Structured Neuro CT Angiography Reporting Reduces Resident Revision Rates

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Hypothesis

Structured CT angiography reporting templates are hypothesized to reduce resident revision rates for these complex studies.

Introduction

Structured reports have previously been shown to be more effective in answering clinical questions and guiding patient care as compared to unstructured reports. At our institution radiology residents read CT angiography (CTA) exams of the head and neck during afterhours call in the emergency setting independent of staff radiologists. These exams are typically dictated in an unstructured fashion. Staff radiologists review the exams the following morning with attention to corrections that would alter patient care. This resident quality improvement project sought to reduce revision rates on resident-dictated neuro CTA exams through implementation of a structured reporting template.

Methods

Baseline revision rates with unstructured reporting were collected between 9/1/2014 and 11/4/2014. A structured reporting template was then created through consultation with neuroradiology staff. This template was created based on critical findings that we felt should be assessed for on all emergent neuro CTA exams. Examples of these findings included vessel occlusion, dissection, stenosis, and/or aneurysms. The report was organized around the presence or absence of these findings, which were reported in a positive or negative fashion with subsequent elaboration using free-text as necessary see (Figure 1). The template was made available to residents through the speech recognition software for all neuro CTA exams between 5/1/2015 and 7/1/2015. An e-mail was sent out

Figure 1

Structured reporting template for head and neck CT angiography exams.

EXAM: CTA head and neck

COMPARISON: [ ]

IMPRESSION:
1. [positive/negative] for significant intracranial/neck vascular abnormality.
2. [ ]

FINDINGS:

VASCULAR:

HEAD:
Occlusion/stenosis: [positive/negative].
Aneurysm: [positive/negative].
Vertebrobasilar system: [comment on dominance].
Normal vascular anatomic variants: [ ]

[Head discussion]

NECK:
Dissection: [positive/negative].
Occlusion: [positive/negative].
Stenosis: [positive/negative] for significant stenosis.
Vascular calcification: [comment on carotid bulb and proximal ICA].

[Neck discussion]

NONVASCULAR:
[ ]
to the residency program notifying them of the availability of the template during this time period and encouraging its use, however, on call residents retained the option of using the structured template or not when dictating afterhours neuro CTA exams. Reports were subsequently reviewed and assessed for revisions. A revision was defined as any change to the original report by the staff radiologist. Material revisions were considered those that could potentially alter patient care while immaterial revisions were those that did not, i.e. typographical errors. Following completion of the testing period the residency class was sent a short survey about structured reporting.

Results

Between 9/1/2014 and 11/4/2014 there were 54 afterhours neuro CTAs finalized by residents using unstructured reporting. The baseline revision rate during this time was 11/54 (20%). Of these revisions, 6 were considered material and 5 were considered immaterial. Between 5/1/2015 and 7/1/2015, while the structured template was available, there were 58 neuro CTAs performed afterhours and finalized by residents. Of these exams, 17 were finalized using the structured reporting template and 41 were finalized without the template (see Table 1). The revision rate with the template was 2/17 (12%) and the revision rate without the template was 10/41 (24%). There were no material revisions with structured reporting and one material revision with unstructured reporting. The remainder of the CTA report revisions were all considered immaterial.

Table 1

<table>
<thead>
<tr>
<th>Revision Type</th>
<th>Unstructured Reporting (n=40)</th>
<th>Structured Reporting (n=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Immaterial</td>
<td>17</td>
<td>2</td>
</tr>
</tbody>
</table>

Following the testing period with the structured template, 25/29 (86%) surveyed residents stated that they believed structured reporting could reduce revision rates. The same number of residents thought structured reports were easier for clinicians to navigate and read. Of the surveyed residents, only 14/30 (47%) residents were aware that a structured template had been made available for neuro CTA exams. Finally, only 6/30 (20%) residents reported using the template to dictate an afterhours neuro CTA exam.

Discussion

At our institution radiology residents rotate through CT neuroradiology during the first year of residency where they are exposed to interpreting and reporting CTA exams. From that point a variable amount of time passes before they begin reading CTA exams independently on-call. Early in training it can be difficult to recall the numerous emergent findings that may be present on a neuro CTA exam. This, in addition to the somewhat infrequent ordering of CTA exams, potentially contributes to overall resident inexperience with the exam, possible reporting errors, and subsequent report revisions by staff.

We found the availability of a structured template was able to reduce resident revision rates both in terms of immaterial revisions and those revisions that could potentially alter patient care. Although only a small number of residents reported using the template, we felt this was reflective of the small percentage of residents that participated in afterhours call during the study period. As a result of the low number of residents aware of the template, additional means of communication will be undertaken to assist in increasing awareness of the template including direct communication and posting notifications on the PACS workstations where residents typically take afterhours call.
Conclusion

Implementation of a structured reporting template for neuro CT angiography exams successfully reduced resident revision rates by approximately 50%. Although structured reports may not be necessary for all radiology exams, we believe they can help train residents to evaluate complex exams in a systematic fashion and assist them in recalling critical findings that are specific to a particular exam. Following the conclusion of the project, the structured template was made available electronically for all neuro CTA exams throughout our institution.

References

1. Marcovici PA, and Taylor GA. Structured radiology reports are more complete and more effective than unstructured reports. AJR. 2014; 203:1265–1271.

Keywords

Quality Improvement, Structured Reporting, Report Revisions, Neuro CT Angiography