenemia X 1000 The total number of patients with DVT.

- Statistical analysis for significance of difference between age, sex, and presence or absence of the risk factors such as DM, HTN, smoking, IHD, immobilization was done using the Chi square test.

OBSERVATION AND RESULTS

A total of 50 patients with DVT were selected for the study. Of these 50 patients, 30 patients were found to have raised homocysteine levels. The prevalence of in cases of DVf in this study was calculated as 600 cases per thousand population. The same has been shown in the pie chart below-



ISSN: 0975-8585

Table No 1: Frequency & percentage distribution patients according to Age

	HYPERHOMOCYTENEMIA				
Age in year	**Absent**	**%**	**Present**	**%**	**Total**
24-43	08	40.0	15	50.0	23
44-63	07	35.0	07	23.3	14
64-83	05	25.0	08	26.7	13
Total	**20**	**100**	**30**	**100**	**50**

Graph No1 : Frequency & percentage distribution patients according to age

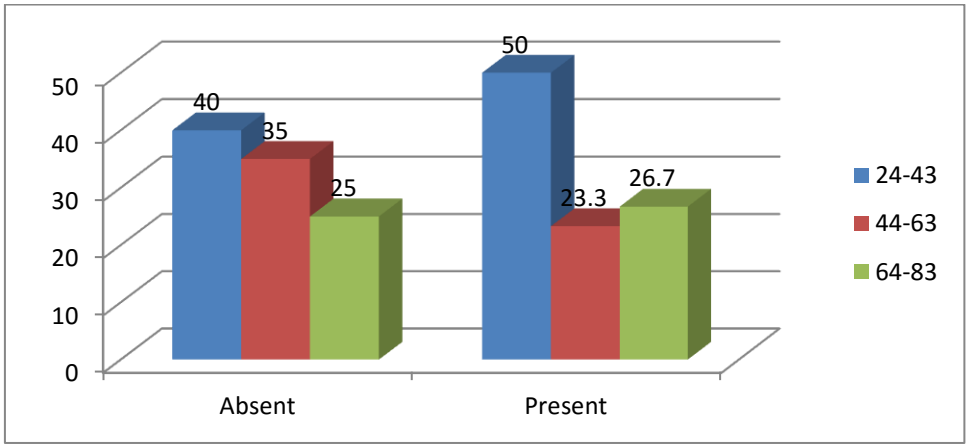


Table No 2: Frequency & percentage distribution patients according to Sex

	HYPERHOMOCYTENEMIA				
Sex	**Absent**	**%**	**Present**	**%**	**Total**
Male	11	55	14	46.7	25
Female	09	45	16	53.3	25
Total	**20**	**100**	**30**	**100**	**50**

Graph No2: Frequency distribution patients according to sex

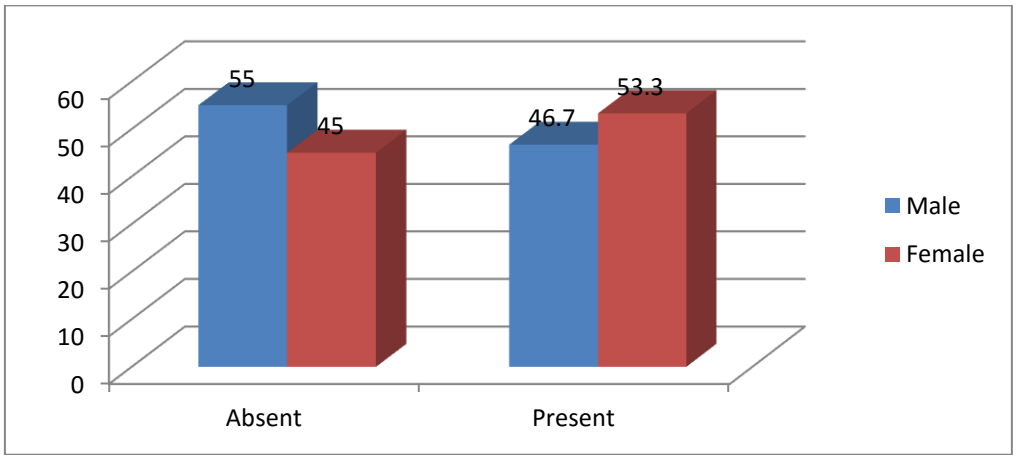


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Table No 3: Frequency & percentage distribution patients according to immobilization

	HYPERHOMOCYTENEMIA				
Immobilization	**Absent**	**%**	**Present**	**%**	**Total**
Present	04	20.0	18	60.0	22
Absent	16	80.0	12	40.0	28
Total	**20**	**100**	**30**	**100**	**50**

Graph 3: Frequency & percentage distribution patients according to immobilization.

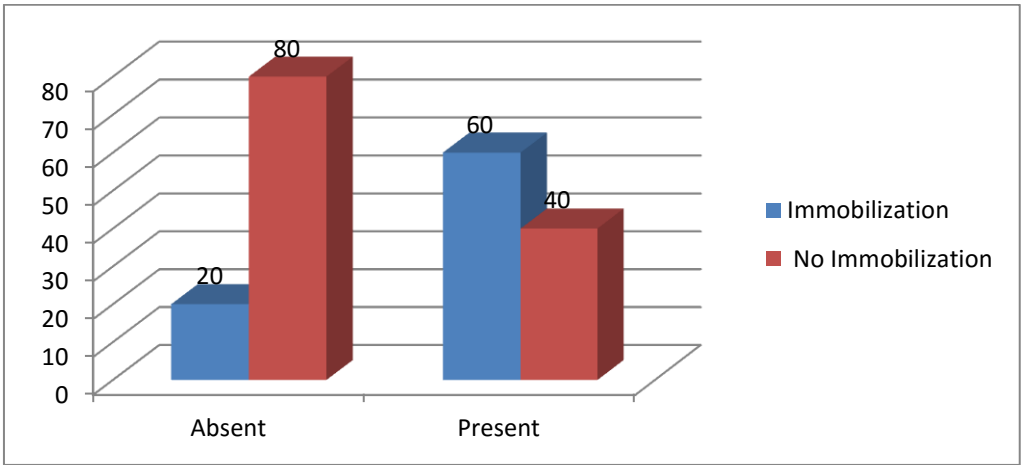

Table No 4: Frequency & percentage distribution patients according to smoking/Tobacco chewing

	HYPERHOMOCYTENEMIA				
Smoking	**Absent**	%	**Present**	%	**Total**
Absent	13	65.0	09	30.0	22
Present	07	35.0	21	70.0	28
Total	**20**	**100**	**30**	**100**	**50**

Graph No 4: Frequency & percentage distribution patients according to smoking /tobacco chewing

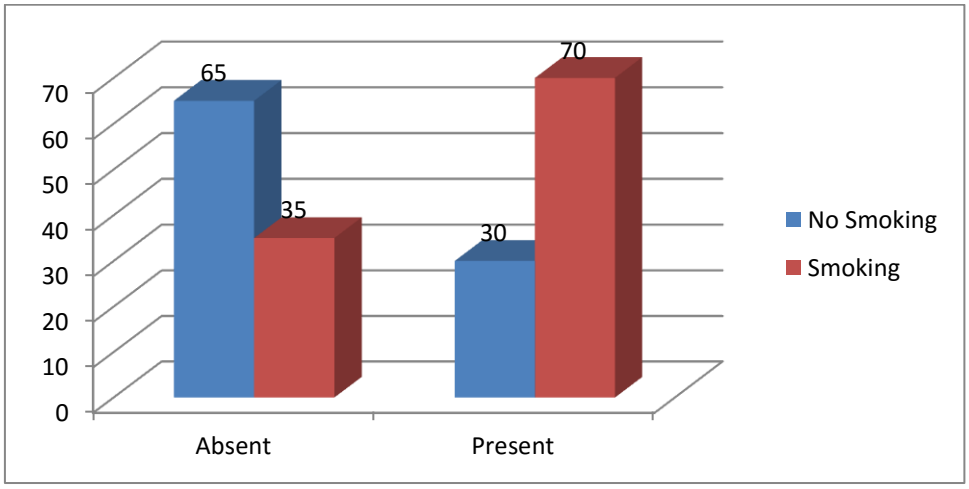

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Table No 5: Frequency & percentage distribution patients according to IHD

	HYPERHOMOCYTENEMIA				
IHD	**Absent**	%	**Present**	%	**Total**
Absent	15	75.0	27	90.0	42
Present	05	25.0	03	10.0	08
Total	**20**	**100**	**30**	**100**	**50**

Graph NO 5: Frequency & percentage distribution patients according to IHD

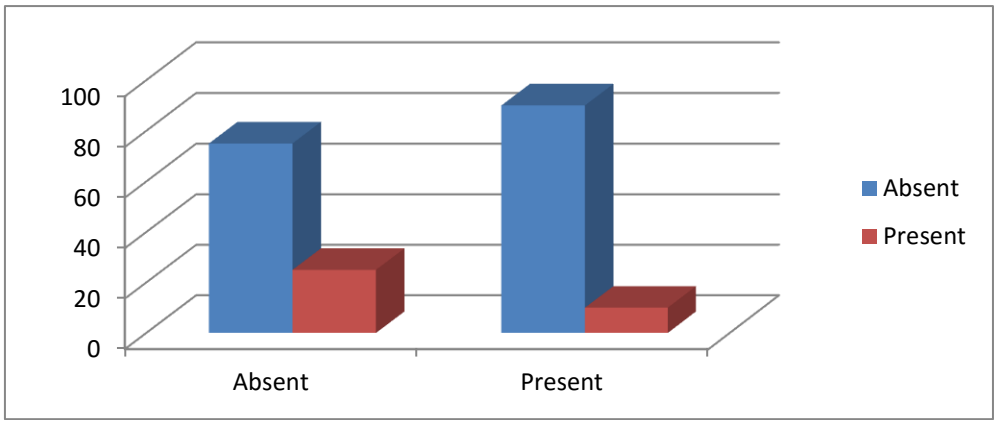

Table No 6: Frequency & percentage distribution patients according to obesity

	HYPERHOMOCYTENEMIA				
Obesity	**Absent**	**%**	**Present**	**%**	**Total**
Absent	18	90.0	26	86.7	44
Present	02	10.0	04	13.3	06
Total	**20**	**100**	**30**	**100**	**50**

Graph No 6: Frequency & percentage distribution patients according to obesity

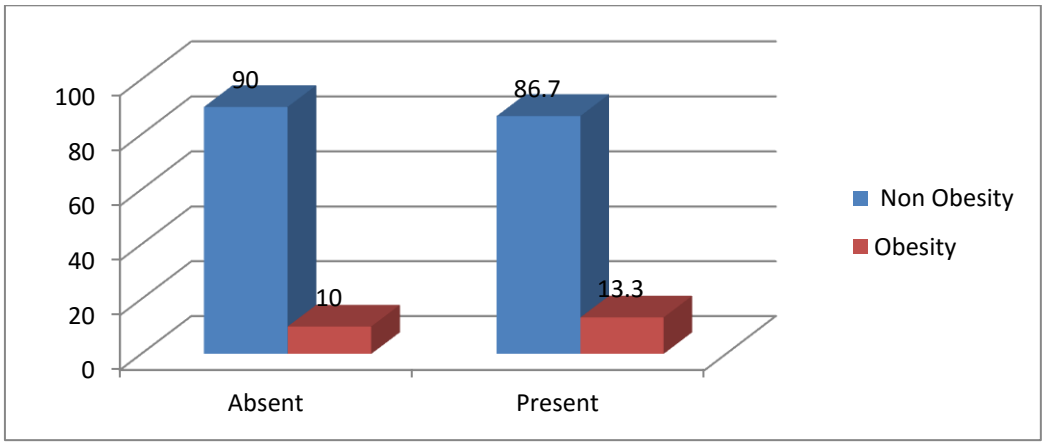

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Table NO 7: Frequency & percentage distribution patients according to HT

	HYPERHOMOCYTENEMIA				
HTN	**Absent**	%	**Present**	%	**Total**
Absent	15	75.0	24	80.0	39
Present	05	25.0	06	20.0	11
Total	**20**	**100**	**30**	**100**	**50**

Graph NO 7: Frequency & percentage distribution patients according to HTN

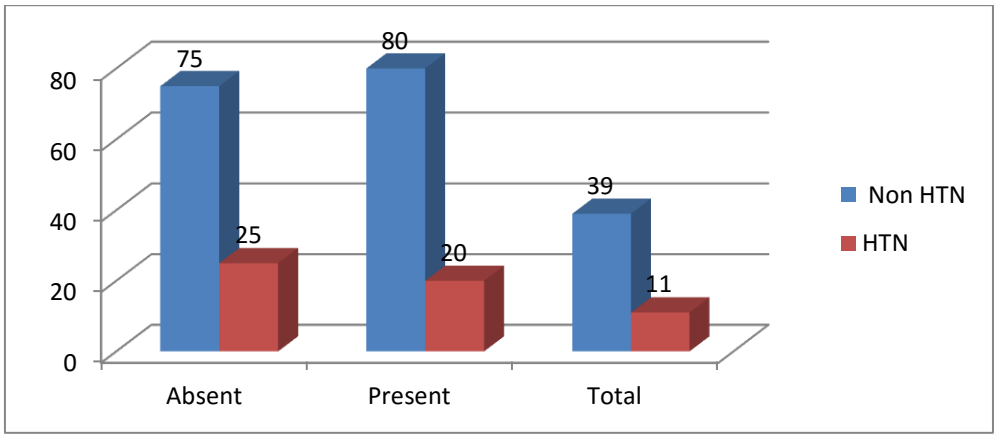

Table No 8: Frequency & percentage distribution patients according to Anaemia

	HYPERHOMOCYTENEMIA				
Anaemia	**Absent**	%	**Present**	%	**Total**
Absent	14	70.0	10	33.3	22
Present	06	30.0	20	66.7	28
Total	**20**	**100**	**30**	**100**	**50**

Graph NO 8: Frequency & percentage distribution patients according to Anaemia

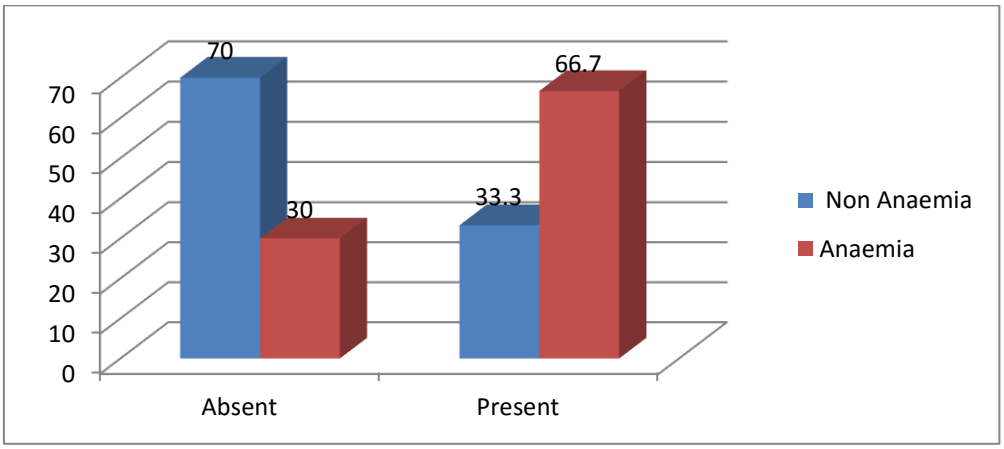

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Table No 9 : Frequency and percentage distribution of patients according to DM

	HYPERHOMOCYTENEMIA				
DM	**Absent**	%	**Present**	%	**Total**
Absent	18	90.0	20	66.7	38
Present	02	10.0	10	33.3	12
Total	**20**	**100**	**30**	**100**	**50**

Table No 10: Analysis of Data

S.I No.	HYPERHOMOCYTENEMIA		* D.F	Chi-square	P- value	Result
	Absent	Present				
Age (years)			**2**	**0.857**	**0.651**	**NS**
24-43	**08**	**15**				
44-63	**07**	**07**				
64-83	**05**	**08**				
Gender			**1**	**0.333**	**0.773**	**NS**
Male	**11**	**14**				
Female	**09**	**16**				
Trauma						
Absent	**15**	**24 '**	**1**	**0.175**	**0.676**	**NS**
Present	**05**	**06**				
Immobilization			**1**	**7.792**	**0.005**	**S**
present	**04**	**18**				
absent	**16**	**12**				
Smoking /Tobacco Chewing						
Absent	**13**	**09**	**1**	**5.96**	**0.021**	**S**
Present	**07**	**21**				
IHD						
Absent	**15**	**27**	**< 1**	**2.009**	**0.156**	**NS**
Present	**05**	**03**				
Obesity						
Absent	**18**	**26**	**1**	**0.126**	**0.722**	**NS**
Present	**02**	**04**				
HTN						
Absent	**15**	**24**	**1**	**0.175**	**0.676**	**NS**
Present	**05**	**06**				
Anaemia						
Absent	**14**	**10**	**1**	**6.46**	**0.02**	**S**
Present	**06**	**20**				
DM						
Absent	**18**	**20**	**1**	**3.58**	**0.058**	**NS**
Present	**02**	**10**				

NS = not significant S= Significant

Table No 10 Reveals that there is no association between Hyperhomocystenemia with selected demographic variables such as age, gender trauma , IHD, HTN and DM as the p-value is more than 0.05. There is association between hyperhomocystenemia and risk factors like immobilization, smoking and anaemia, as p-value is less than 0.05.

DISCUSSION

Hyperhomocystenemia is a proven risk factor for DVT. A case control study by Simioni et al showed that the prevalence of hyperhomocystenemia was 25%[36]. Another study by Den Heijer M showed the prevalence of hyperhomocystemia as 10%[18]. According to Wadia R et al, the prevalence of hyperhomocystenemia in [37] Indians is between 52-84%[37]. In our study,the prevalence of hyperhomocystenemia in patients of DVT was 600 per thousand population. Thus our study shows that the prevalence of hyperhomocystenemia in patients with DVT is higher in Indian population as compared to the western population.

In a case control study, Falcon et al found that hyperhomocystenemia was a risk factor for thrombosis in patients younger than 40 years of age[6]. Hyperhomocystenemia is a risk factor for recurrent venous thrombosis in patients between 20 and 70 years of age, as compared with controls from the general population[7]. In our study, young patients with DVT had higher prevalence of hyperhomocystenemia as compared to older population but there was no statistical significance in the prevalence of hyperhomocystenemia among the different age groups.

Study by Y Unlu, S Keles and N Becit showed higher plasma levels of tHcy in men than women in all ages. The ratio of Hey levels in male to female subjects was 1.2:1[38]. Martin Den Heijer, Ted Koster, Henk J Blom et al showed that the odds ratio was twice as high for women as for men suggesting that women were more succeptible to the pathological effects of elevated homocysteine levels, although their homocysteine levels are in general lower than that of men[18]. However, in our study the prevalence of hyperhomocystenemia was higher in the female population (53.3%) when compared to males (46.7%).

Claes Bergmark et al suggested that smokers have a higher level of homocysteine than non smokers. They also have lower levels of Vit B6[39]. Hyperhomocystenemia may increase smoking related platelet and clotting effects or exert a toxic effect on the endothelium. Furthermore, smoking lowered the levels of Vit B6 and folate which explains the increased levels of homocysteine in smokers[40]. This is consistent with our study, which shows a statistical significance between smoking and hyperhomocystenemia.

Hyperhomocystenemia is associated with three fold increased risk of IHD and coronary heart disease[41]. Study by Gautam V Kamat, S C Metgud, Vishwanath M Pattanashetti showed association between IHD and hyperhomocystenemia[42]. However, in our study no statistical significance was found between the same.

Some studies have demonstated an association between DM and HTN with hyperhomocystenemia. Study by Medha N Munshi, Angie stone, Louis Fink et al showed greater frequency of hyperhomocystenemia in patients with NIDDM (39%)as compared with age matched controls (7%)[43]. Also hyperhomocystenemia limits the bioavailability of nitric oxide, increases oxidative stress, stimulates the proliferationof vascular smooth muscle cells and alters the elastic properties of the vascular wall [44]. However in our study, no association was found between HTN, DM and obesity and hyperhomocystenemia.

In our study, a statistical association of hyperhomocystenemia with immobilization and anaemia was found.

CONCLUSION

- The prevalence of hyperhomocystenemia in cases of deep vein thrombosis in our population was 600 per thousand cases.
- There was a statistically significant association between hyperhomocystenemia and immobilization, smoking and anemia .

- There was no association between hyperhomocystenemia and age, gender, IHD, HTN, DM and obesity in our study.

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