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STUDY OF CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH DVT (DEEP VEIN THROMBOSIS)

Medicine

Dr Gautam Panduranga* Assistant Professor In Medicine, Mediciti Institute Of Medical Sciences, Telangana *Corresponding Author

Dr Faraz Farishta Associate Professor In Medicine, Mediciti Institute Of Medical Sciences, Telangana

Dr Manjusha Tumu Junior resident in Medicine

ABSTRACT

The association between traditional cardiovascular risk factors like obesity, age, male, sex, hyperlipidemia, hypertension, diabetes, smoking, alcohol consumption, family history of thrombosis and risk of venous thromboembolism (VTE) has not been extensively examined in previous studies. Cross-sectional, observational study was conducted to determine the association of cardiovascular risk factors in patients diagnosed with DVT in outpatient department. The study found that most of the DVT patients had two or more cardiovascular risk factors. DVT was seen more commonly in males and older age group. Poorly controlled diabetes, poorly controlled hypertension, high BMI, low HDL cholesterol, high LDL cholesterol and smoking history were frequenly associated with DVT. Among the risk factors, most were modifiable, including obesity, hypertension, diabetes, smoking and dyslipidemia.

KEYWORDS

DVT, deep vein thrombosis, cardiovascular risk factors

INTRODUCTION

The association between traditional cardiovascular risk factors like obesity, age, male, sex, hyperlipidemia, hypertension, diabetes, smoking, alcohol consumption, family history of thrombosis and risk of venous thromboembolism (VTE) has not been extensively examined in previous studies. Several studies suggest a link between DVT and cardio vascular risk factors, including obesity, smoking, hypertension, low HDL-cholesterol, high LDL-cholesterol high levels of lipoprotein(a), and diabetes. However, results have been inconsistent. In the Longitudinal Investigation of Thromboembolism Etiology (LITE), obesity and type 2 diabetes were associated with DVT, but not other traditional atherosclerosis risk factors (1)This study will therefore give the etiological association between cardiovascular risk factors and DVT.

Most studies from India have looked at specific patient groups like postoperative orthopedic patients(2)(3) and there is no data about DVT in outpatients. The prevailing belief that DVT in the Asian population is less than in the Western population has essentially been disproved(4)(5) and there appears no reason to believe that it should be any different in India.

Indian perspective on this topic is lacking due to limited published Indian data. Moreover, the published studies are based in northern region of India and no data is available from southern population. This study will therefore look for any association between DVT and cardiovascular risk factors or not. DVT is a preventable disease. People in India and other developing nations continue to suffer from DVT which can cause pulmonary embolism and death. Better health awareness will reduce the burden of disease. Among the cardiovascular risk factors most are modifiable like obesity, hypertension, diabetes, smoking, alcohol. Non-modifiable cardiovascular risk factors are age, sex, family history of venous thrombosis. By studying the etiological association of cardiovascular risk factors, preventive measures can be taken to control the modifiable risk factors and thereby prevent DVT and thromboembolism and reduce morbidity and mortality.

METHODOLOGY

Cross-sectional, observational study was conducted to determine the frequency of cardiovascular risk factors in DVT patients in outpatient department of a tertiary care hospital in Telangana. Both male and female patients aged more than 20 years, attending outpatient department, who had clinical suspicion of deep vein thrombosis and confirmed by imaging, were included in the study. Patients with previous DVT's, pregnant patients and those with upper extremity DVT's were excluded. Informed consent was taken.

Well's score of all these patients was calculated. Venous Doppler of limb was done for those with high probability of DVT according to Well's score. In those with low probability of DVT, D-dimer was done. Patients with positive D-dimer were subjected to venous doppler and the patients with negative D-dimer was excluded. All the patients who were positive for DVT on imaging were included in our study.

A detailed history from all the subjects about their cardiovascular risk factors involving age, sex, obesity, hyperlipidemia, hypertension, diabetes, smoking habit and family history of thrombosis was taken by standard questionnaire.

STASTICAL METHODS:

The observations were recorded in spread sheets (Microsoft Excel®). Charts and graphs were prepared and analysed by using spreadsheets. After confirming the homogeneity of the data, all continuous variables are reported as mean and standard deviation; categorical variables were expressed as frequency distribution, tables. Frequency distribution was done with the help of bar diagrams and pie charts and expressed in percentage.

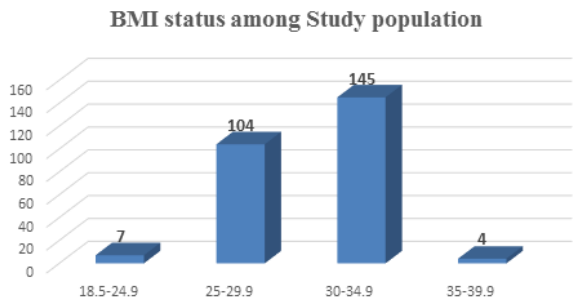
RESULTS

The study was conducted in a tertiary care hospital over a period of 2 years from 2015 to 2017 and included a total number of 260 patients.

Most of study populations were in the age group of 65 to 79 years. 57.69 % of study population were in age group of 65 to 79 years. This indicates that DVT is more common with advancing age.

In the present study, out of 260 DVT patients, 185 were males (71%).

OBESITY AND DVT:



X axis-BMI of study population; Y axis-number of cases

In the present study about 56 % of study population were obese (BMI in between 30 and 34.9). 4% of study population were morbidly obese.

Status Of Hypertension Among Study Population:

Hypertension	Frequency	Percentage
Present	157	60.38
Absent	103	39.61
Total	260	100

FIGURE 2

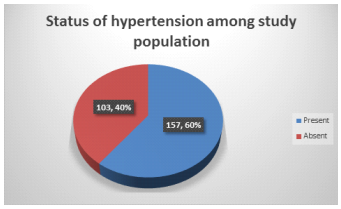


FIGURE 3

Hyper tension	frequency	Percentage
<120mm of Hg	29	11.15
120-139mm of Hg	75	28.84
140-159mm of Hg	58	22.3
>160mm of HG	98	37.69
Total	260	100

FIGURE 4

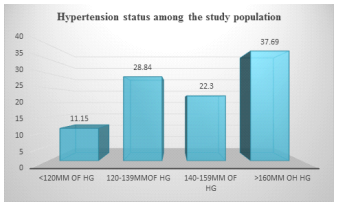


FIGURE 5

X axis systolic BP; Y axis –percentage of study population
60% of study population were hypertensive. Most of them had poorly controlled BP (37.69 % had SBP >160). 28.84% were prehypertensive according to JNC 7 hypertension guidelines.

SMOKING STATUS AMONG STUDY POPULATION:

Smoking	Frequency	Percentage
Current	99	38.08
Former	50	19.23
Non smoker	111	42.69
Total	260	100

FIGURE 6

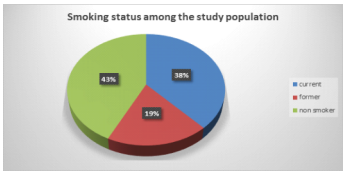


FIGURE 7

Out of 260 study population, 57% were smokers (current and former).

STATUS OF DIABETES AMONG STUDY POPULATION:

Diabetes	Frequency	Percentage
Present	186	71.53
Absent	74	28.46
Total	260	100

FIGURE 10

HbA1C LEVELS AMONG STUDY POPULATION:

HbA1C	Frequency	Percentage
<6.5	78	30
6.5-7.4	63	24.23
7.5-8.4	75	28.84
>8.5	44	16.92
Total	260	100

FIGURE 11

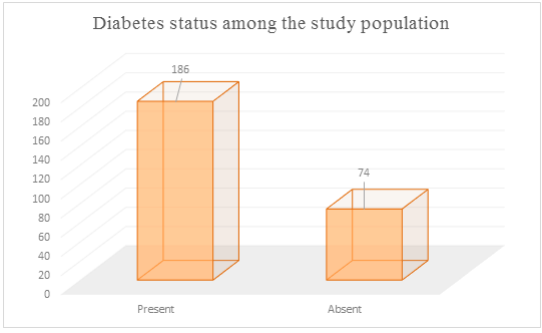


FIGURE 12

71.53% of study population were diabetics. 28.84% had HbA1C within range of 7.5-8.4 (largest group). This indicates diabetes is a frequent association in patients with DVT.

TRIGLYCERIDE LEVELS IN STUDY POPULATION:

Triglycerides	frequency	Percentage
<150 mg/dl	13	5
150-199mg/dl	89	34.23
>200 mg/dl	158	60.76
Total	260	100

FIGURE 13

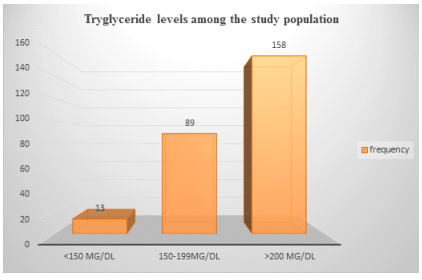


FIGURE 14

60.76% of study population had triglycerides level >200 mg/dl.

LDLCHOLESTROL LEVELS AMONG STUDY POPULATION:

FIGURE 15

LDL	frequency	Percentage
100-129mg/dl	21	8.07
130-159mg/dl	68	26.15
160-189mg/dl	106	40.76
>189 mg/dl	65	25
Total	260	100

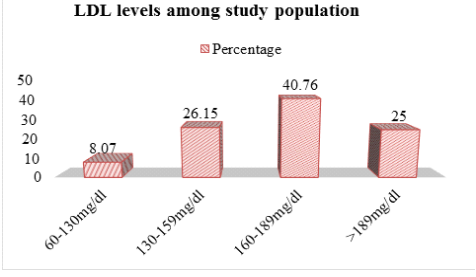


FIGURE 16

X axis-LDL cholesterol range Y axis-percentage of population

Largest category of patients (40.76%) had LDL cholesterol in the range of 160-189 mg/dl.

FAMILY HISTORY OF THROMBOSIS IN DVT PATIENTS:

Family h/o of Thrombosis	Frequency	Percentage
Present	71	27.3
Absent	189	72.69
Total	260	100

FIGURE 17

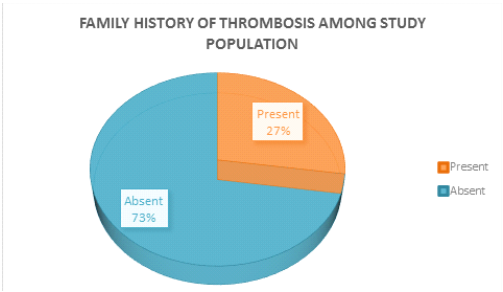


FIGURE 18

Family history of venous thrombosis was present in 27% of study population.

Frequency Of Various Cardio Vascular Risk Factors In Dvt Patients:

Risk factors	Cut off value	Frequency	Percentage
Age	65-79yrs	150	57.69
BMI	30-34.9	145	55.77
Sex	male	185	71.15
Smoking	Present	149	57.31
HDL	<40mg/dl	207	79.61
LDL	>160mg/dl	171	65.76
Triglycerides	>200mg/dl	158	60.76
Diabetes	Present	186	71.53
HTN	Present	157	60.38

FIGURE 19

CARDIOVASCULAR RISK FACTORS OF DVT IN STUDY POPULATION:

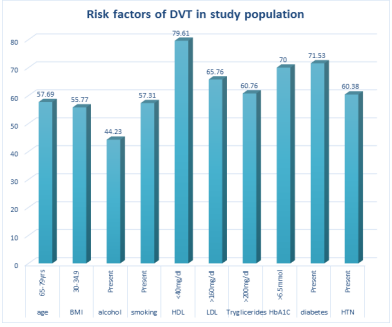


FIGURE 20

DISCUSSION

The primary objective of the present study was to determine the distribution of cardiovascular risk factors in the DVT patients. The observations made in this study are discussed here.

In the present study mean age of patients diagnosed with DVT is 66.21 ±7.63.This is similar to study done by **Mazzoccoli et al(9)** where the mean age of DVT patients is 65.49±17.22. In the present study the number of patients diagnosed as DVT with age >80 years were less because of likely comorbid conditions and and less likelihood of them presenting to outpatients department.

In the present study, 71.15% were males.This was more when compared to **Mazzoccoli et al(9)** **Nazim Isma et al(8)**. In the present study a male predominance was there which could be due to social, cultural taboos in the society, making health care facilities more readily available to males as compared to females, leading to increased male representation in hospitals. Male to female ratio in the present study was 2.4:1.

In the present study 30.3% of DVT patients had stage II hypertension. It was comparable to study done by **Quist Paulsen et al(6)** where 37.69% of DVT patients were stage II hypertensive. In the present study 53.1% of study population were hypertensive. This indicates hypertension was associated with DVT. Control of hypertension may decrease the risk of DVT.

In the present study mean BMI of study population is 29.46±2.59.This was similar to study by **Quist Paulsen et al**[6] where the mean BMI is27.9±4.7. In the present study more than half of the patients (57.3%) diagnosed with DVT were obese (BMI > 30). It indicates obesity is strongly associated with it. Obesity is a modifiable risk factor.

In the present study mean HDL cholesterol was 34.46±6.92mg/dl. In a study done by **Quist-Paulsen et al(6)** mean HDL cholesterol was 25.2±7.2mg/dl. In this study 79.6% of DVT patients had low HDL level (<40 mg/dl). This indicates that low HDL cholesterol is another association seen in DVT.

Mean LDL cholesterol in the present study was 170.67±30.47 mg/dl. In a study done by **Kawasaki et al(7)** mean LDL cholesterol was 135±64mg/dl. About 92% of DVT patients had LDL cholesterol >130 mg/dl. This indicates high LDL cholesterol is frequently seen in DVT.

Family history of DVT was present 27.3% of patients with DVT in the present study. It is comparable to study by **Isma et al(8)** where family history of DVT was present in 25% of patients. This indicates family history of DVT is one of the important risk factors for DVT.

In the present study 57.31% of study populations were smokers of which 38.08% were current smokers and 19.23% were former smokers. This was very high when compared to **Golomb et al(10)** where current smokers were only 9.46%. Smoking is a modifiable risk factor and more awareness and education regarding complications and smoking prevention and cessation is likely to reduce DVT as well.

In the present study, 71.53% of DVT patients were diabetics. But this is very high when compared to **Mazzoccoli et al**[9] where diabetes was present in only 15.38% of DVT patients. High incidence in the present study indicates that diabetes is frequently associated with DVT in this part of the world.

CONCLUSIONS

Most of the DVT patients had two or more cardiovascular risk factors. In the present study, DVT was seen more commonly in males and older age groups. Patients with poorly controlled diabetes, poorly controlled hypertension, high BMI, low HDL cholesterol, high LDL cholesterol and smoking history were commonly associated with DVT.

Among the risk factors, most were modifiable, including obesity, hypertension, diabetes, smoking and dyslipidemia. These modifiable cardiovascular risk factors were more prevalent in the study population than non modifiable cardiovascular risk factors.

Further studies and research should investigate whether risk factor modification would lead to reduction in the risk of developing DVT and thromoembolism.

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