ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 11, Issue – 3, May – 2026, Page No. : 20 – 24

An Observational Study to Assess Prevelance of Pulmonary Embolism in Acute Exacerbation of COPD

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Citation this Article: Davinder Kumar Kundra, Vikas Jaiswal, Sachin Baliyan, "An Observational Study to Assess Prevelance of Pulmonary Embolism in Acute Exacerbation of COPD", IJMSIR – May – 2026, Vol – 11, Issue – 3, P. No. 20 – 24.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Identification of pulmonary embolism (PE) in patients with acute exacerbation of chronic obstructive pulmonary disease (AECOPD) carries significant therapeutic implications. We aimed to assess the prevalence of PE in patients with AECOPD.

Methods: An observational study was conducted in Department of Pulmonary Medicine on Case fulfilling criteria of AECOPD according to GOLD 2025.

Results: The prevalence of pulmonary embolism in acute exacerbation of COPD patients was 7.50%.

Conclusion: Pulmonary embolism is a frequent and serious complication in patients hospitalized for acute exacebations of COPD. Pulmonary embolism could be a trigger for acute exacerbation or mimic exacerbation-like symptoms in COPD patients, since vascular occlusion leads to bronchoconstriction.

Keywords: COPD, Pulmonary embolism, GOLD.

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable disease with some significant extrapulmonary effects that may contribute to the severity in individual patients. Its pulmonary component is characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and associated with an abnormal inflammatory response of the lung to noxious particles or gases. Chronic Obstructive Pulmonary Disease (COPD) is a major cause of chronic morbidity and mortality throughout the world. Many people suffer from this disease for years and die prematurely from it or its complications. COPD is the fourth leading cause of death in the world[1], and further increases in its prevalence and mortality can be predicted in the coming decades[2].

In AE-COPD, co-existence or development of secondary disorders can significantly determine outcome[3,4]. One of these potentially harmful disorders is pulmonary embolism (PE).

Pulmonary embolism is an acute, serious condition that can be directly life threatening. It happens when an artery in the lungs is blocked by a substance that has traveled from elsewhere in the body through the bloodstream. COPD is often cited among the risk factors for acute venous thromboembolism and was recently identified as an independent predictor of pulmonary embolism.[15]Previous studies suggest a high prevalence of PE in AE-COPD, ranging from 18 - 25 percent[5-6].This prevalence might be explained by the increase of inflammatory markers which further increases pro-coagulation state during exacerbation[7-8].Secondly, patients with AECOPD are often treated with glucocorticoids, that increase risk for venous thromboembolism, especially after initiation of treatment. Others have suggested that PE could be trigger for AE-COPD or mimic exacerbation-like symptoms in COPD patients, since vascular occlusion leads to bronchoconstriction[9-10].

Material And Method

Study design: Observational study

Inclusion criteria

- Case fulfilling criteria of AECOPD according to GOLD 2025.
- Hospital admission because of acute exacerbation COPD.
- Written informed consent.

Exclusion criteria

- Patients not providing written consent.
- Renal failure (plasma creatinine>150micromol/l)
- Allergy to intravenous contrast medium.
- On long term anticoagulant therapy at admission.
- Pregnancy.
- Malignancy.
- Surgery with in previous 4 weeks.
- Fracture of bone.
- History of pulmonary tuberculosis

Statistical Analysis

The Categorical data was presented as numbers (percent) and were compared among groups using Chi square test. The quantitative data was presented as mean and standard deviation and were compared by students t-test. Probability was considered to be significant if less than 0.05.

For significance, cut off values were as follows →

- $p > 0.05$ = not significant
- $p < 0.05$ = significant

Results

Table 1: Prevalence of pulmonary embolism in acute exacerbation of COPD patients

AECOPD without embolism	74
AECOPD with embolism	6
Total patients	80
Prevalence	7.50%

The prevalence of pulmonary embolism in acute exacerbation of COPD patients was 7.50%.

Table 2: Distribution according to severity of pulmonary hypertension

PHTN	AECOPD without embolism (N=74)	AECOPD with embolism (N=6)
Mean ± SD	31.06±12.87	47±10.29
P-value	0.0021	

Mean pulmonary arterial pressure was significantly higher in AECOPD with pulmonary embolism than without PE (P<0.0021).

Table 3: Distribution according to spirometry

Spirometry indices	AECOPD without embolism (N=74)		AECOPD with embolism (N=6)		P-value
	Mean	SD	Mean	SD	
FEV1/FVC	46.7	11.9	41.2	10.6	0.2426
FEV1	49.4	15.4	38.7	15.6	0.0835
FVC	80.1	15.2	71.3	18.2	0.1540

The mean FEV1/FVC, FEV1 and FVC in AECOPD without embolism was 46.7, 49.4 and 80.1 and in AECOPD with embolism mean FEV1/FVC, FEV1 and FVC was 41.2, 38.7 and 71.3. The difference was statistically not significant between two groups as p-value>0.05.

Table 4: Distribution of cases according to ABG parameters.

ABG Parameters	AECOPD without embolism (N=74)		AECOPD with embolism (N=6)		P-value
	Mean	SD	Mean	SD	
PH	7.4	0.1	7.43	0.07	0.8644
PaO2	65.7	11.2	44.14	6.91	<0.0001
PaCO2	48.0	9.7	37.85	12.13	0.0115
HCO3	25.9	5.0	23.45	6.41	0.2304

Here we found that mean pH, PaO_2, $PaCO_2$, HCO_3 in patients of AECOPD without PE was 7.4, 65.7, 48, 25.9 respectively whereas in PE the mean pH, PaO_2, $PaCO_2$, HCO_3 was 7.43, 44.14, 37.85, 23.45 respectively. There was significant difference in PaO_2 (P<0.001) and $PaCO_2$ (0.0115) between AECOPD and AECOPD with embolism patients, hence hypoxemia was more in patients of AECOPD with pulmonary embolism. Other ABG parameters did not show any significant difference between two groups.

Discussion

Pulmonary Embolism in COPD exacerbation is frequent and is associated with higher mortality. The diagnosis of PE should be considered in elderly and sedentary patients with COPD. This should prompt clinicians to enhance suspicious of PE in COPD patients with exacerbation. Thus, present study was conducted with an aim to assess prevalence of pulmonary embolism in acute exacerbation of COPD in tertiary care center of western Rajasthan.

In our study, 80 patients of acute exacerbation of COPD was investigated for Pulmonary embolism and the prevalence of pulmonary embolism in acute exacerbation of COPD patients was 7.50%. in concordance with our results Akpinar et al[11] found prevalence of PE was 29.1%. They studied that the

prevalence of PE in COPD exacerbations is not precisely known. Tillie- Leblond et al[12] found the prevalence of PE to be 25% in COPD patients with severe exacerbation of unknown origin. Gunen et al[13] found the prevalence of PE among patients who were hospitalized due to COPD exacerbation to be 13.7%. Choi et al.[14] the prevalence of PE among hospitalized patients with COPD exacerbation was found to be 5%. The variation in the prevalence of PE is thought to be the result of differences in study populations and study design. Jindel et al[15]reported that prevalence of pulmonary embolism was 18%. Francis Couturaud et al[16] found among 740 patients, pulmonary embolism was confirmed within 48 hours of admission in 5.9% patients (44 patients).

Conclusion

Pulmonary embolism is a frequent and serious complication in patients hospitalized for acute exacebations of COPD. Pulmonary embolism could be a trigger for acute exacerbation or mimic exacerbation-like symptoms in COPD patients, since vascular occlusion leads to bronchoconstriction.

References

1. World Health Report. Geneva: World Health Organization. Available from URL: http:// www.who.int/whr/2000/ en/statistics.htm; 2000.
2. Lopez AD, Shibuya K, Rao C, Mathers CD, Hansell AL, Held LS, et al. Chronic obstructive pulmonary disease: current burden and future projections. Eur Respir J 2006;27 (2):397-412.
3. Ho TW, Tsai YJ, Ruan SY, et al. In-hospital and one-year mortality and their predictors in patients hospitalized for first-ever chronic obstructive pulmonary disease exacerbations: a nationwide population-based study. PloS one.2014;9(12): e114866.
4. Sidney S, Sorel M, Quesenberry CP, Jr., DeLuise C, Lanes S, Eisner MD. COPD and incident cardiovascular disease hospitalizations and mortality: Kaiser Permanente Medical Care Program. Chest.2005;128(4):2068-2075
5. Tillie-Leblond I, Marquette CH, Perez T, et al. Pulmonary embolism in patients with unexplained exacerbation ofchronicobstructive pulmonary disease: prevalence and risk factors. Annals of internal medicine. 2006;144(6):390-396.
6. Shapira-Rootman M, Beckerman M, Soimu U, Nachtigal A, Zeina AR. The prevalence of pulmonary embolism among patients suffering from acute exacerbations of chronic obstructive pulmonary disease. Emergency radiology.2015; 22(3):257-260.
7. Saghazadeh A, Rezaei N. Inflammation as a cause of venous thromboembolism. Critical reviews in oncology/hematology. 2016;99(1):272-285.
8. Johannesdottir SA, Horvath-Puho E, Dekkers OM, et al. Use of glucocorticoids and risk of venous thromboembolism: a nationwide population-based case-control study. JAMA internal medicine.2013; 173(9):743-752.
9. Moua T, Wood K. COPD and PE: a clinical dilemma. International journal of chronic obstructive pulmonary disease. 2008;3(2):277- 284.
10. Gurewich V, Thomas D, Stein M, Wessler S. Bronchoconstriction in the presence of pulmonary embolism. Circulation. 1963;27:339- 345.
11. Akpinar EE, Hoşgün D, Akpinar S, Ataç GK, Doğanay B, Gülhan M. Incidence of pulmonary embolism during COPD exacerbation. J Bras Pneumol. 2014 Jan-Feb;40(1):38-45.
12. Tillie-Leblond I, Marquette CH, Perez T, Scherpereel A, Zanetti C, Tonnel AB, et al.

Pulmonary embolism in patients with unexplained exacerbation of chronic obstructive pulmonary disease: prevalence and risk factors. Ann Intern Med. 2006;144(6):390-6.

13. Gunen H, Gulbas G, In E, Yetkin O, Hacievliyagil SS. Venous thromboemboli and exacerbations of COPD. Eur Respir J. 2010;35(6):1243-8.
14. Choi K, Cha S, Shin K, Lee J, Hwangbo Y, Yoo S et al. Prevalence and Predictors of Pulmonary Embolism in Korean Patients with Exacerbation of Chronic Obstructive Pulmonary Disease. Respiration 2013;85:203-209.
15. Jindal A, Rathore YS, Joshi V, Jain S, Khippal N. A cross- sectional study for the evaluation of pulmonary embolism in unexplained dyspnea in acute exacerbation of chronic obstructive pulmonary disease. Indian J Respir Care 2020;9:191-5.