An audit of the adequacy of contrast enhancement in CTPAs in a South African tertiary academic hospital setting

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BACKGROUND

The primary imaging modality in diagnosing pulmonary embolism, a common and life-threatening disease, is computed tomography pulmonary angiography (CTPA). Accurate diagnosis is imperative. Suboptimal contrast enhancement is the second most common cause of indeterminate CTPAs.[1]

AUDIT STANDARDS

Royal College of Radiologists (RCR) guidelines[2]:
- ≤ 210 Hounsfield units (HU) in the main pulmonary artery [Figure 1] = suboptimal contrast enhancement
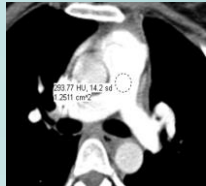- ≤ 11% Studies allowed suboptimal contrast enhancement

Figure 1: Region of interest for HU measurement

OBJECTIVES

- Audit the adequacy of contrast enhancement of CTPAs at Charlotte Maxeke Johannesburg Academic Hospital using the RCR guidelines.
- To determine if suboptimal enhancement is affected by:
  - IV cannula size
  - IV cannula site
  - Injection flow rate
  - Volume of contrast
  - Contrast leakage
  - Day shift versus after hours

METHODOLOGY

Contrast enhancement was measured in all eligible CTPAs in a retrospective audit (December 2019) and prospective audit (January – March 2020). The protocol technique variables were collected prospectively from questionnaires completed by radiographers performing the studies.

RESULTS

A total of 62 (retrospectively) and 130 patients (prospectively) were included with suboptimal contrast enhancement rates of 19% (n=12) [Figure 2] and 21% (n=27) [Figure 3] respectively.
The median flow rate (3ml/s) and contrast volume (80ml) were identical in both optimal and suboptimal groups, while the rest of the protocol variables were not significantly different   ($p > 0.05$).
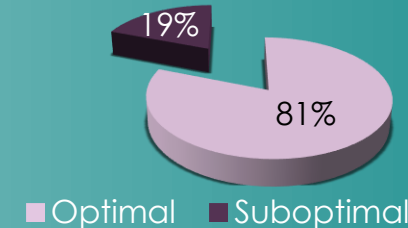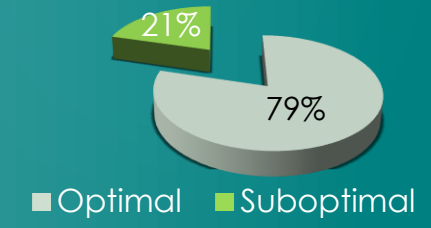

Figure 2: Retrospective audit

Figure 3: Prospective audit

CONCLUSION

The rate of suboptimally enhanced CTPAs is too high, whilst the protocol variables did not have a significant influence on the rate of suboptimal enhancement. Further study is required to establish optimal protocol factors.

REFERENCES

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