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STUDY OF CLINICAL PROFILE, DIAGNOSIS AND MANAGEMENT OF PATIENTS WITH SYMPTOMATIC PULMONARY EMBOLISM

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Abstract
Back ground of the study: 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. The aim of this Research was to study clinical profile, management and outcome of Pulmonary embolism.
Methods: Prospective assessment of clinical features, radiology and outcome of patients presenting with symptomatic PE over one year period, between 01/06/2018 to 31/05/2019. PESI (pulmonary embolism severity index score), predisposing factors, symptoms, clinical feature at the time of admission, ECG features, echocardiogram, treatment received and the outcome were reviewed.
Results: The study has 53 participants. The mean age was 49.15±16.08 years. The most prevalent clinical symptoms were tachycardia (79.25%) and hypotension (33.96%).The study population had a mean PESI score of 96.72 ± 31.95. The most prevalent ECG results were sinus tachycardia (79.25%) and s1q3t3 pattern (52.83%). Most patients had right atrial and right ventricular dilatation (73.58%) and 2D echo showed pulmonary arterial hypertension (73.58%).CT pulmonary angiograms showed lobar thrombus distribution in 67.92% of patients. Tenecteplase thrombolysis (69.81%), traditional heparin infusion for 3–5 days, or acitrom anticoagulation were the most common, followed by streptokinase (9.43%) and reteplase (1.89%).10 (18.87%) individuals received just anticoagulation. In this trial, most patients in the anticoagulation-only group got standard heparin for 3–5 days before acitrom (80%).The most common anticoagulants at discharge were acitrom (75.47%), rivaroxaban (13.20%), dabigatran (3.77%), apixaban (1.88%), and warfarin (1.88%). At discharge, the mean acitrom dose was 2.39 ± 0.9 mg. Most patients (96.23%) were released in stable clinical condition, with a 3.77% mortality rate.
Conclusion: Pulmonary embolism is a prevalent condition that can be readily diagnosed if it is clinically suspected. Early detection and proactive treatment are crucial for a successful outcome.
Keywords: Pulmonary Embolism, Thrombolysis, ECHO.

Introduction

Pulmonary embolism (PE) is a common clinical disorder with an average annual incidence of one case per 1000 population in the western population. (1). It is responsible for about 5-10% of all in-hospital deaths (2). It is an important diagnosis to consider, given the fact, that 10% of symptomatic PE are fatal in the first hour and that a hospital mortality to untreated PE can be reduced from 30% to nearly 8% if treated appropriately1,2. Most of the deaths occur when the diagnosis is delayed or never made. The clinical syndromes of PE and deep venous thrombosis (DVT) are now considered part of a spectrum of dysregulated hemostasis within the venous system designated as venous thrombo embolism (VTE)(3,4). Although rapid advances have taken place in the diagnosis and management of VTE, PE is still an unreported entity form India. Most of the reports are limited to autopsy reports and short case series (5-

10). However, with the advent of spiral computed tomography (CT), there is now an increased recognition of this entity in India. In this study, we describe our experience with the diagnosis and management of (PE).

Materials and Methods

Data source and collection

This is a prospective study included all patients who were admitted and diagnosed with acute PE during01/06/2018 to 31/05/2019 at Dr. Ramesh hospital Andhra Pradesh, India. The patient registration numbers were used to obtain the corresponding files from the medical records department. Only patients with a confirmed diagnosis of acute PE based on a computed tomography (CT) pulmonary angiogram were included in the study. Data collected from the patient files included age, sex, assessment for risk factors, symptoms, signs, chest roentgenogram and trans thorasic echocardiographic (ECHO) findings, CTPA, treatment obtained, and outcome. All the findings recorded were present within the first 24–48 h of admission. Chest X- ray findings are based on the reports given by the radiologist. Similarly, echocardiographic findings are those based on the reports given by the cardiologist.

Results

A total of 53 participants were included in the study. The mean age was 49.15±16.08 years.(Table 1)

Table 1: Descriptive analysis of age in study population (N=53)

Parameter	Mean ± SD	Median	Minimum	Maximum	95% C.I	
					Lower	Upper
Age	49.15 ± 16.08	49.00	20.00	87.00	44.72	53.58

36 (67.92%) participants were male and 17 (32.08%) participants were female , Smoking (33.96%) was the most common risk factor, followed by surgery with in the last 3 months (22.64%) ,most of them underwent orthopedic surgery. Dyspnea, lower limb swelling, chest pain were the most common symptoms respectively.

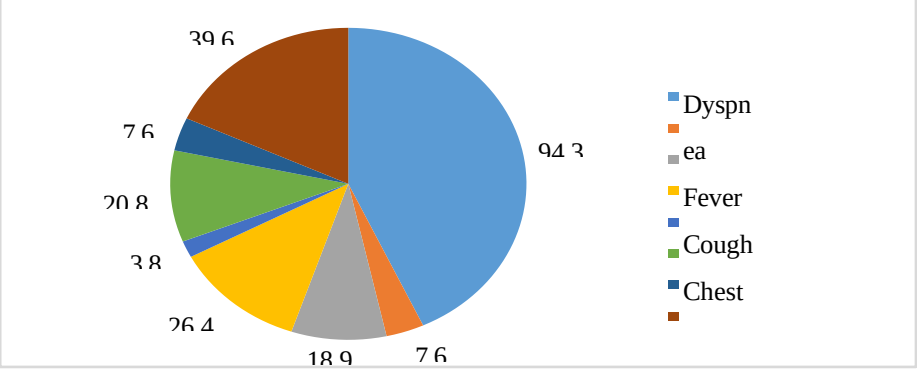


Fig no -1 Descriptive Analysis of risk factors in the study population

As fig no 2 shows that The mean of PESI Score (calculated on line by mdcalc) of the study population was 96.72 ± 31.95. More than half (54.71%) of the study population were in the intermediate risk class (C3) as stratified by the PESI score. Intermediate risk, high risk and very

high risk groups taken together constituted 43(81.12%) of the study population Sinus tachycardia (79.25%) followed by s1q3t3 (52.83%) pattern were the most common ECG findings.

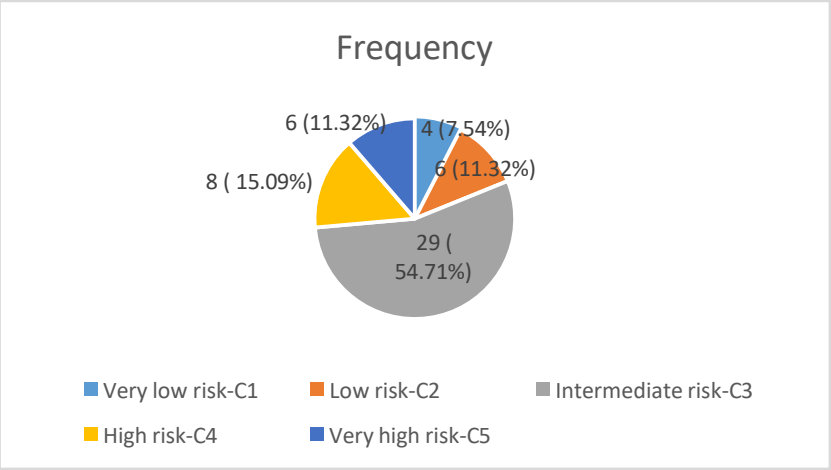


Fig – 2; Pie Chart of class (by PESI) Score

Table 2: Descriptive Analysis of ECG in the Study population

ECG	**Frequency**	**Percentages**
ST	42	79.25%
S1Q3T3	28	52.83%
Rbbb	4	7.55%
Rv Strain	18	33.96%

As fig no 03 shows that Most patients had right atrial and right ventricular dilatation (73.58%) with evidence of pulmonary arterial hypertension (73.58%) by 2D ECHO. Most patients had moderate degree of pulmonary arterial hypertension (47.17%) as quantified by 2d echo using bernoulli's equation.

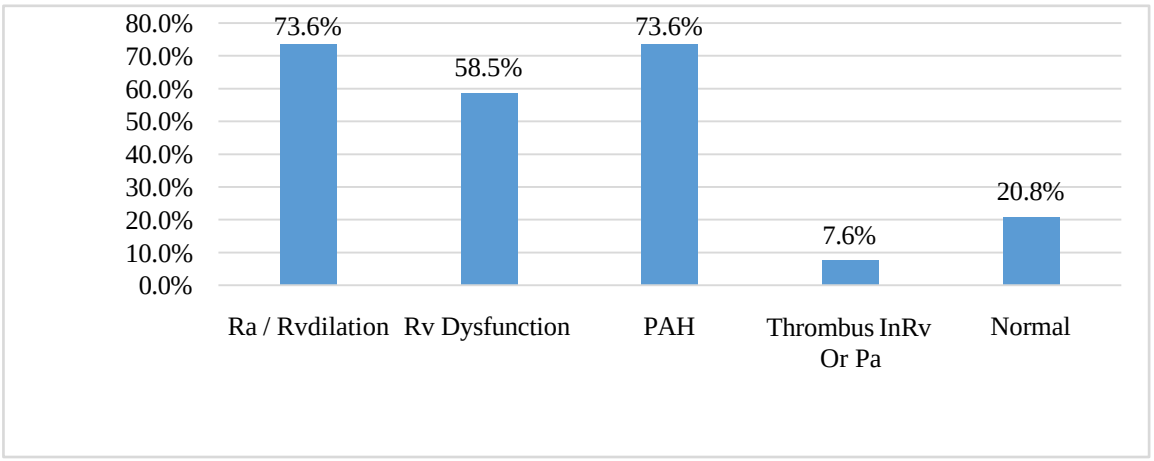


Fig-03-Descriptive Analysis of 2D ECHO in the Study population

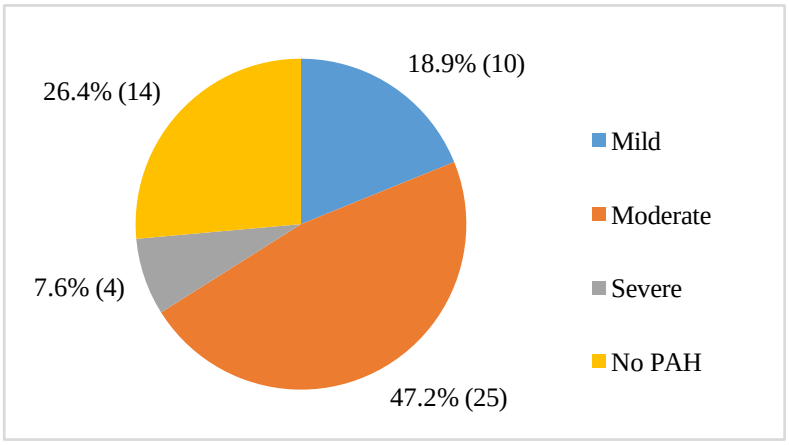


Figure 4.0: Pie chart of PAH in the study population (N=53)

As fig no 4 shows that Most of the patients in the study group had moderate pah (47.2%). severe pah was observed in only 7.6% of the PAH group. Positive Trop I was identified in 43.4% of the study population. Most of the patients had normal(64.15%) chest x ray, 9 (16.98%) participants had pleural effusion,9 (16.98%) participants had consolidation,3 (5.66%) participants had lobar collapse on chest x ray

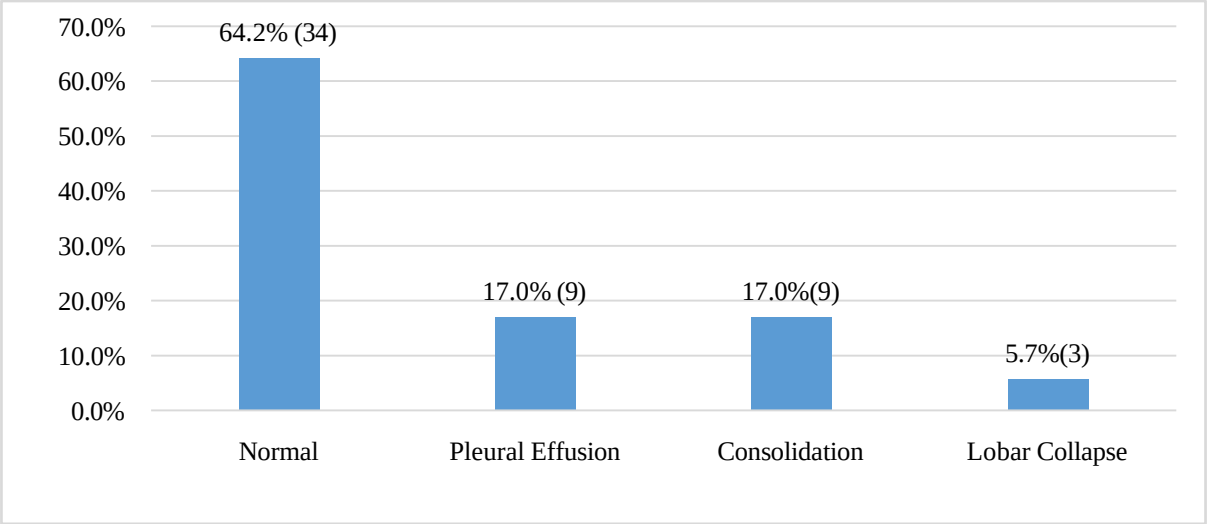
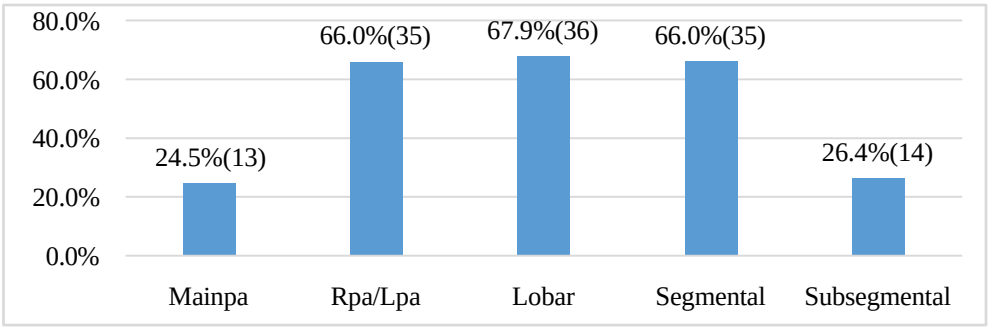


Figure 5.0: Bar chart of CXR in the study population (N=53)

As table no 06 shows that Most patients had lobar (67.92%) distribution of thrombus extending from right or left pulmonary artery to their respective segmental branches (66.04%), in the CT pulmonary angiogram.



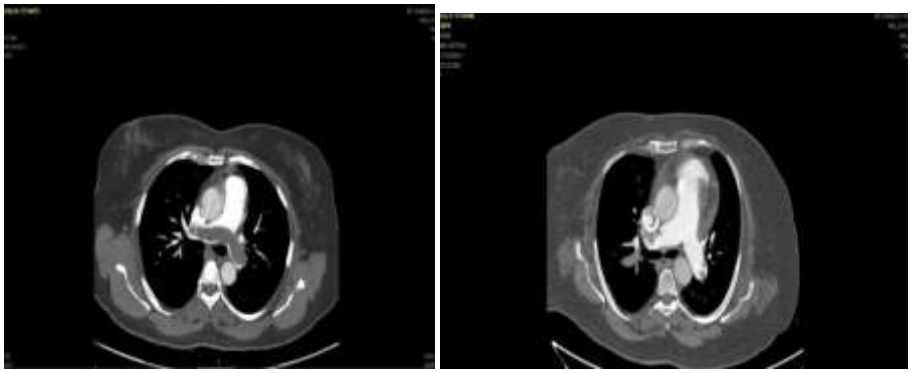


Figure 6.0: Barchart of CTPA in the study population (N=53)

Axial CTPA section of patient MB-1911220201, showing thrombus in main pulmonary artery extending into both pulmonary arteries. Axial CTPA section of patient MB-1907126049, showing thrombus in right and left pulmonary arteries. Evidence of deep vein thrombosisby venous doppler in 39.62% of the participants.

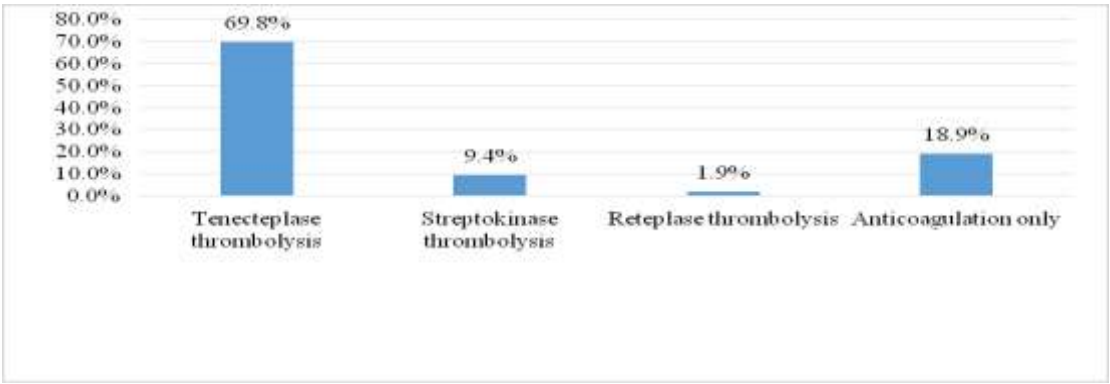


Figure 7.0: Bar chart of therapy in the study population (N=53)

As fig no 6. Shows that Among the study population, most (69.81%) participants received tenecteplase thrombolysis ,followed by streptokinase thrombolysis (9.43%), reteplase thrombolysis in 1.89%. 10(18.87%) participants received only anticoagulation.
At discharge most (40) patients received anticoagulation with acitrom(75.47%) followed by rivaroxaban(13.20%) , dabigatran, apixaban, warfarin respectively.Mean dose of acitrom at discharge was 2.39 ±0.9 mg.Most of the (96.23%) patients were discharged in a stable clinical condition, 2 patients died in hospital, mortality rate in the present study was 3.77%.No major bleeding events occurred, minor bleeding events occurred in 3(5.66%) of the study population.

Discussion

This retrospective study gives an insight on the clinical profile of a cohort of 53 hospitalized patients in India with a confirmed diagnosis of acute PE based on CT pulmonary angiography. In the study population 49.15 ± 16.08 was the mean age. Lolly, M., et al (11) performed a retrospective study in 56 participants in which 47.7 ± 13 was the mean age of the study population. In a prospective study conducted by Diwan, A., et al. (12) in 55 patients 44.98 years was the mean age of the participants.
Majority of the patients were males with (67.92%) , females were (32.08%). In a prospective study performed by Agarwal, R., et al. (13) 70.83% of patients were males and 29.16% were females. Diwan, A., et al. (12) conducted a prospective study in a population of 55 patients

in which majority of the participants were males with 83.6% and females with 16.4%. In our study smoking was the major risk factor for acute PE and was found in of the`18 patients(33.96%). In a study conducted by Diwan, A., et al.(12)Smoking (40%) was the most common risk factor .This could be due to the fact that smoking increases the risk of DVT, which is also confirmed in our study, whereapproximately21(39.62%) patients were diagnosed with a lower limb DVT as the primary cause of PE. Similar to other studies like Diwan, A., et al.(12),Chaurasia, S., et al. (14) dyspnea was the predominant symptom (94.34%).

The study population(64.15%)of participants had normal chest X ray whereas pleural effusion, consolidation and lobar collapse were identified in 16.98%, 16.98% and 5.66% respectively. In the study conducted by David singh., S, et al (15) 85.7% of the participants had normal chest X ray while 5.7% had wedge shaped opacity and lobar collapse each. Lolly, M., et al. (11) conducted a retrospective study in 53 patients in which normal X ray showed by 81.1% of patients while consolidation, pleural effusion and both the consolidation and pleural effusion were identified in 9.4%, 7.5% and 1.8% of patients respectively. The chest radiograph cannot be used to diagnose or exclude PE, it contributes to the non-invasive diagnostic assessment of PE through the exclusion of disease processes that may mimic PE.

Transthorasic echocardiography was done in all the patients in our study. An abnormal ECHO was found in 79.25% of the patients. This implies its use as an important screening tool in a suspect of acute PE, especially if there is no prior cardiopulmonary disease. Most patients had right atrial and right ventricular dilatation with evidence of moderate degree pulmonary arterial hypertension(73.58%) by 2d echo. Similar findings were found in a study done by Agarwal *et al*.,(13)where 83% of the patients with a confirmed diagnosis of acute PE had an abnormal ECHO.

2D echo was done by Philips AFINITI 70machine .pulmonary artery systolic pressure was calculated by TR jet velocity using bernoulli s method(P= 4v2).RV function was assessed by eye ball method and also by TAPSE. TAPSE less than 16 mm indicates rv systolic dysfunction. PAH was categorized as mild ,moderate , severe based on PASP(mild:40-45 mmhg, moderate :46-60 mmhg, severe :greater than 60 mmhg, Diwan, A., et al.(12) The use of spiral CTPA is a major advancement in the diagnosis of PE. The sensitivity and specificity for detection of pulmonary embolus by CTPA at the main, lobar and segmental levels are greater than 90% with accuracy decreasing when isolated sub segmental vessels are involved (14). Also, spiral CTPA has a greater inter observer agreement. With the third-generation scanners which provide 1-mm resolution in a single breath hold, the spiral CTPA is now the preferred imaging (16). CT PA was performed in all patients by Philips ict 256 slice ct at our hospital. Most patients lobar (67.9%) distribution of thrombus in the ct pulmonary angiogram.

Thrombolytic therapy is recommended in all patients with high-risk PE, unless contraindicated Routine use of thrombolytics in non-high risk PE is not recommended but may be considered in selected cases with intermediate-risk PE. Both half dose thrombolysis and ultrasound catheter-based low dose thrombolysis have been found to be effective with significantly less bleeding. This would allow more patients to benefit from therapy taking into account the long term benefit on development of pulmonary hypertension Thrombolytic therapy is not recommended in patients with low risk PE.(17) Among the study population, most (69.81%)participants received tenecteplase thrombolysis ,followed by streptokinase thrombolysis (9.43%),reteplase thrombolysis in 1.89% . 10(18.87%) participants received only anticoagulation. Lastly it was found that, despite the mode of treatment given, the clinical outcome was good with only 2(3.77%) in hospital deaths among the 53 patients. This could be due to the prompt diagnosis and treatment N given to this group of patients or due to

the younger age of the cohort..Agarwal, R., et al. (18) conducted a prospective study in 24 participants in which 83.3% of patients were discharged stable and 16.66% was the mortality rate in the study population.

Conclusion

PE is a clinical condition that is frequently misdiagnosed and under recognized globally. It takes a strong index of suspicion to rule out the diagnosis. Newer imaging modalities are becoming more widely available, which could help in diagnosis. Even in cases when diagnostic methods are not readily available, empirical treatment ought to be started. In this potentially lethal illness, early detection and aggressive, proper therapy enhance the prognosis.

Conflict of interest: Nil

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