

Clinical Profile & Management Of Acute Pulmonary Embolism In A Tertiary Care Centre At South Tamilnadu In This Covid Era

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DOI: 10.29322/IJSRP.12.09.2022.p12911

<http://dx.doi.org/10.29322/IJSRP.12.09.2022.p12911>

Paper Received Date: 18th July 2022

Paper Acceptance Date: 29th August 2022

Paper Publication Date: 6th September 2022

Abstract- Background: Pulmonary embolism is a potentially life-threatening condition. There is a rising trend in pulmonary embolism after the advancement of covid 19 infection.

Methods: It is a prospective observational study conducted in the department of Cardiology, Tirunelveli Medical College hospital from April 2021 - March 2022. All patients diagnosed with pulmonary embolism by CTPA or direct evidence of thrombus in an Echocardiogram were included in the study. Pre-existing cardiac or pulmonary disease & CTEPH were excluded. Risk factor assessment was done including the covid status, D dimer, Troponin T, ECG, Echocardiogram & CTPA. The patients were followed up 2 days after thrombolysis/anticoagulation, 1 week & after 3 months.

Results: Among 28 pulmonary embolism patients, 7 patients had a prior covid infection. Of which CTPA showed the central distribution of thrombus in 6 patients (85.7%), and peripheral distribution in 1 patient (14.3%). High risk category found in 4 patients (57.1%), intermediate high risk in 1 patient (14.3%) & intermediate low risk in 2 patients (28.6%). 5 patients (71.4%) had pulmonary embolism without evidence of DVT. Among 7 patients, 3 received thrombolytic therapy (42.86%), rest were treated with heparin. 6 patients (85.7%) had resolution & 1 patient (14.3%) showed persistent pulmonary hypertension on follow-up.

Conclusion: Post covid patients had a higher thrombus burden when compared to noncovid patients and had better clinical outcomes with appropriate management.

Index Terms- Pulmonary embolism, Post covid patients

I. INTRODUCTION

Venous thromboembolism presenting as Pulmonary embolism or DVT is globally the third most frequent acute cardiovascular syndrome next to MI & stroke¹. Annual incidence of pulmonary embolism ranges from 39-115/ 1,00,000

population^{2,3}. About 10% of pulmonary embolism is fatal during the first hour⁴. The mortality rate is 3-8%, increasing to about 30% in untreated patients.

II. OBJECTIVE

To study risk factors including covid status, clinical profile, ECG & echocardiographic features in patients with acute pulmonary embolism, to assess the severity of pulmonary embolism, classify them according to disease severity & management of acute Pulmonary Embolism patients with anticoagulation and/or advanced therapy in addition to anticoagulation, its outcome & prognostic significance.

III. METHODS OF DATA COLLECTION

It is a prospective observational study conducted in the department of Cardiology, Tirunelveli Medical College hospital from April 2021 - March 2022 for 1 year.

INCLUSION CRITERIA: All patients diagnosed with acute pulmonary embolism by CTPA or direct evidence of thrombus in an Echocardiogram were included in the study.

EXCLUSION CRITERIA: Pre-existing cardiac or pulmonary disease & CTEPH were excluded.

The clinical presentation, investigations & management were analyzed in all pulmonary embolism patients. Pulmonary embolism was diagnosed if there was evidence of thrombus in CTPA or echocardiogram. D-dimer, Troponin T, ECG, Echocardiogram, & CTPA were done. Routine blood investigations, coagulation profile, inherited thrombophilia workup, ANA, and assessment of the covid status of the patient by RTPCR, CT chest, or previous history of positive covid status in the last 6 months was assessed. The pulmonary embolism severity assessment is done & classified according to disease severity.

Patients who were eligible for advanced therapy were lysed using a Streptokinase bolus of 2.5 lakh units over 30 mins followed by an infusion of 1 lakh units/hour for 24hrs. The rest of the patients were anticoagulated with unfractionated heparin 80U/kg IV bolus followed by an 18U/kg/hr infusion. The patients were clinically & echocardiographically followed up 2 days after advanced therapy or anticoagulation, 1 week later, and after 3 months. The outcome & prognostic significance of our management is assessed.

IV. RESULTS

Among 28 pulmonary embolism patients, 7 patients had a prior covid infection. Of which CTPA showed the central distribution of thrombus in 6 patients (85.7%), and peripheral distribution in 1 patient (14.3%). High risk category found in 4 patients (57.1%), intermediate high risk in 1 patient (14.3%) & intermediate low risk in 2 patients (28.6%). 5 patients (71.4%) had pulmonary embolism without evidence of DVT. Among 7 patients, 3 received thrombolytic therapy (42.86%), rest were treated with heparin. 6 patients (85.7%) had resolution & 1 patient (14.3%) showed persistent pulmonary hypertension on follow-up.

V. DISCUSSION

Pulmonary Embolism is often unrecognized & under-diagnosed. A high index of suspicion is necessary because clinical signs & symptoms of pulmonary embolism are nonspecific. Further, routine laboratory tests are nonspecific & not helpful in diagnosis. Therefore, patients suspected to have pulmonary embolism because of unexplained dyspnea, tachypnea, chest pain, or the presence of risk factors must undergo diagnostic tests until the diagnosis is confirmed or an alternative diagnosis is made. With the advent of CT pulmonary angiogram (CTPA), there is increased recognition of pulmonary embolism in India. Despite diagnostic advances, delays in pulmonary embolism diagnosis are not uncommon⁶. When definitive diagnostic tests are not available, empiric treatment should be initiated immediately. Early diagnosis & aggressive therapy improves the outcome in pulmonary embolism patients.

Despite rapid advances in diagnosis & management, it is still underreported in India. Most of the reports are limited to short case series⁷. No such studies are performed in South Tamil Nadu so far. Venous thromboembolism is one of the major cardiovascular hazards noted in more than >20% of critically ill covid patients. When surveillance venous ultrasonography was performed, the frequency of VTE was as high as 69%. Autopsy studies had shown nearly 88% had widespread thromboembolic disease⁸. Small arteries (< 1mm) had fibrin thrombi in 87%⁹. Dysregulated immune response, hypoxia & direct triggers by SARS-CoV-2 contribute to the thrombotic milieu¹⁰. RV failure due to acute pressure overload is the primary cause of death in severe pulmonary embolism⁵.

VI. LIMITATION

Asymptomatic patients and patients with nonspecific signs & symptoms were not included in the study.

VII. CONCLUSION

Early diagnosis & aggressive therapy improves outcome in pulmonary embolism patients. Post covid patients had a higher thrombus burden when compared to noncovid patients and had better clinical outcomes both in terms of mortality and morbidity with appropriate management.

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	NONCOVID PTE (n 21)	COVID PTE (n 7)
Symptoms - dyspnoea	18 (85.7%)	7 (100%)
cough	6 (23.8%)	2 (28.6%)
chest pain	4 (19%)	1 (14.3%)
syncope	2 (9.5%)	1 (14.3%)
Signs - Tachypnoea	20 (95.2%)	6 (85.7%)
Tachycardia	19 (90.5%)	6 (85.7%)
Hemoptysis	4 (19%)	1 (14.3%)
Fever	2 (9.5%)	1 (14.3%)
SpO2 ≤ 90%	9 (42.9%)	3 (42.8%)
Venous doppler evidence of DVT	16 (76.2%)	2 (28.6%)
ECG - Sinus tachycardia	19 (90.5%)	6 (85.7%)
RV strain	19 (90.5%)	6 (85.7%)
P pulmonale	2 (9.5%)	1 (14.3%)
RAD	5 (23.8%)	1 (14.3%)
ICRBBB	5 (23.8%)	1 (14.3%)
S1Q3T3	7 (33.3%)	1 (14.3%)
SVT	0 (0%)	1 (14.3%)
Echo - RA/RV dilatation	19 (90.5%)	7 (100%)
Flat IVS	18 (85.7%)	6 (85.7%)
60/60 sign	18 (85.7%)	6 (85.7%)
Mcconnell sign	14 (66.7%)	4 (57.1%)
PHT	18 (85.7%)	7 (100%)
Direct evidence of thrombus	7 (33.3%)	2 (28.6%)
RV Dysfunction	15 (71.4%)	6 (85.7%)
Positive trop T	5 (23.8%)	4 (57.1%)
PESI - Class I	6 (28.6%)	0 (0%)
Class II	4 (19%)	1 (14.3%)
Class III	6 (28.6%)	4 (42.8%)
Class IV	3 (14.3%)	2 (28.6%)
Class V	3 (14.3%)	1 (14.3%)
CTPA Central thrombus	14 (66.7%)	6 (85.7%)
Peripheral thrombus	7 (33.3%)	1 (14.3%)
High risk	2 (9.5%)	4 (57.1%)
Intermediate high	9 (42.9%)	1 (14.3%)
Intermediate low	7 (33.3%)	2 (28.6%)
Low risk	3 (14.3%)	0 (0%)
Nasal O2	9 (42.9%)	5 (71.4%)
Inotropics	2 (9.5%)	3 (42.86%)
Anticoagulant alone	11 (52.4%)	4 (57.14%)
Thrombolysis & anticoagulation	10 (47.6%)	3 (42.86%)
Discharged	19 (90.9%)	7 (100%)
Expired	2 (9.1%)	0 (0%)
Follow up 1 week Normal	7 (33.3%)	4 (57.1%)
RA RV Dilatation	14 (66.7%)	3 (42.86%)
PHT	14 (57.1%)	3 (42.86%)
RV dysfunction	5 (23.8%)	1 (14.3%)
Residual thrombus	3 (14.3%)	1 (14.3%)
Follow up 3 months Normal	13 (61.9%)	6 (85.7%)
RA RV Dilatation	8 (38%)	1 (14.3%)
PHT	8 (38%)	1 (14.3%)
RV dysfunction	3 (14.3%)	1 (14.3%)
CTEPH	8 (38%)	1 (14.3%)

Table 1: Baseline characteristics of pulmonary embolism patients

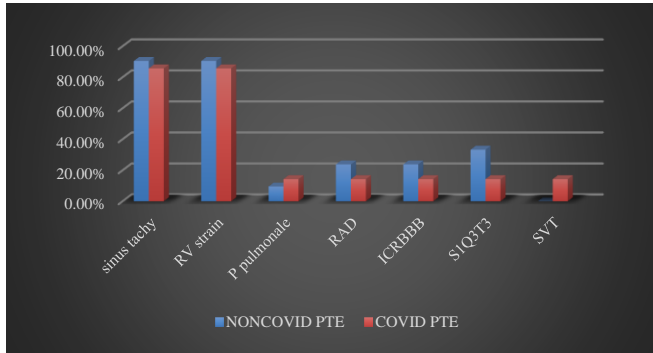


FIG 1: ECG features of pulmonary embolism patients

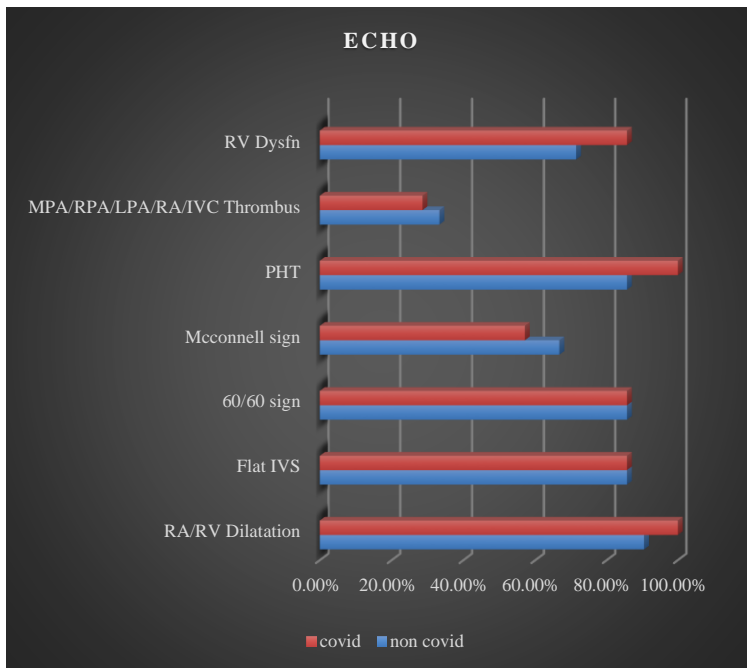


FIG 2: Echocardiographic manifestations in pulmonary embolism patients

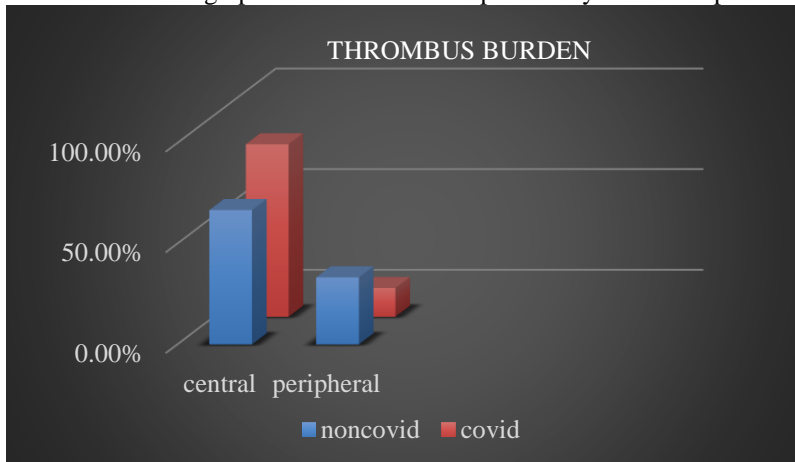


FIG 3: Thrombus burden in pulmonary embolism patients

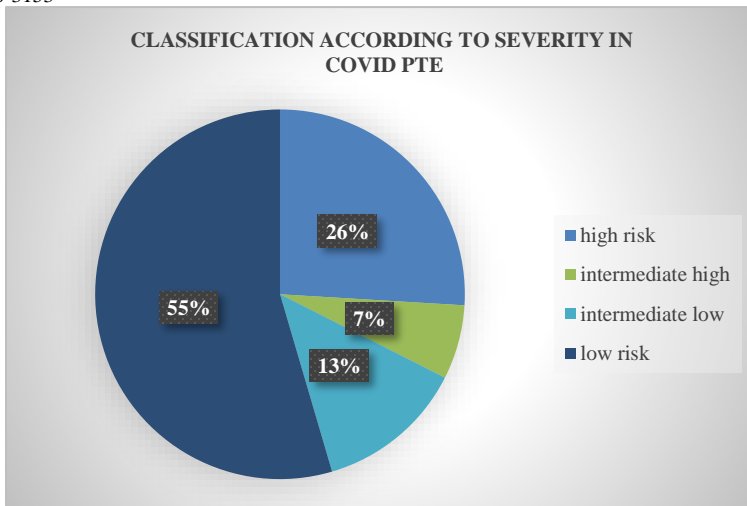


FIG 4: Classification of pulmonary embolism according to the severity in covid patients

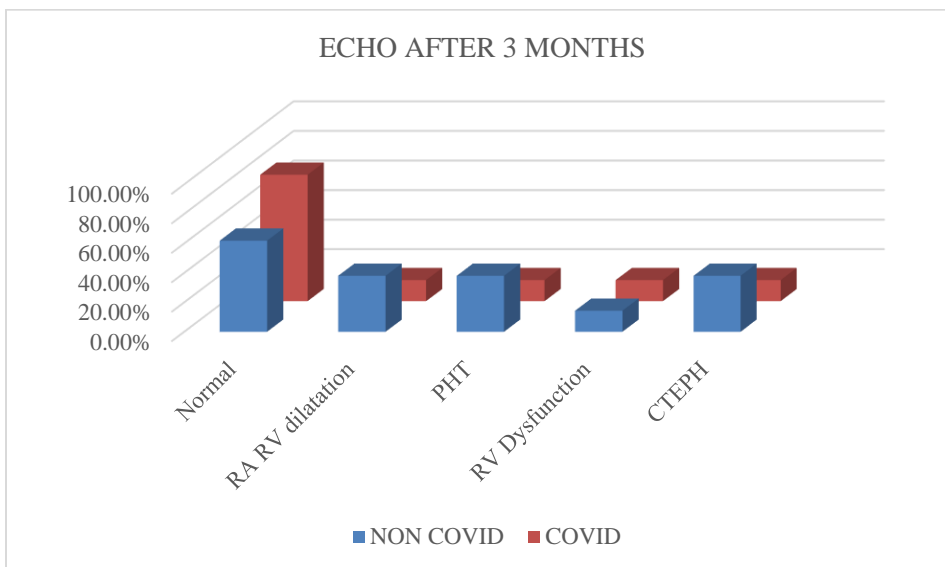


FIG 5: Follow up ECHO after 3 months