

Original Research Article

A HOSPITAL BASED PROSPECTIVE STUDY TO ASSESS THE CLINICAL CHARACTERISTICS, TREATMENT STRATEGY, IN-HOSPITAL OUTCOMES, AND PROGNOSTIC FACTORS OF PATIENTS WITH PULMONARY THROMBOEMBOLISM

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ABSTRACT

Background: Acute pulmonary thromboembolism is associated with high mortality, similar to that of myocardial infarction and stroke. Despite significant advancements in diagnosis and management, there is limited reporting of this condition from India. The present study was carried out to study the clinical profile and associated risk factors in patients diagnosed with pulmonary thromboembolism.

Materials and Methods: The prospective study included all patients who were admitted and diagnosed with Acute PE for a period of two years in the Department of Medicine in a Tertiary care hospital in Western Rajasthan. A pre-tested, semi-structured questionnaire was used as a tool to collect data. Detailed clinical history and examination were done which were followed by laboratory investigations and radiological investigations.

Results: The mean age of the cases was 52.64 years. Hypertension was the most common risk factor and Diabetes was the most common comorbidity. ECG finding was Sinus tachycardia in 70% of the cases, the chest x-ray finding was dilated MPA/R in 35% of the cases, Right Ventricular (RV) dysfunction was seen in 30% of the cases on Echocardiography, DVT was seen in 13.33% of the cases in doppler and Pulmonary thromboembolism was seen 100% of the cases on CT pulmonary angiography. Heparin was given in 33.33% of cases and LMW Heparin was seen in 36.66% of the cases. Oral anticoagulation was given in 81.6% of the cases. New-oral anticoagulants were given in 36.66% of the cases. Thrombolytic therapy, Streptokinase was given in 30% of the cases. The outcome was discharge in 72.66% of the cases and death in 28.33% of the cases.

Conclusion: Pulmonary thromboembolism (PTE) remains a major cause of morbidity and mortality all over the world. Risk factors are present in a majority of patients with confirmed venous thromboembolic disease. This condition is unrecognized and underdiagnosed clinically despite its high mortality.

Keywords: PTE, Oral Anticoagulant, Risk Factors, Clinical Characteristics.

INTRODUCTION

Pulmonary thromboembolism (PTE) is an occlusion of pulmonary arterial circulation by a blood clot formed elsewhere, usually in the deep veins of the leg; less than 5% of venous thrombosis occurs in other sites. It is a major health concern with high mortality and morbidity. Nearly 10% of untreated

PTE is fatal in the first hour.^[1] The most important conceptual advancement regarding pulmonary thromboembolism over the last several decades have been the realization that it is not a disease but rather a complication of venous thromboembolism. The annual incidents are 1 case per 1000 population in the Western world.^[2] It is said to be responsible for as many as 15% of hospital death. Most patients who

succumb to pulmonary thromboembolism do so in the first few hours of event.^[3] Overall, major risk factors for thromboembolic events include recent Immobilization, Myocardial Infarction, Cerebro-Vascular Accident, Surgery, and recent Trauma.

Pulmonary embolism is present in 60–80% of patients with DVT and more than half these patients are asymptomatic.^[4]

Early diagnosis and aggressive management is the key to successful outcome. 10% of symptomatic PE are fatal in the first hour and that hospital mortality to untreated PE can be reduced from 30% to nearly 8% if treated appropriately.^[5]

The clinical manifestations of acute pulmonary embolism are highly variable, ranging from pulseless electrical activity to mild dyspnoea, new or worsening dyspnoea, chest pain or hypotension. PTE when suspected during a routine diagnostic session includes biomarkers (e.g., D-dimer), and/or imaging modalities such as computed tomography angiography or a ventilation-perfusion scan. Additional evaluations may be performed with troponins, B-type natriuretic peptide (BNP), Pro-BNP, and/or echocardiography.^[6]

PTE is commonly classified as massive (high-risk), sub-massive (intermediate-risk), and low-risk to help determine the required treatment. Massive pulmonary embolism accounts for 5-10% of cases.^[7] PTE often appears in the presence of a temporary or reversible risk factor such as surgery, trauma, immobilization, pregnancy, oral contraceptive use or hormone replacement therapy within the last 6-12 weeks before diagnosis. Risk stratification scores are used to determine management and the risk of complications and associated mortality.^[8]

The reporting of pulmonary thromboembolism is not given much importance in Asian countries in general and in India in particular. The present study was carried out to study the clinical profile and associated risk factors in patients diagnosed with pulmonary thromboembolism.

MATERIALS AND METHODS

The prospective study included all patients who were admitted and diagnosed with Acute PE for a period of two years in the Department of Medicine in a Tertiary care hospital in Western Rajasthan.

The inclusion criteria for the study are as follows: all patients aged > 18 years, with a demonstration of thrombus in pulmonary arteries confirmed by echo or CT or pulmonary angiography, and patients or their relatives willing to give consent. Exclusion criteria include patients below 18 years of age, patients without demonstrable clot in pulmonary arteries, and those not willing to participate.

The demographic data like age and sex, history of comorbidities and presence of risk factors for VTE in form of history of immobilization, history of DVT, history of smoking, recent surgery and history of malignancy were noted. Chest radiograph (CXR), electrocardiograph (ECG), a two-dimensional echocardiography (2D-echo) and a bilateral lower limb venous Doppler was performed and the findings were noted. CTPA findings were noted. Data was analyzed and presented as percentages and mean.

RESULTS

A total of 60 patients were enrolled in this study. The mean age of the cases was 52.64 years with a standard deviation of 15.30 years. 55% (33) of the cases were males and 45% (27) of the cases were females. Hypertension (n=42, 70%) was the most common risk factor and Diabetes (n=35, 58.33%) was the most common comorbidity [Table 1].

Our study showed that the TSH was >10 in 13.33% of the cases, ANA (dsDNA) was positive in 16.66% of the cases and APLA was positive in 5% of the cases, ECG finding was Sinus tachycardia in 70% of the cases, the chest x-ray finding was dilated MPA/R in 35% of the cases, Right Ventricular (RV) dysfunction was seen in 30% of the cases on Echo cardiography, DVT was seen in 13.3% of the cases in doppler and Pulmonary thromboembolism was seen 100% of the cases on CT pulmonary angiography [Table 2]. Parenteral anticoagulation, Heparin was given in 33.33% of cases and LMW Heparin was seen in 36.66% of the cases. Oral anticoagulation, was given in 81.66% of the cases. New-oral anticoagulants were given in 36.66% of the cases. Thrombolytic therapy, Streptokinase was given in 30% of the cases as mentioned in [Table 3].

In the present study, the outcome was discharge in 72.66% of the cases and death in 28.33% (n=17) of the cases.

Table 1: Clinico-demographic details of Study Participants

	Frequency(n=60)	Percentage (%)
Age groups (yrs)		
<25	2	3.33%
26-50	25	41.66%
51-75	26	43.33%
>75	7	11.66%
Gender		
Male	33	55%
Female	27	45%
Risk Factors		
Obesity	28	46.66%
Smoking	29	48.33%
Hypertension	42	70%

Malignancy	1	1.66%
h/o Surgery	4	6.66%
Air travel	1	1.66%
DVT	13	21.66%
Coronary artery disease	10	16.66%
Oral contraceptives	4	6.66%
Cardiovascular accidents	6	10%
Comorbidities		
Diabetes Mellitus	35	58.33%
Malignancy	1	1.66%
Coronary artery disease	10	16.66%
Cardiovascular accidents	6	10%

Table 2: Distribution of cases by Procoagulant workup, ECG findings, chest X-ray findings, ECHO findings, venous Doppler findings and CT pulmonary angiography

	Frequency(n=60)	Percentage (%)
Procoagulant workup		
TSH>10	8	13.33%
ANA (dsDNA)	10	16.66%
APLA	3	5%
ECG findings		
Sinus tachycardia	42	70%
SIQ3T3	18	30%
Chest X-ray findings		
Dilated MPA/R	21	35%
Opacity	7	11.66%
Bilateral pleural effusion	11	18.33%
WNL	21	35%
ECHO findings		
RV dysfunction	18	30%
No RV dysfunction	42	70%
Venous Doppler findings		
DVT	8	13.33%
WNL	52	86.66%
CT pulmonary angiography		
Pulmonary thromboembolism	60	100%

Table 3: Distribution of cases by administration of parenteral anticoagulation, oral anticoagulation, new-oral anticoagulants and thrombolytic therapy

	Frequency(n=60)	Percentage (%)
Parenteral anticoagulation		
Heparin	20	33.33%
LMW Heparin	22	36.66%
Not given	18	30%
Oral anticoagulation		
Yes	49	81.66%
No	11	18.33%
New-oral anticoagulants		
Yes	22	36.66%
No	38	63.33%
Thrombolytic therapy		
Streptokinase	18	30%

DISCUSSION

Pulmonary thromboembolism (PTE) remains a major cause of morbidity and mortality all over the world. It is the third most common cardiovascular disease of the industrialized world after myocardial infarction and stroke.^[9] Acute pulmonary embolism is associated with a significant mortality rate – as high as 30% if untreated, whereas the death rate of diagnosed and treated pulmonary embolism is 8%. Up to 10% of acute PE patients die suddenly.^[10] Clinical suspicion of this disease is of paramount importance in guiding diagnostic testing. Diagnosis of PE is more difficult than treatment. Risk factors

for venous thromboembolic disease and pulmonary embolism is well known.

In this study, the mean age of the cases was 52.64 years with a standard deviation of 15.30 years. Similarly, a mean age of 50 ± 15, 42.1, 52.3 ± 15.56, 48.14, 50.5 ± 17.8, and 47.2 ± 13 years were reported by Muralidharan et al,^[11] C.M. Adhikari et al,^[12] Sheikh et al,^[13] Ketaki Utpat et al,^[14] Ana Manuel et al,^[15] and Lolly et al,^[16] respectively.

Hypertension was the most common risk factor seen and Diabetes was the most common comorbidity seen in the present study. Manisha Fulzele et al,^[17] observed that the most common underlying risk factor was hypertension. While Sheikh et al,^[13] Ketaki Utpat et al,^[14] and Ana Manuel et al,^[15]

observed that the most common underlying risk factor was immobilization.

In the present study, the ECG finding was Sinus tachycardia in 70% of the cases and S1Q3T3 in 30% of the cases. Sinus tachycardia was found to be the most common finding in ECG by C.M. Adhikari et al,^[12] Sheikh et al,^[13] and Ketaki Utpat et al.^{14]}

Our study found DVT in 13.33% of the cases in Doppler similarly Ketaki Utpat et al,^[14] reported Incidence of DVT in unilateral right and left lower limb being 6 (8.6%), and 7 (10 %) respectively.

In our study, parenteral anticoagulation, Heparin was given in 33.33% of cases and LMW Heparin was given in 36.66% of the cases. Heparins were the most common form of in-hospital anticoagulation reported by Ana Manuel et al.^[15] Oral anticoagulation, was given in 81.6% of the cases. new-oral anticoagulant was given in 36.66% of the cases. Contrary to this C.M. Adhikari et al,^[12] and Sheikh et al,^[13] observed that all the patients received anticoagulation.

In our study, Thrombolytic therapy, Streptokinase was given in 30% of the cases. These findings were comparable to the findings of Ana Manuel et al,^[15] (18%) and Lolly et al,^[16] (18.7%) but were way lesser than what Muralidharan et al,^[11] (62.5%) reported.

Bhardwaj et al,^[18] thrombolized all (81.5%) patients with intermediate to high risk pulmonary embolism, with streptokinase, and got good results. Lolly M et al, in their study also thrombolized 18.7% cases, while 11.3% patients under went embolectomy.^[16]

Our study reported that the outcome was death in 28.33% of the cases. This finding was consistent with the mortality rates reported by Muralidharan et al,^[11] and Manuel A et al,^[15] where 25.7% and 20% of cases respectively died.

CONCLUSION

In conclusion PE in wide clinical spectrum from asymptomatic disease to life threatening massive PE and shock. The key to diagnosis is high index of suspicion and prompt appropriate investigation. Thrombolytic therapy was associated with significantly reduced in-hospital mortality in patients with massive PE. Public education of this illness, promptly recognizing acute pulmonary thromboembolism and the concept of Pulmonary Embolism Response Team (PERT) with the creation of regional centers of excellence serving such patients will likely be instrumental in achieving improved patient outcomes.

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