The Role Of Multi-detector CT Pulmonary Angiography In Pulmonary Vascular Disorders

Thesis submitted for fulfillment of MD degree in Radiodiagnosis

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ABSTRACT

Introduction: Multi-detector pulmonary CT angiography is now the first line of investigation in the diagnosis of most of the pulmonary vascular disorders. The increase in gantry speed and thinner collimation that accompanied the introduction of multidetector CT scanners has extended the accuracy of assessment of the pulmonary vasculature to the subsegmental level. **Purpose:** The aim of this study is to demonstrate the role of MDCT pulmonary angiography in the diagnosis of different pulmonary vascular disorders. **Patients and methods:** 50 patients were examined using a 4-multidetector CT scanner in the radiology department in Cairo University. The study population was divided into 3 groups. Group A including 29 patients clinically suspected with pulmonary embolism. Group B including 12 patients diagnosed with pulmonary hypertension upon echocardiographic basis. Group C including the last 11 patients having other pulmonary vascular disorders as pulmonary artery aneurysms, congenital anomalies and pre-operative assessment of neoplastic lesions. **Results:** Group A showed 69% of the patients having pulmonary embolism and 27.5% showing embolic filling defects at the subsegnmental level. Group B showed dilated pulmonary artery in all patients, right ventricular enlargement in 33.3% of cases, and dilated bronchial and non-bronchial vessels in 25% of cases. Group c showed a variety of other pulmonary vascular disorders as pulmonary artery aneurysms, congenital absence of the pulmonary artery, Macleod's syndrome, pulmonary AVM (showing the hypertrophied deeding vessels), and pre-operative assessment of a neoplastic hilar mass shown to be irresectable. **Conclusion:** MDCT pulmonary angiography is a relatively available, minimally invasive investigation that can now be considered as the first line of investigation in diagnosis of pulmonary embolism with its ability to detect small emboli down to the segmental and subsegmental level. It is of value in patients with pulmonary hypertension as it shows different signs of pulmonary hypertension as well as the possible cause. In most cases of congenital anomalies and pulmonary aneurysms pulmonary CTA provides the needed data for management in such cases.

KEYWORDS: CT pulmonary angiography (CTPA) - pulmonary vascular disorders - pulmonary embolism (PE) - pulmonary hypertension.

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LIST OF ABBREVIATIONS

2D	two dimensional
3D	three dimensional
ACS	acute coronary syndrome
AD	aortic dissection
APAH	associated pulmonary arterial hypertension
AVM	arteriovenous malformation
COPD	chronic obstructive pulmonary disease
CPR	curved planar reconstruction
CREST	calcinosis, Raynaud's, oesophageal dysmotility, sclerodacyly, telangiectasia
CTEPH	chronic thrombo-embolic pulmonary hypertension
CTPA	computed tomography of pulmonary angiography
DSPA	digital subtraction pulmonary angiography
DVT	deep venous thrombosis
ECG	electrocardiogram
F4	Fallot's tetralogy
FOV	field of view
FPAH	familial pulmonary arterial hypertension
HIV	human immune difeciency virus
HU	Hounsfield unit
ICBT	intercostobronchial trunk
ICU	intensive care unit
IPAH	idiopathic pulmonary arterial hypertension
IVC	inferior vena cava
LV	left ventricle
MDCTPA	multidetector computed tomography of pulmonary angiography
MIP	maximum intensity projection
MPR	multiplanar reconstruction
PA	pulmonary artery
PACS	picture archiving and communication system
PAH	pulmonary arterial hypertension
PAVM	pulmonary arteriovenous malformation

PCH	Pulmonary capillary hemangiomatosis
PCTA	pulmonary computed tomography angiography
PE	pulmonary embolism
PH	pulmonary hypertension
PIOPED	prospective investigation of pulmonary embolism diagnosis
PMRA	pulmonary magnetic resonance angiography
POVD	pulmonary veno-occlusive disease
PPH	primary pulmonary hypertension
RA	right atrium
ROI	region of interest
RV	right ventricle
SOB	shortness of breath
SPAH	secondary pulmonary arterial hypertension
SSD	shaded surface display
SVC	superior vena cava
V/Q	ventilation-perfusion scan
VR	volume rendering
VSD	ventricular septal defect
WHO	world health organization

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