

# APPROPRIATE CLINICAL PRACTICES, AN APPROACH TO OPTIMIZE CT PULMONARY ANGIOGRAM TIMELINE AND PATIENT CARE

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## ABSTRACT

**PURPOSE:** To allow closure of audit loop by re-auditing the timeline for computerized tomography pulmonary angiography (CTPA) and monitor whether or not accepted standards of recommendation are maintained since initial audit. **METHODS:** Data from radiology department of SKMCH&RC was collected retrospectively over a three months period and included 124 patients who underwent CTPA. Request time, scan time, time of initial and final reporting was noted. Time elapsed between request to scan and that for scan to report was figured out. Patients were categorized according to their risk for into high, non-high risk and also on into suspected massive and sub-massive pulmonary embolism (PE). Results were compared with the standard guidelines and with the previous audit. **RESULTS:** For comparison with the reporting standards, 20 cases turned out high risk and were suspected massive PE, of which 11 were reported within standard time of 30 minutes. For non-high risk and suspected sub-massive PE, 94 presented to EAR and INP department, 89 of which were reported in same working day and all 10 OPD cases were reported by next working day after scanned. For comparison of time elapsed between request and scan, 4 patients were suspected massive PE, of which 3 were scanned within 1 hour. For suspected sub-massive PE 94 out of 104 cases were scanned with in standard limits of 24 hours. **CONCLUSION:** Though results falls very close to recommended standards yet, Re-audit clearly shows no noticeable upgrading changes since the initial audit. **Keywords:** Clinical audit, CT-scan, Time-lapsed imaging, pulmonary thromboembolism.

## Introduction

Pulmonary embolism (PE) is a common cardiovascular emergency having substantial morbidity and mortality with most death following within first hour of its presentation.<sup>1</sup> Early diagnosis to provide effective management is lifesaving. CTPA due to its non-invasiveness and accuracy is presently used as a first line imaging modality for patient with suspected PE<sup>2</sup> as have shown to be 90-100% sensitive and 89-94% specific for the diagnosis of PE up to the sub segmental level.<sup>3,4</sup>

PE is stratified on the basis of suspected probability into massive or high risk and sub-massive or non-high risk PE thus helping the choice for optimal diagnostic strategy and to guide initial management.<sup>5</sup> This suspected probability clearly corresponds to the increase in the likelihood of PE as with low-risk its 10%, medium-risk 30% and high-risk patient its 65%. Canadian rule is the most commonly employed rule for accurate of risk assessment of patient susceptible for PE.<sup>5,6</sup> The classifying point between massive and sub-massive PE is sustained systolic hypotension of <90 mmHg for massive pulmonary embolism while in sub-massive PE systolic arterial pressure is >90 mmHg.<sup>7</sup>

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CTPA as a modality of choice for PE should ideally be performed within 1 hour for suspected massive and high-risk patients and 24 hours for sub-massive and non-high risk cases.<sup>8</sup> The reporting standards for massive PE is 30 min and for sub-massive is by same day or by next working day depending upon their mode of presentation to the hospital.<sup>9</sup>

To maintain the Audit cycle and to see whether accepted standards of CTPA timeline are achieved since initial audit, a re-audit was performed at the radiology department of SKMCH&RC.

## Method

Using the hospital information system, a retrospective study was conducted from 10th July 2013 till March 2013. About 124 patients who were suspected of having pulmonary embolism were included in the study after exclusion of walk-in patients due to unavailability of their follow-up notes.

Data was compiled in tabulated form. Patients were categorized into massive and sub-massive PE. Patients were also classified on the basis of suspected probability into high-risk and non-high risk by using well criteria. All patients with non-high risk pulmonary embolism were further classified on the basis of their mode of referral for CTPA into EAR, INP and OPD patients and then compared with the recommended standards.

## Results

To compare with reporting time standards just 4 patients were suspected for massive PE, of which all were successfully reported within the standards time of 30 min. For high risk patients there were 16 patients, of which 7 were reported within 30 min.

For sub-massive and low risk patients 94 were presented in EAR and INP department of which 89 patients were successfully reported within same working day. For OPD patients all 10 were reported within next working day of their scanned time. Whereas there was no documented reporting done for delayed reported cases, in all cases the reports were verbally discussed and were acknowledged by the requesting department Physician instantaneously.

For time elapsed between request to scan out of 4 patients with suspected massive PE all were successfully scanned within first hour of their requested time.

For sub-massive PE, 94 out of 104 patients were scanned successfully within 24 hours limit of their request. For all those in which scan was delayed other investigation were done before and CTPA was done simply to rule out PE.

## Discussion

To compare it with the previous audit, Re-audit demonstrate that although the results remains very close to recommended standards, there had been no reasonable change implemented as suggested in the last study. Moreover, the study unveils two in appropriate routine clinical practices adapted at the local hospital.

Taking into account the Radiology Department, until now there are no protocols documented for PE suspected cases to be followed by the residents. Thus to optimize patient care at the hospital this study again recommends that, all residents at the respective department must be informed about the recommended standards for radiological studies, so each case ensures to follow and report accordingly.

Furthermore, the radiology department must highlight the importance of documenting a preliminary report by every resident even after its verbal communication to the referring physician in real-time,<sup>10,11,12</sup> thus keeping the efficiency, validity and reliability of Electronic record system for streamline workup thus providing optimal healthcare to the patient.<sup>13</sup>

Another aspect of the study addresses the referring department's Physician to properly access the patient clinically and document the probability for each referred cases by using scoring criteria's<sup>14</sup> before a request is sent to the radiology department for CTPA. It can be generally concluded from patient's record that there were many of requested cases for which CTPA was done merely to rule out pulmonary embolism or as a part of work-up studies and were not truly suspicion cases for PE. It is evidenced as there were 94 patients referred from INP and EAR department and only 18 turned positive for PE in scans. On the other hand after scoring was done evidently from patient's notes 20 patients were scored high risk, of which 15 came out positive for PE. Therefore every Physician should give prime importance to score all requested cases. This provide a benefit to the patients in terms of providing quality insurance so they don't go under unnecessary and expensive investigation that are not needed for them and for those in which CTPA is

requested as a part of workup studies can go through other essential investigation first. Furthermore this promotes an aid to the radiology department so as to prioritize all CTPA referred cases, to follow and schedule them accordingly.

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