Evaluating EMS door-to-CT times using an EMR-based communication tool

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Purpose
Evidence-based standards of care in EMS and emergency nursing are well defined in clinical populations. This project was designed to measure the effect on door-to-CT times when nurses used the current American Heart Association (AHA) “Get with the Guidelines” standards and introduced the use of an AHA structured template into the electronic medical record (EMR). Accrediting organizations identified a need to improve communication between the pre-hospital teams and the emergency department (ED). An EMR evidence-based stroke template was developed as a guide for staff during EMS calls. The aim of this study was to identify if using an EMR based template would impact door-to-CT times.

Design
This quality improvement process involved:
- Developing & implementing an EMR-based stroke reporting template
- Facilitating structured reports with EMS providers
- Measuring effect of changes with quality indicators
- Introducing EMS reports into the EMR
- Obtaining EMS time of symptom onset, Cincinnati assessment, glucose, 12-lead, and IV placement
- Training ED staff in the use of the template
- Recording All EMS calls & reviewing calls with stroke activation
- Tracking Door-to-CT completion and average door-to-activation times
- Comparing transcripts of calls between ED staff and EMS with and without template

Setting
- Suburban Level 2-trauma center ED in Northeast Ohio
- Part of a larger multi-hospital health system
- 14,400 EMS calls & approximately 10,000 referring provider calls annually
- Calls average 100 seconds in length, the majority received between 1100-1900 hours
- ED’s EMS catchment area includes many large retirement facilities

Participants
All patients who arrived to the ED via EMS and were subsequently subject to stroke activation over an eight week period. While all ED nurses and paramedics were educated on template use and purpose, template use was voluntary.

Teaching Document
Dot phrase is initiated as placeholder on the emergency department tracking board

- Chief complaint – may include:
  - Vision changes/visual loss
  - Skew deviation
  - Weakness or numbness (hypoesthesia) on one side of the body
  - Dysarthria/vomiting, loss of balance, feeling clumsy
  - Witnessed or sudden onset of ataxia
  - Sudden onset headache headache of unknown origin
  - Last known well – New neurological complaint and were seen normal ~ 6 hours ago
- Cincinnati Assessment – consider advanced maneuvers such as heel to shin, finger to nose, etc.
- Glucose – EMS glucose result
- 12 lead EKG transmitted – Must have patients name on - needed as differential diagnosis
- IV and labs – Will you need a medic in CT to assist?
- Stroke protocol activated – yes – or if no, explain why?

Completed smart phrase populates with all of the information received from EMS. This data also populates in the EMR when the patients arrive.

Average Door-to-Activation

<table>
<thead>
<tr>
<th>Time</th>
<th>Number of Calls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 min</td>
<td>51</td>
</tr>
</tbody>
</table>

Average Door-to-CT Time

<table>
<thead>
<tr>
<th>Time</th>
<th>Number of Calls</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 min</td>
<td>51</td>
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</tbody>
</table>

Methods
Nationally recognized quality markers were included for patients arriving via EMS with stroke activation. Stroke cases were reviewed for the inclusion of symptom onset, recorded/documented stroke assessment, and evaluation of differential diagnoses. 19 Cases were excluded as inter-facility transfers, for patients who were outside of the therapeutic window, incomplete documentation, misleading pre-notification, trauma, or were full arrests.

Results
- 51 patients were included in the study
- Results were measured every two weeks for eight weeks
- Average door-to-activation times ranged from 1 to 4.25 minutes after arrival vs. 6.8 to 9.5 minutes post-arrival when the template was used
- Staff using the template averaged activation times ahead of EMS arrival to the ED and halved the door-to-CT time with a significant value of p < 0.05 (independent sample t test)
- Five patients in the non-template group exceeded 25 minute door-to-CT time set by the AHA compared with none in the template using population
- Pre-hospital information is now permanently documented in the EMR. Staff satisfaction with pre-hospital report and triage decision-making has improved.

Implications
- Early identification and reduction of stroke intervention time are known to improve patient mortality
- Triage compliance for quality indicators can be enhanced and pre-hospital information permanently documented in the EMR by having trained emergency nurses hold EMS teams accountable for evidence-based standards of care
- This QI project demonstrated improved patient outcomes and established a permanent record of EMS assessment and procedures in the EMR
- Larger, multi-center studies should be conducted on EMS call structure to measure triage times, time to final testing, and patient outcomes using this EMR template

A variation of this template has been implemented throughout the hospital’s health system with IV placement and EKG transmission removed to simplify the EMS reporting.