Many a slip twixt the cup and the lip: A novel review of MRI appendicitis steps

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BACKGROUND

- MRI to evaluate for acute appendicitis after equivocal ultrasound has become popular in recent years given lack of ionizing radiation
- Although MRI scan times continue to decrease, they remain longer than CT scan times, potentially delaying treatment
- Numerous studies have been published outlining limited sequence, “fast” MRIs for the evaluation of acute appendicitis
- To-date, no studies describing the individual steps and associated average times have been published

METHODS

- Retrospective review of pediatric pt with MRI between Dec 16 – Dec 21 for clinically suspected appendicitis
- Pt database created utilizing Montage exam code X10474
- 64 exams reviewed; 2 f/u studies excluded
- Order times verified in EPIC
- Study start and stop times recorded from DICOM headers
- Report creation and report finalization times obtained from Montage database
- Order to exam start, order to exam completion, order to report creation, order to report finalization, interpretation times, and time between exam completion and report calculation by the difference in each category

RESULTS

- 62 individual exams included
  - Mean age: 12 yrs (range, 5-17 yrs ± 3.8)
  - 68% were female
  - 55 (89%) contrast-enhanced (CE) and 7 (11%) non contrast (NC) MRIs
  - 11 MRIs were read positive for appendicitis (9 CE; 2 NC)
  - 7/9 CE MRI and both NC MRIs confirmed at surgery
  - 1 false positive with a normal appendix was found at surgery
  - 1 patient with a negative MRI went to surgery due to clinical concerns, positive for acute appendicitis
  - Sensitivity and specificity: 90.9 and 98.0
  - Negative and positive predictive values: 90.9 and 98.0

Average Time from Ordering to Report Finalization by Steps

- MRI ordered
  - 1 hr 37 min
- Tech starts MRI
  - 2 hr 3 min
- Tech completes MRI
  - 2 hr 26 min
- Rad starts dictation
  - 2 hr 47 min
- Rad finalizes dictation
  - 21 min

CONCLUSIONS

- CHCO sensitivities and specificities are comparable with national metrics
- Greatest time delay was between when the study was ordered and when the study was started
- Average study length time was greater than national average, possibly due to extra sequences and gadolinium administration
- Estimated report dictations times are higher than national average, however time does not account for interruptions or consultations

IMPLICATIONS

- Greatest potential delay in treatment occurs prior to the MRI starting
- Additional investigation for the reasons why there is delayed study start time should be considered
- Longer than national dictation times may be secondary to interruptions vs less familiarity with MRI appendicitis images
- Additional studies evaluating the most essential sequences should be considered to decrease scan time length

REFERENCES


Figure 1: Ax T2FS (A), Ax T1FS Post Contrast (B) show an enlarged appendix (1.2 cm diameter), with gas-fluid levels, and surrounding periappendiceal edema and enhancement