Interpretation Of Coronary Computed Tomography Angiography: Agreement of On-call Radiology Residents and Cardiothoracic Radiology Faculty


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Coronary CTA in the Emergency Department

Coronary computed tomography angiography (CCTA) has been shown to improve efficiency of care in the emergency department (ED) for patients with symptoms concerning for acute coronary syndrome.
Implementation of 24-Hour CCTA

- We recently implemented availability of 24-hour CCTA interpretation in the ED
- Cardiothoracic radiology faculty were available to review CCTA studies at all hours
- We aimed to evaluate the feasibility of on-call radiology resident interpretation of CCTA through creation of a dedicated CCTA curriculum for residents and subsequent assessment of agreement between on-call radiology residents and cardiothoracic radiology faculty interpretations

ED CCTA Study Components

- Calcium Score
- CTA
CCTA Curriculum

• Curriculum on performance/interpretation of CCTA was created including both lectures and small group sessions taught by cardiothoracic radiology faculty

• Curriculum included:
  • Three 45-minute group lectures on core concepts
  • Two case-based group lectures reviewing 15 CCTA
  • Faculty-led small group sessions with review of 20 additional CCTA examinations at the PACS workstation

  ▪ Total exposure to 50 CCTA cases with faculty-guided review

Resident Workflow

• Only senior radiology residents (PGY-4 and PGY-5) were responsible for CCTA interpretation on-call, all of which had also completed a required one-month cardiac radiology rotation including exposure to CCTA examinations

• A dedicated resident workflow was created to outline the role of the on-call resident at each stage of the CCTA scan protocol
Resident Duties for CCTA from the ED

1. Protocol the study. Medication ordering is managed by ED.
2. Check calcium score. Do not proceed with CCTA if calcium score >400 as unlikely to exclude significant stenosis.
3. Interpret the case, including axial images and 3D reformations created by 3D lab.
4. Enter preliminary interpretation category and discuss with ED.

Simplified Scoring System for CCTA

- CCTAs were classified by the on-call resident into 5 categories:
  1. Normal
  2. Coronary Stenosis <50%
  3. Coronary Stenosis ≥50%
  4. Calcium Score >400
  5. Non-Diagnostic (motion or other artifacts)
Category 1 - Normal

Category 2 – < 50% Stenosis
Category 3 – ≥ 50% Stenosis

Category 4 – Calcium Score > 400
Category 5 – Non-Diagnostic

Steps Toward Faculty Interpretation

- Residents record preliminary CCTA impression category into online module that permanently saves their choice.
- Residents contact on-call cardiothoracic radiology faculty member for final interpretation.
- Faculty review the case and enter their final CCTA category into online module.
Methods

• We collected 6 months of preliminary resident scores and final faculty interpretation from July 2015 to January 2016

• Agreement between the on-call resident and faculty CCTA score was tabulated

• Historical data on resident interpretation was not available, as previously on-call residents did not routinely and irreversibly record a preliminary interpretations before contacting a faculty member

Acquiring Resident Feedback

• Feedback was obtained from the on-call residents anonymously through the chief radiology residents
  • Successes of the program
  • Areas of concern
Results

- 32 CCTAs were performed in the ED during our 6-month evaluation period

![Resident Preliminary Scores](chart)

Faculty/Resident Agreement

- There was agreement between the on-call resident preliminary category and faculty category in 32/32 cases
Resident Feedback

• Chief residents indicated that the ongoing primary concern of on-call residents throughout the study period was not the interpretation of the studies but rather comfort and familiarity with the workflow including coordination with nursing, technologists, and the 3D lab staff.

Conclusions

• On-call radiology resident categorization of CCTA examinations performed in the ED displayed excellent agreement with cardiothoracic radiology faculty interpretation.

• These results suggest that on-call radiology resident interpretation of CCTA using a simplified scoring system is feasible following dedicated CCTA training.

• Utilization of on-call resident interpretation may allow institutions to increase after-hour availability of CCTA.
Next Steps

• Further data collection will be needed:
  • To assess for long-term stability of resident-faculty agreement
  • To evaluate whether residents develop increased familiarity with the workflow over time

QUESTIONS OR COMMENTS?

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