Decreasing Radiology Resident Miss Rates by Using an Innovative Educational Module

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Disclosure

The authors do not have a financial interest or relationship with any of the products or techniques referenced within this presentation.
Background

- Discrepant reports of overnight imaging exists between preliminary resident reports and attending radiologist reports
  - Published discrepancy rate approaches 2.3% in neuroimaging
- Discrepant reports can have harmful effects on patients
- Focused missed case conferences have decreased miss rate in musculoskeletal radiology
- Goal to assess the neuroradiology miss rate at our institution and decrease miss rate via an innovative educational module
Materials/Methods

- Noncontrast head CT reports of four R-2 residents (Academic year 2012) evaluated for discrepant findings.
  - Retrospectively identified via data-mining software
  - Discrepancy findings were reviewed by 2 senior residents and neuroradiologist for quality control
- Missed cases compiled into educational module
- Half (3/6) of the R-2 class in 2014 were provided the educational module and the other half were not
- Discrepancy rates were compared during the first 2 weeks of independent call
Educational Module

- Missed cases from 2012 academic class
- Studies compiled in scrollable fashion simulating PACS station
  - After initial radiology rotation, most residents can identify clinically significant findings on static CT images
  - Adding scrollable element simulates call and further encourages awareness decreasing errors in perception
- Detailed explanations of missed findings and common pitfalls were provided
- Additional self directed reading resources regarding missed topics were also provided
Sample Module

Case 1 - What was missed?

Resident called the mass a parenchymal mass in the cerebellum.

*My search pattern – I look at the cerebrum first and then scrutinize the cerebellum. – You don’t want to miss a cerebellar infarct either – early treatment (posterior decompression as need) = good prognosis.

Case 1 - Headache

1. What is the finding – please give location and space (intra vs extraaxial)?
   *The finding is in the posterior fossa – there is a hyperdense structure abutting the left cerebellum near the left sigmoid sinus (time markers 2-4 seconds)
   *This is clearly an extraaxial structure – notice the mild mass effect on the left cerebellum.

2. Describe the finding – see above

3. What is your differential(broad terms)?
   *extraaxial mass vs hematoma is your primary ddx. MC extraaxial mass is Meningioma – which is the correct diagnosis.
Results

- Missed or misinterpreted cases ranged from 1.6% to 3.2% (average 2.4%) in the 2012 R-2 class
- Summed discrepancy rate for 2014 R-2 class
  - 3.6% for the residents without the module
  - 1.3% for residents with the module
<table>
<thead>
<tr>
<th>Table A</th>
<th>Baseline Data 2012</th>
<th>No Educational Module 2014</th>
<th>With Educational Module 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Missed Cases</td>
<td>Total Number Read Cases</td>
<td>Percentage</td>
</tr>
<tr>
<td>Resident 1</td>
<td>10</td>
<td>396</td>
<td>2.5%</td>
</tr>
<tr>
<td>Resident 2</td>
<td>10</td>
<td>639</td>
<td>1.6%</td>
</tr>
<tr>
<td>Resident 3</td>
<td>13</td>
<td>509</td>
<td>2.6%</td>
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<tr>
<td>Resident 4</td>
<td>16</td>
<td>493</td>
<td>3.2%</td>
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<tr>
<td>Sum Total</td>
<td>49</td>
<td>2037</td>
<td>2.4%</td>
</tr>
<tr>
<td>Resident 5</td>
<td>1</td>
<td>67</td>
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</tr>
<tr>
<td>Resident 6</td>
<td>3</td>
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<tr>
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<tr>
<td>Sum Total</td>
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<tr>
<td>Resident 8</td>
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<tr>
<td>Resident 10</td>
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<td>65</td>
<td>0%</td>
</tr>
<tr>
<td>Sum Total</td>
<td>3</td>
<td>236</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Data obtained from Residents 1 – 4 from Academic Year 2011-2012 was for baseline data and module creation. Data obtained from Residents 5 – 10 was for Academic Year 2014-2015 (Resident 5-7 without educational module, and Residents 8 - 10 was with educational module).
Discussion

- Discrepant results between preliminary reads and attending final reads can have harmful effects on patient care
  - May cause delayed diagnosis or death
- Summed baseline data (2012) showed 2.4% missed or misinterpreted cases, within expectations
- Aggregated miss rate of 3.6% for residents without the module was higher than the miss rate from the baseline data
  - As the baseline data was obtained over an entire year, the miss rate should decrease as training progresses
Discussion

- Miss rate significantly decreased for those residents with the module
  - Likely multiple causative factors including differences in individual preparation, variety of case loads and pathology, and assistance provided by senior residents/attending physicians

- Reviewing missed cases, via module or case conference, is vital to resident education
  - Especially true as residents in a program are often taught similarly and have the same nuances with study interpretation
Discussion

- The utility of the education module should be further assessed as 2014 sample was limited in total number of cases.
- As the educational module has thus far proven to be effective, we recommend implementation during the Loyola neuroradiology rotation and as preparation prior to independent call.
References

