



Frequency of Deep Vein Thrombosis (DVT) in Patients with COPD in a Tertiary Care Hospital

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A B S T R A C T

Background: COPD is one of the biggest causes of mortality all around the world. This disease represents significant and potentially rising burden on health services on global level. COPD is thought to rise to fourth rank the list of diseases with highest mortality. It is also expected to rise to 7th number among the diseases with highest burden on the health system by 2030. COPD is the cause of mortality in 2.5 million people all over the world. COPD is commonly associated with cardiovascular diseases, and CVD is the commonest cause of mortality among COPD patients.

Objective: To determine the frequency of deep vein thrombosis (DVT) among the patients with COPD presenting at a tertiary care hospital.

Methodology: This was a cross sectional study conducted at Department of Pulmonology, Nishtar Hospital Multan, from August 2019 to January 2020. Total 211 patients were selected for the study. Mean and standard deviation were calculated for continuous data while frequencies and percentages were calculated for the nominal data Effect modifiers such as age, gender, obesity, diabetes, dyslipidemia, hypertension, duration of disease, smoking, residential status, and socioeconomic status were controlled by stratification and chi-square test was applied, keeping $p \leq 0.05$ as statistically significant.

Results: Of these 211 study cases, 133 (63%) patients were male while 78 (37%) patients were female. Mean age of the patients was 53.81 ± 9.90 years. Diabetes was present in 54 (25.6%), and hypertension was present in 93 (44.1%) of all the patients. Mean BMI was 25.19 ± 2.34 kg/m² and 32 (15.2%) patients were obese. Of these 211 study cases, 71 (33.6%) were smokers. Dyslipidemia was present in 55 (26.1%) of patients. Deep vein thrombosis was present in 23 (10.9%) of all the patients included in study.

Conclusion: High prevalence of deep vein thrombosis was observed in current study in the patients with COPD. Deep vein thrombosis was highly associated with poor control of hypertension, smoking, obesity, and long duration of the disease.

Keywords: COPD; Deep Vein Thrombosis (DVT); Frequency; Association

Introduction

Chronic obstructive pulmonary disease (COPD) is one of the biggest causes of mortality all around the world. This disease represents significant and potentially rising burden on health services on global level. COPD is thought to rise to fourth rank the list of diseases with highest mortality. It is also expected to rise to 7th number among the diseases with highest burden on the health system by 2030. COPD is the cause of mortality in 2.5 million people all over the world.¹

Cigarette smoking is the most important factor leading to COPD, other factors being exposure to chemicals and dust, and hereditary deficiency of alpha-1 antitrypsin.² Common presentation of COPD is dry or productive chronic cough, shortness of breath, and impaired exercise tolerance which worsens during acute exacerbation of the disease.³ COPD is managed both pharmacologically as well as non-pharmacologically; later includes pulmonary rehabilitation through patient education, exercise training and psychosocial support leading to better quality of life.⁴

Especially in the developing world, the prevalence of COPD is on the rise.⁵ Although it is a progressive disease leading to airway obstruction, it also causes reduced physical activity and psychological problems. These factors lead to patient's disability and poor health-related quality of life (HRQoL).^{6,7} COPD is commonly associated with cardiovascular diseases, and CVD is the commonest cause of mortality among COPD patients.⁸ A study conducted in Turkey showed the prevalence of DVT to be 8.3 % in COPD patients,⁹ while a study from China showed the prevalence of DVT to be 9.7 % in COPD patients.¹⁰ Anemia is another illness which has emerged to be associated with COPD.¹¹

Current study is aimed to determine the prevalence of DVT in patients with COPD. The results will help in anticipating DVT in these patients which will lead to the early management resulting in good prognosis. The results of current study will also highlight the role of prophylactic therapy for DVT in COPD patients, thus decreasing disease morbidity and hospital stay.

Objective

To determine the frequency of deep vein thrombosis (DVT) among the patients with COPD presenting at a tertiary care hospital.

Methodology:

This cross sectional study was performed in Department of Pulmonology, Nishtar Hospital Multan, from August 1st, 2019 to January 10th 2020, after taking ethical approval from the hospital review committee. Sample size was

calculated from the reference study¹⁰ and 211 patients were selected by nonprobability consecutive sampling technique. Patients of both the genders, male and female, of the age ranging from 30 to 70 years were included in the study. Included patients were diagnosed cases of COPD and the disease duration was more than six months. Patients having congenital heart disease, ischemic heart disease, altered sensorium due to exacerbation of COPD, and past history of CABG were excluded from the study.

Informed consent was taken from all the patients after explaining to them the procedure and purpose of the study. A specific performa was designed for collecting data. Age, weight, height, gender, duration of disease, socioeconomic status, residential status, and history of diabetes mellitus, hypertension and smoking were documented. Fasting blood samples were sent the central laboratory of the hospital for documenting dyslipidemia. Doppler ultrasonography was performed on all the patients for diagnosis and documentation of DVT. Doppler ultrasonography was performed by the senior sonologist with a minimum post-fellowship experience of 10 years.

Data was entered in SPSS V.23.0 and analysed. Mean and standard deviation were calculated for continuous data including age and disease duration. Frequencies and percentages were calculated for the nominal data including gender, socioeconomic status, residential status, and duration of disease, dyslipidemia, obesity, age groups, presence of DVT, history of diabetes mellitus, hypertension and smoking. Effect modifiers such as age, gender, obesity, diabetes, hypertension, smoking, dyslipidemia, duration of disease, residential status, and socioeconomic status were stratified. Chi square test was applied, keeping $p \leq 0.05$ as value for statistical significance of the difference.

Results

In current study, 133 (63 %) patients were male while 78 (37 %) patients were female. Mean age of all patients was 53.81 ± 9.90 years. Mean age of male patients was 56.99 ± 9.56 years while that of female patients was 48.37 ± 7.95 years ($p < 0.001$). Of all patients, 103 (48.8 %) were from rural areas and 108 (51.2 %) were from urban areas. Poor socioeconomic status was noted in 132 (62.6%) and middle income were 79 (37.4%). Diabetes was present in 54 (25.6 %) patients. Hypertension was present in 93 (44.1 %) patients. Mean body mass index of our study cases was 25.19 ± 2.34 kg/m² and obesity was present in 32 (15.2 %) patients. Mean disease duration was 26.53 ± 16.37 months and 141 (66.8 %) had duration of illness more than 12 months. Of these 211 study cases, 71 (33.6 %) gave positive history of smoking. Dyslipidemia was present in 55 (26.1%) of our study cases. Deep vein thrombosis was present in 23 (10.9%) patients (Table 1).

Table 1. Demographic and baseline data

| Variable | Number (percentage) |
|---------------------------------|---------------------------|
| Age | |
| 30-50 years | 88 (41.7%) |
| 51-70 years | 123 (58.3%) |
| Gender, (Male/ Female) | 133 (63%) / 78 (37%) |
| Residence, (Rural/Urban) | 103 (48.8%) / 108 (51.2%) |
| Socioeconomic status | |
| Poor | 132 (62.6%) |
| Middle | 79 (37.4%) |
| Diabetes mellitus | 54 (25.6 %) |
| Hypertension | 93 (44.1 %) |
| Smoking | 71 (33.6 %) |
| Obesity | 32 (15.2%) |
| Disease duration | |
| Up to 1 year | 70 (33.2 %) |
| More than 1 year | 141 (66.8 %) |
| Dyslipidemias | 55 (26.1%) |
| DVT | 23 (10.9 %) |

Deep vein thrombosis (DVT) was present in 16 males and 07 females with statistically insignificant difference (P-value = 0.648). Eight patients with DVT belonged to 30-50 years age group and 15 patients with DVT were in 51-70 years age group with statistically insignificant difference (p=0.511). Among patients of rural areas, 08 had DVT while 15 patients from the urban areas had DVT, the difference being statistically insignificant (P-value= 0.187). Of all DVT patients, 15 were poor while other 08 belonged to middle class with statistically insignificant difference (P-value = 0.824). Of all DVT patients, 08 were diabetic and 15 were non-diabetic (p=0.34); all 23 patients with DVT were normotensive (P<0.001); 16 were smokers and 07 were non-smokers (P<0.001); and all 23 patients were of normal weight (P=0.029). All DVT patients had disease duration of more than one year (P<0.001). Of all DVT patients, dyslipidemia was present in 08 patients while other 15 had no dyslipidemia (P=0.321) (Table 2).

Discussion

Current study included 211 patients meeting the inclusion criteria of study. In current study, 133 (63 %) patients were male while 78 (37 %) patients were female. Higher predominance of male gender has been reported by different studies as observed in current study. Waqas et al.¹² from Islamabad conducted a study and showed

predominance of male gender as 70 % of the patients with COPD were male, and these results are close to those of current study. Khan et al.¹³ conducted a study in Karachi and reported very predominance of male gender as 80 % of the patients with COPD were male. In a study directed by Ahmad et al.,¹⁴ different results were presented which showed higher predominance of female gender among the patients with COPD in Peshawar. Maula et al.¹⁵ also showed predominance of male gender as 65.4% % of the patients with COPD were male, and these results are very close to those of current study.

Mean age of all the patients was 53.81 ± 9.90 years (minimum age 35 years – maximum age 70 years). Mean age of male patients was 56.99 ± 9.56 years while that of female patients was 48.37 ± 7.95 years (p<0.001). Current study showed that 123 (58.3 %) patients were older than 50 years. Mean age of the patients with COPD was observed to be 62 ± 13 years in a study conducted by Ahmad et al.¹⁴ in Peshawar. Similar results were reported in another study, also conducted in Peshawar, by Iftikhar et al.¹⁶ Maula et al.¹⁵ conducted a study in Bannu and reported mean age of the patients with COPD to be 60.18 ± 11.67 years.

Of these 211 patients, 103 (48.8 %) were from rural areas and 108 (51.2 %) were from urban areas. Poor

Table 2. Comparison of data between normal patients and patients with Deep Vein Thrombosis (DVT)

| | Variable | DVT (n = 23) | Normal (n = 188) | p-value |
|----------------------|---------------------|--------------|------------------|---------|
| Gender | Male (N=133) | 16 | 117 | 0.648 |
| | Female (N=78) | 07 | 71 | |
| Age | 30-50 years (N=88) | 08 | 80 | 0.511 |
| | 51-70 years (N=123) | 15 | 108 | |
| Residence | Rural (N=103) | 08 | 95 | 0.187 |
| | Urban (N=108) | 15 | 93 | |
| Socioeconomic status | Poor (N=132) | 15 | 117 | 0.824 |
| | Middle class (N=79) | 08 | 71 | |
| Diabetes mellitus | Yes (N=54) | 08 | 46 | 0.314 |
| | No (N=157) | 15 | 142 | |
| Hypertension | Yes (N=93) | 00 | 93 | <0.001 |
| | No (N=118) | 23 | 95 | |
| Smoking | Yes (N=71) | 16 | 55 | <0.001 |
| | No (N=140) | 07 | 133 | |
| Disease duration | Up to 1 year(N=70) | 00 | 70 | <0.001 |
| | > 1 year(N=141) | 23 | 118 | |
| Obesity | Yes (N=32) | 00 | 32 | 0.029 |
| | No (N=179) | 23 | 156 | |
| Dyslipidemias | Yes (N=55) | 08 | 47 | 0.321 |
| | No (N=156) | 15 | 141 | |

Data is entered as number.

socioeconomic status was noted in 132 (62.6%) and middle income were 79 (37.4%). Diabetes was present in 54 (25.6 %) of all the patients. Similar results were observed by Mahishale et al.,¹⁷ who showed 21.24 % prevalence of diabetes mellitus in patients with COPD. Hypertension was present in 93 (44.1 %) of all the patients. Mean body mass index of all the patients was $25.19 \pm 2.34 \text{ kg/m}^2$ and 32 (15.2 %) patients were obese.

Of these 211 study cases, 71 (33.6 %) gave positive smoking history. Similar results were observed by Ahmad et al.¹⁴ from Peshawar, who showed positive smoking history among 37.5 % of all the patients with COPD included in their study. Dyslipidemia was present in 55 (26.1%) of all the patients. Iftikhar et al.¹⁶ from Peshawar also showed in their study that 38% of all the patients included in study has positive smoking history, results close to those observed in current study.

Deep vein thrombosis was present in 23 (10.9%) of all the patients. A study from Turkey reported DVT in 8.3% patients with COPD,⁹ results close to those observed in current study. A study from China has reported DVT to be 9.7 %¹⁰, results close to current study results. Dong et al.¹⁸ conducted a study on 151 patients of COPD and among those 29 patients had venous thromboembolism (VTE); of which 18 had pulmonary embolism (PE), 05 had DVT, and

06 patients had both DVT and PE.

Morgan et al.¹⁹ conclude in their study that severe COPD is associated with the thromboembolic events in patients with COPD. Borvik T. et al.²⁰ suggested that COPD patients had higher risk of VTE. COPD patients with VTE had higher mortality rate (50.2% per year) as compared to COPD patients without VTE (5.6% per year). However, Le Mao R. et al.²¹ observed that frequency of recurrent VTE was 9.1 % in COPD patients and 7% in non-COPD patients, with no statistically significant difference.

Conclusion

High prevalence of deep vein thrombosis was observed in current study in the patients with COPD. Deep vein thrombosis was highly associated with poor control of hypertension, smoking, obesity, and long duration of the disease.

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