Clinico Radiological Profile of Pulmonary Thromboembolism in a Tertiary Care Hospital

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Abstract: Introduction: The diagnosis of Pulmonary embolism (PE) is often missed due its varied clinico-radiological presentation. The presentation may vary from an incidental finding in an asymptomatic patient to sudden death. High index of suspicion is required for early diagnosis and prevention of mortality since pulmonary embolism is Aim: To study the clinical and radiological profile of patients diagnosed with pulmonary thromboembolism. Methods: This Retrospective observational study was carried out in 30 patients diagnosed with pulmonary embolism admitted in the year 2012 to 2015 tertiary care hospital and their clinical and radiological profile was recorded and analyzed. Results: The mean age of patients was 47.94yrs. Male sex predominance was found. The most common predisposing factor was immobilization. Dyspnea was the most common symptom followed by swelling and pain of lower limb. Sinus tachycardia followed by RV strain was the significant ECG finding. Pulmonary arterial hypertension was assessed by ECHO was present in 86% of patients. CT pulmonary angiogram finding revealed thrombus lodgment mainly in sub segmental level followed by segmental level. Conclusion: Pulmonary embolism must be suspected in those patients presenting with acute breathlessness with normal chest X-ray and sinus tachycardia particularly when associated with RV strain pattern in the presence of risk factors for PE. The awareness that classical findings of PE in X-ray and ECG are uncommon, need to be stressed among general practitioners and physicians.

Keywords: Pulmonary thromboembolism, immobilization, normal chest X-ray, pulmonary hypertension

1. Introduction
Pulmonary thromboembolism (PE) is a devastating clinical problem. Mortality rate of diagnosed and treated pulmonary embolism ranges from 3 to 8%, but increases to about 30% in untreated pulmonary embolism [1]. Many cases are missed due to lack of clinical suspicion even in tertiary care centers. This is because of the fact that the clinical signs and symptoms of pulmonary thromboembolism are often found to be nonspecific. The availability of CT pulmonary angiography (CTPA) enables rapid diagnosis and hence management of PE in the appropriate clinical setting. Awareness of the varied clinic radiological presentation of pulmonary thromboembolism enables early diagnosis and reduction in mortality.

2. Aims and Objectives
To study the clinico-radiological profile of patients diagnosed with pulmonary thromboembolism.

3. Methodology
This Retrospective study was conducted at Department of Respiratory Medicine, Chettinad Hospital and Research Institute. Case Records of the patients with confirmed diagnosis of pulmonary thromboembolism admitted during the period of 2012-2015 in this hospital were included in the study. Clinical history including risk factors, Radiology (Chest X ray & CTPA) findings, Electrocardiography and Echocardiographic findings were recorded from the case records. All the above parameters are recorded and analyzed.

4. Results
Thirty patients were included in this study and the results obtained after applying appropriate statistical tests are presented below.

4.1 Demographic Characteristics
The mean age of the patients was 47.94yrs ±16.38(95% CI - 41.93 to 53.94).66% of patients were males while 33% of patients were females. Thus male predominance in the ratio of 2:1 was noted.

4.2 Predisposing factors
The most common predisposing factor noted was prolonged immobilisation. 63.3% of patients had a history of prolonged immobilisation followed by trauma, nephrotic syndrome, protein C and S deficiency, atrial myxoma and oral contraceptive pills. Table 1

| Table 1: Predisposing factors |
|-------------------------------|
| Predisposing Factors | Number of Patients (N=30) |
|------------------------|--------------------------|
| Immobilization         | 19(63.33%)               |
| Trauma                 | 5(16.66%)                |
| Nephrotic syndrome     | 2(6.66%)                 |
| Protein C and S deficiency | 2(6.66%)               |
| Atrial myxoma          | 1(3.0%)                  |
| Oral contraceptive pills | 1(3.0%)                 |
4.2 Clinical Features

The most common symptom of presentation was dyspnea that was found in 84% cases followed by lower limb pain and swelling 53%. Other presenting symptoms and their frequency is shown in Table-2.

4.3 ECG and Echocardiography

The most common ECG finding noted was sinus tachycardia (86%) followed by RV strain pattern (70%). The Classical ECG finding of S1Q3T3 pattern was present only in 20% of patients as shown in Table-3. Echocardiographic examination revealed the presence of pulmonary hypertension in twenty-six patients (86.6%) out of which sixteen (62%) patients had a moderate PAH, six (23%) patients had mild PAH and four (15%) patients were found to have severe PAH. Table-4

4.4 Radiologic Findings

Normal chest radiograph was the most common X-ray finding (66%), followed by Pleural effusion (16.6%) and elevated right Hemidiaphragm(10%) Table-5. The most common site of thrombus was found at sub segmental level followed by segmental and central part of main pulmonary artery on CTPA. Table 6

| Table 2: Clinical presentation: |
|---------------------------------|
| **Symptom** | **Number of Patients (N=30)** |
| Dyspnea     | 25 (84%)                     |
| Lower Limb pain & swelling     | 16(53%)                      |
| Chest pain  | 5 (16%)                      |
| Cough       | 3 (9%)                       |
| Fever       | 2 (4%)                       |
| Hemoptysis  | 1 (3%)                       |

| Table 3: ECG Findings: |
|------------------------|
| **ECG Finding** | **Number of Patients (N=30)** |
| Sinus Tachycardia    | 26 (86%)                     |
| RV strain            | 21 (70%)                     |
| S1Q3T3 Pattern       | 6 (20%)                      |
| RBBB                 | 3 (10%)                      |

| Table 4: ECHO findings |
|------------------------|
| **ECHO - PAP** | **Number of Patients (N=30)** |
| Normal PAP       | 4 (15%)                      |
| Mild PAH (30-50mmHg) | 6 (23%)                    |
| Moderate PAH (50-70mmHg) | 16 (62%)                    |
| Severe PAH (>70mmHg) | 4 (15%)                     |

| Table 5: X-ray findings |
|------------------------|
| **Chest X Ray** | **Number of Patients (N=30)** |
| Normal            | 20 (66%)                     |
| Pleural Effusion  | 5 (16.6%)                    |
| Elevated right Hemidiaphragm | 3 (10%)          |

| Table 6: CT Pulmonary Angiography Findings |
|------------------------------------------|
| **Location of Thrombus** | **Number of Patients (N=30)** |
| Central                    | 4 (13%)                       |
| Segmental                  | 11 (37%)                      |
| Sub segmental              | 15 (50%)                      |
5.4 Radiologic Findings

Worsley et al [6] found that 12% of patients with PE had a normal chest x-ray among 45 patients. Calwin Davidsingh et al [5] in their study among 35 patients found that 30 patients had normal chest x-ray. A. Toribicki et al [12] found that plate like atelectasis was the most common finding in chest x-ray in 66%, followed by pleural effusion and elevation of hemi diaphragm, among 64 patients diagnosed with pulmonary thromboembolism.

The value of CTPA in the diagnosis of PE was evaluated in several studies. M RemyJardin et al [13] found that among 112 patients diagnosed with pulmonary embolism, the most common finding was thrombus in sub segmental level followed by segmental and main pulmonary artery. Oser RF et al [14] found that emboli is located exclusively in sub segmental arterial branch among 79 patients. In our study the most common abnormality on CTPA was thrombus at the sub-segmental level. Saddle embolus was found in three patients overall.

6. Conclusion

Pulmonary embolism must be suspected in those patients presenting with acute breathlessness with normal chest X-ray and sinus tachycardia particularly when associated with RV strain pattern in the presence of risk factors for PE. The awareness that classical findings of PE in X-ray and ECG are uncommon, need to be stressed among general practitioners and physicians, to enable early diagnosis and prevent mortality.

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