Tracking Results: A Novel Approach to Tracking Resident Miss Rates on Trauma Patients While Improving Education and Satisfying Trauma Certification Requirements for a Level 1 University Hospital

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Introduction

• The primary goal of this quality improvement project is to create a sustainable system that monitors radiology resident trauma miss rates to satisfy our states level 1 trauma designation requirements.

• Secondary objectives are:
  • Create opportunities for residents to participate in inter-professional teams to promote and enhance safe care
  • Satisfy the ACGME requirement that requires residents to evaluate their personal practice
  • Engage residents in the use of data to improve patient outcomes
  • Provide data to our ED regarding quality of resident preliminary reads
Introduction:

• American College of Surgeons’ requirements for a hospital’s radiology dept. for maintaining level 1 trauma certification:
  – Radiologist promptly available to interpret exams.
  – Written report in a timely manner.
  – Verbally communicating critical results and monitoring changes between preliminary and final interpretations.
  – Monitoring of resident/attending discrepancies by the institution’s PIPS (Patient Improvement/Patient Safety) system.
    • These discrepancies need to be made available for trend analysis.
Introduction cont.

Resident and Attending Discrepancies

• Currently a highly discussed topic
• This technique allows us to monitor resident performance on a monthly basis.
  – We only evaluate trauma cases, however these represent the majority of our on call cross-sectional imaging
• Monitoring discrepancy rates is vital to proving that residents are safe and appropriately managing patients while under indirect supervision.
ACGME Requirements

• Currently, the ACGME requires radiology residents to “Evaluate their personal practice, utilizing scientific evidence, best practice and self-assessment programs with the intent of practice improvement.”

  – Utilizing our monthly results, residents are informed if they have a discrepancy and can focus on self-improvement in that particular area.
Introduction cont.

Satisfying our Emergency Department

• Our emergency department has requested that our resident to attending discrepancy rates be made available to them.
  
  • Our data provides current and accurate representation of resident discrepancy rates for each PGY year.
  
  • Allows us to compare these numbers with published resident-attending and attending-attending miss rates.
    – Goal is to meet or exceed the national standards for resident discrepancy rates.
Methods

Data Collection

• Data collection began in July 2012
  – We review approximately 20% of our total trauma activations/month (correlates with 20 patients/month).

*NOTE: Prior to Dec 2012 we evaluated 50 trauma patients/month. On review this was over-sampling and the number of patients/month was decreased to 20.

– These cases are randomly selected by our institution’s trauma coordinator.
  • All imaging studies of the randomly selected patients are then evaluated.
  • The resident’s preliminary report is compared to the final report and any discrepancies are noted.
Methods

Discrepancy Evaluation

• Discrepancies undergo peer review by 2 attending radiologists and a senior radiology resident.
  – Utilizing RADPEER, a RADPEER score is assigned to each case.
  – Limited chart review is performed of the significant discrepancies to evaluate outcome.
  – Using EXCEL the following data is documented:
    • Patient name, MRN, study type, discrepant finding, interpreting resident’s name, attending’s name and RADPEER score.
# Methods

**RADPEER scoring language**

<table>
<thead>
<tr>
<th>Score</th>
<th>Meaning</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Concur with interpretation</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Discrepancy in interpretation/not ordinarily expected to be made</td>
<td>a. Unlikely to be clinically significant</td>
</tr>
<tr>
<td></td>
<td>(understandable miss)</td>
<td>b. Likely to be clinically significant</td>
</tr>
<tr>
<td>3</td>
<td>Discrepancy in interpretation/should be made most of the time</td>
<td>a. Unlikely to be clinically significant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Likely to be clinically significant</td>
</tr>
<tr>
<td>4</td>
<td>Discrepancy in interpretation/should be made almost every time</td>
<td>a. Unlikely to be clinically significant</td>
</tr>
<tr>
<td></td>
<td>— misinterpretation of finding</td>
<td>b. Likely to be clinically significant</td>
</tr>
</tbody>
</table>
Methods
Utilizing the collected data

• Discrepancies are:
  – Discussed individually with the interpreting resident
  – Presented at the monthly hospital trauma committee meeting
  – Presented at our monthly Radiology Intradepartmental QI meeting
Results
Monthly Discrepancy Rates

Our average overall discrepancy rate: 1.4%
Results

RADPEER score

<table>
<thead>
<tr>
<th>RADPEER score</th>
<th>Percent of total discrepancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a</td>
<td>72%</td>
</tr>
<tr>
<td>2b</td>
<td>4%</td>
</tr>
<tr>
<td>3a</td>
<td>12%</td>
</tr>
<tr>
<td>3b</td>
<td>8%</td>
</tr>
<tr>
<td>4a</td>
<td>4%</td>
</tr>
<tr>
<td>4b</td>
<td>0%</td>
</tr>
</tbody>
</table>
Results
Resident Discrepancies

Note: Our trauma interpretations are almost exclusively performed by 2<sup>nd</sup>-4<sup>th</sup> year residents.
Results
Resident Discrepancies

MRI and US are rarely ordered on trauma patients, hence no significant misses were found.
Results
Resident Discrepancies

Discrepancies by Significance

- 2a: 72%
- Significant 2b, 3a/b or 4a/b: 28%
Why is this important?

• Overnight radiology coverage has been a “hot button” topic recently and will be in the near future.
  – Many academic medical centers utilize residents to provide overnight preliminary reads.
  – Other trends include in house staff coverage 24/7 and tele-radiology services.
Discussion

What is Major?

- Using the RADPEER guidelines scores of 2b, 3, and 4 are considered significant
  - Score of 1 or 2a require no further action except for some random validation
  - Scores of 2b, 3, and 4 require further internal radiology review by the QA committee to substantiate findings.
Discussion

Published major discrepancy rates

• Numerous published discrepancy rates between residents and attendings have been reported:
  – Values range between 0.1% and 10%
  – Majority report a major discrepancy rate between 0.5-2.0%
### Discussion

Examples of published resident-attending major discrepancy rates

<table>
<thead>
<tr>
<th>Study</th>
<th>Discrepancy Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of the RADPEER™ scoring language to interpretation discrepancies between diagnostic radiology residents and faculty radiologists.</td>
<td>1.3%</td>
</tr>
<tr>
<td>Maloney E, Lomasney LM, Schomer L.</td>
<td></td>
</tr>
<tr>
<td>Department of Radiology, Loyola University Medical Center, Maywood, Illinois 60153, USA. <a href="mailto:ozmaloney@lumc.edu">ozmaloney@lumc.edu</a></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Identifying benchmarks for discrepancy rates in preliminary interpretations provided by radiology trainees at an academic institution.</td>
<td>0.9%</td>
</tr>
<tr>
<td>Ruutuainen AT, Scanlon MH, Itl JN.</td>
<td></td>
</tr>
<tr>
<td>Department of Radiology, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania 19104, USA. <a href="mailto:alexander.ruutuaineditor@uphs.upenn.edu">alexander.ruutuaineditor@uphs.upenn.edu</a></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Cross-sectional examination interpretation discrepancies between on-call diagnostic radiology residents and subspecialty faculty radiologists: analysis by imaging modality and subspecialty.</td>
<td>0.7%</td>
</tr>
<tr>
<td>Ruma J, Klein KA, Chong S, Wesołowski J, Kezarooni EA, Ellis JH, Myles JD.</td>
<td></td>
</tr>
<tr>
<td>Department of Radiology, University of Michigan Health System, Ann Arbor, MI, USA.</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Overnight resident interpretation of torso CT at a level 1 trauma center an analysis and review of the literature.</td>
<td>2.0%</td>
</tr>
<tr>
<td>Chung JH, Strigel RM, Chew AR, Albrecht E, Gunn ML.</td>
<td></td>
</tr>
<tr>
<td>Department of Radiology, University of Washington and Harborview Medical Center, Seattle, WA, USA.</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Radiology resident interpretations of on-call imaging studies: the incidence of major discrepancies.</td>
<td>1.0%</td>
</tr>
<tr>
<td>Cooper VF, Goodhartz LA, Nemec AK Jr, Ryu RK.</td>
<td></td>
</tr>
<tr>
<td>Department of Radiology, Northwestern University Feinberg School of Medicine, 676 North St. Clair Street, Suite 800, Chicago, IL 60611, USA.</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

Summary of discrepancy rates

- We evaluated 1781 studies thus far in 14 months.
  - 25 total discrepancies
  - 7 significant discrepancies
Discussion

Summary of discrepancy rates by modality

• The majority of our discrepancies were from CT.
• The discrepancy typically represented a missed finding rather than misinterpretation or overcall.
• Although 0.39% of the misses were deemed significant no death, morbidity or significant management change occurred in these cases.
Summary of discrepancy rates by resident level and month

• The majority of our discrepancies were from 2\textsuperscript{nd} and 3\textsuperscript{rd} year residents.
  – This was expected as they interpret the majority of our trauma imaging.
  – No significant difference between 2\textsuperscript{nd} and 3\textsuperscript{rd} years

• No significant spike in monthly discrepancy rate during July-August in 2012 or 2013
  – These findings demonstrate that our residents taking call during the first few months of the academic year have similar discrepancy rates throughout the year

Discussion
Discussion

Published attending-attending radiologist discrepancy data

- Outsourced Teleradiology Imaging Services: An Analysis of Discordant Interpretation in 124,870 Cases
  - 1.1%

- Optimizing peer review: A year of experience after instituting a real-time comment-enhanced program at a children's hospital.
  - 3.6%

- RADPEER™ Scoring White Paper
  - 2.9%
Discussion

Improving Resident Education

• How we utilize the data:
  – Focused education, especially call-prep lectures with increased attention to cross-sectional imaging
  – Individual residents are made aware of their misses and appropriate review materials can be made available
Discussion
Satisfying ACGME

• This project satisfies the ACGME requirement that “Residents must evaluate their personal practice, utilizing scientific evidence, best practice and self-assessment programs with the intent of practice improvement.”

• Helps institutions satisfy ACGME’s CLER site visit in 2 of the 6 focus areas:
  – Patient safety and Quality Improvement
Conclusion

Our results

• Discrepancy rates of our radiology residents are similar to recently published resident-attending literature

• Our rates are at or below published attending-attending discrepancy rates

• Majority of our misses are by 2\textsuperscript{nd}-3\textsuperscript{rd} year residents

• Majority of our discrepancies are on CT imaging
Conclusion

Advantages of our project

• Continual data collection on resident-attending discrepancy rates
  – In the future we plan to compare this to our RADPEER attending-attending discrepancy rate data.
• Monthly discrepancy data is available to our ED
• Involvement of our residents in an on-going QI project and helps familiarize our residents with the RADPEER scoring system and CLER site visit requirements
Conclusion

Limitations of the study

• Our data only reflects trauma imaging
• We do not directly evaluate clinical impact, we only estimate it
• Our trauma imaging interpretations are heavily weighted towards 2\textsuperscript{nd}-3\textsuperscript{rd} year residents so evaluation of our 1\textsuperscript{st} and 4\textsuperscript{th} year resident’s discrepancy rates is limited
• We evaluate approximately 20% of our monthly trauma activations
References

2. Chung JH, Strigel RM, Chew AR, Albrecht E, Gunn ML. Overnight resident interpretation of torso CT at a level 1 trauma center an analysis and review of the literature. Acad Radiol. 2009 Sep;16(9):1155-60.