

ORIGINAL RESEARCH PAPER		Radio-Diagnosis
<div></div> <div>“EVALUATION OF SPECTRUM OF CASES OF PULMONARY THROMBOEMBOLISM, USING MDCT PULMONARY ANGIOGRAPHY”</div>		KEY WORDS: Computed tomography pulmonary angiography, pulmonary embolism
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ABSTRACT	Imaging plays an important role in the evaluation and management of acute pulmonary embolism (PE). Computed tomography (CT) pulmonary angiography (CTPA) is the current standard of care and provides accurate diagnosis with rapid turnaround time. CT also provides information on other potential causes of acute chest pain. With dual-energy CT lung perfusion abnormalities can also be detected and quantified. Chest radiograph has limited utility, occasionally showing findings of PE or infarction, but is useful in evaluating other potential causes of chest pain. Ventilation-perfusion (VQ) scan demonstrates ventilation-perfusion mismatches in these patients, with several classification schemes, typically ranging from normal to high. Magnetic resonance imaging (MRI) also provides accurate diagnosis, but is available in only specialized centers and requires higher levels of expertise. Catheter pulmonary angiography is no longer used for diagnosis and is used only for interventional management. The aim of this study is to illustrate the spectrum of abnormalities in patients presenting with clinical suspicion of pulmonary embolism (1).	
INTRODUCTION	enrolment in the study	
Pulmonary embolism (PE) is a common and often fatal complication of venous thromboembolic disease (VTE). Indeed, it is the third leading cause of cardiovascular-related death. Correct diagnostic work-up is pivotal to ensure timely institution of appropriate therapy (2). While multi-detector computed tomography (CT) pulmonary angiography (CTPA) is the most commonly used modality in the workup of suspected PE. Accurate diagnosis of PE is important because the consequences of a false-positive or false-negative diagnosis can be rapidly fatal (3). Establishing a diagnosis of PE can be challenging, as patients often present with nonspecific symptoms. Classic presentations include acute onset of dyspnea, pleuritic chest pain, tachycardia, and signs of right heart strain. A correct interpretation of the clinical picture is essential for generating a diagnostic hypothesis concerning these clinical entities, so that an investigative pathway could be set up to confirm it and to rule out the other differential diagnosis.	Inclusion criteria: 1. Patient clinically symptomatic. 2. Patients above age of 18 years.	
Aim:	Exclusion Criteria: 1. Patients with history of claustrophobia. 2. Patients with the allergy to iodinated contrast, contraindications for IV contrast (creatinine >1.5 mg/dl, hyperthyroidism), severe cardiorespiratory insufficiency and hemodynamic instability as well as pregnancy.	
Objectives:	Apparatus And Materials	
The purpose of this study is to diagnose and evaluate the signs associated with pulmonary embolism cases in a systematic way (other than pulmonary embolism itself).	<ul style="list-style-type: none">• Study was explained to the patient & written informed consent was taken for contrast administration.• Renal function test was performed. Appropriate gauge IV cannula was inserted into a superficial vein of the upper limb.• Intravenous non-ionic, low osmolar contrast agent (e.g. Iomeprol/ Iohexol) injection at a flow rate of 3.5 – 4.0 ml/sec. Multi-detector row CT angiography was performed on Siemens 'Somatom Perspective' 128 slice CT scanner.• The patients were scanned in a supine position with the arm above the head. A breath-hold was requested from the patients trying to avoid respiratory motion artifact. A region over interest was drawn on the main pulmonary artery. Bolus IV injection of non-ionic contrast medium 1.2 ml/kg was used at rate 4 ml/s using injector pump followed by 40 ml saline at rate 4 ml/s• Post scan processing was done using multi planar reconstruction, curved planar reconstruction, maximum intensity projection (MIP), volume rendered imaging. Data was collected and compiled using Microsoft Excel. Statistical analysis was done using descriptive statistics.	
MATERIALS AND METHODS	Risk Factors:	
Study Type / Design:	<ul style="list-style-type: none">• Age > 60 years.• Immobilisation• Surgical Procedure• Malignancy	
<ul style="list-style-type: none">• Hospital based descriptive study.		
Source Of Data:		
<ul style="list-style-type: none">• Patients visiting the department of Radiology at a tertiary care centre.		
Participant Size - minimum 351 cases.		
Informed consent was taken from each participant prior to		
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- Genetic factors
- Obesity
- Use of oral contraceptive pills
- Congestive heart failure
- H/o Myocardial infarction
- H/o PTE
- Chemotherapy

Signs And Symptoms:

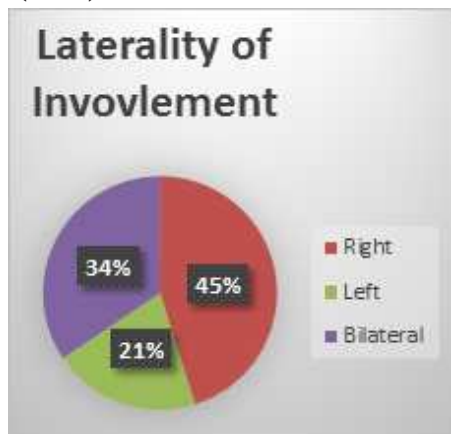
- Dysnea
- Tachypnea (>18 breaths/min)
- Cough
- Syncope
- Hemoptysis
- Hypotension (Systolic BP < 90 mm Hg)
- Tachycardia (HR > 100 beats / min)
- Clinical signs of RV overload
- Distended neck veins
- Tricuspid Regurgitation

RESULTS:

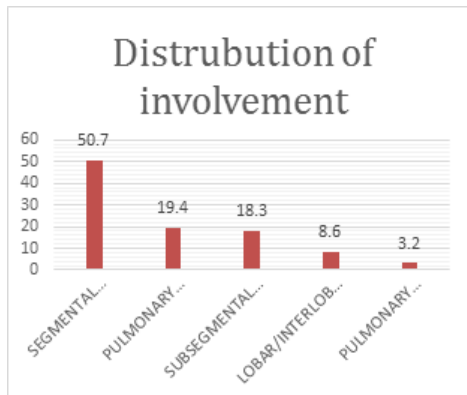
In this study, 351 patients were involved with respiratory complaints suspected of pulmonary thromboembolism. Out of which only 93 were diagnosed with pulmonary thromboembolism.

AGE (YEARS)	NO. OF PATIENTS	PERCENTAGE (%)
10 - 20	2	2.1
21 - 30	6	6.4
31 - 40	9	9.6
41 - 50	10	9.7
51 - 60	40	43.0
61 - 70	18	19.3
71 - 80	8	8.6

Out of these patients, 53 patients (56.9 %) were males and 40 patients (43.0%) were females.



Bilateral involvement was seen in 32 (34%), right sided in 42 (45.2%) and left sided in 19 (20.4%) patients.

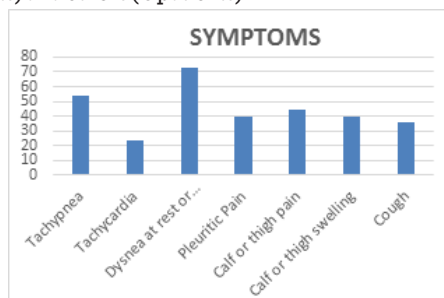


Among the 351 CTPAs performed within the study period, 93 of them (26.5%) had evidence of PE. Half of those (50.7%)

were found within segmental pulmonary arteries. This was followed by the pulmonary artery (19.4%), subsegmental (18.3%), lobar/interlobar (8.6%), and pulmonary trunk (3.2%).



The risk factors identified in our study were: Recent surgery (15 patients), pregnancy (10 patients), previous DVT (21 patients), OCP pills (5 patients), Prolong bed rest (11 patients), trauma (21 patients), hypercoagulable state (5 patients) and others (5 patients).



Dysnea and tachypnea were the most common chief complaints with which patients presented to OPD.



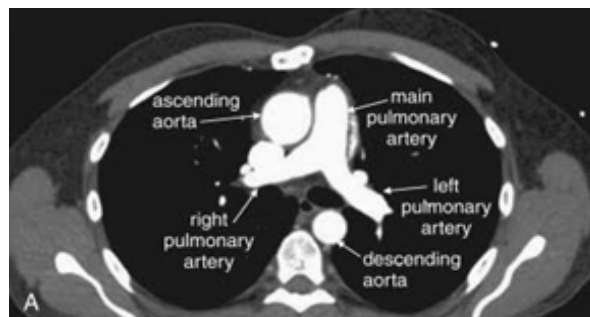
Out of these patients, 53 patients (57%) were males and 40 patients (43%) were females.

DISCUSSION:

The most common age group of patients was the 5th decade with 43.0% (40 patients) presenting between 51-60 years. A slight male predominance was noted with 56.9 % male and 43.0 % female population. Thus the M:F ratio was 1.3.

22.5 % of patients had history of trauma and DVT each, followed by history of recent surgery and prolong bed rest in 16.1 % & 11.8 % of patients respectively.

Case - 1



Normal CT Pulmonary Angiogram (Axial image)

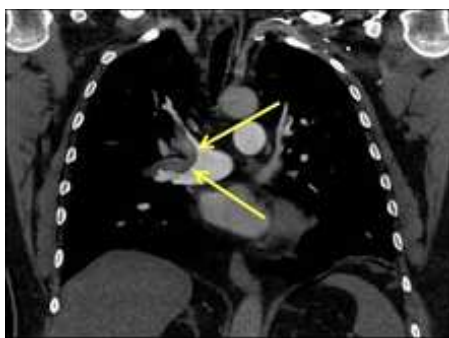


Normal CT Pulmonary Angiogram (Coronal Image)

Regarding clinical presentation, most common chief complaints with which patients presents to the OPD were dyspnea, tachypnea and calf pain.

Most common site of involvement was in segmental pulmonary artery (50.5%) followed by pulmonary artery (19.4%) and subsegmental artery (18.3%).

Case -- 2



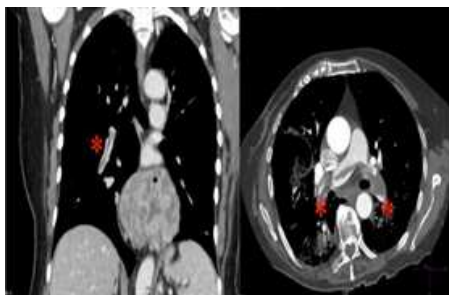
Hypodense filling defect noted in right main pulmonary artery and extending into its lobar branches.

Case - 3



CTPA shows saddle embolism.

Case - 4



CTPA showing hypodense filling defect in segmental branches on right side (coronal image) and left and right pulmonary arteries extending into its branches.

CONCLUSIONS:

CTPA is efficient and accurate in the vealuation of PTE. It can detect thrombosis with respect to number of sites, its extension and nature of involvement. MDCT angiography shows more vascular segments than DSA. Parenchymal disease as well as bony evaluation can also be obtained.

CT and angiography have complementary roles in accurate diagnosis of acute and chronic thromboembolic diseases. Conventional angiography should be used as a problem solving technique after CT angiography have been performed because CT angiography is less invasive.

CTPA is the current gold standard in the diagnosis of acute PTE with high accuracy , wide availability and rapid turnaround time. Invasive pulmonary angiography is reserved for those patients needing endovascular intervention.

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