Hospital-Directed Feedback to Emergency Medical Services Improves Prehospital Performance

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Background and Purpose—A potential way to improve prehospital stroke care and patient handoff is hospital-directed feedback for emergency medical service (EMS) providers. We evaluated whether a hospital-directed EMS stroke follow-up tool improved documentation of adherence to the Rhode Island state prehospital stroke protocol for EMS providers.

Methods—A standardized, 10-item feedback tool was developed in 2012 and sent to EMS directors for every transported patient with a discharge diagnosis of ischemic stroke. We reviewed patient charts meeting these criteria between January 2008 and December 2013. Performance on the tool was compared between the preintervention (January 2008 through January 2012) and postintervention (February 2012 through December 2013) periods.

Results—We identified 1176 patients with ischemic stroke who arrived by EMS in the study period: 668 in the preintervention period and 508 in the postintervention period. The overall score for the preintervention group was 5.31 and for the postintervention group 6.42 (P<0.001). Each of the 10 items, except checking blood glucose, showed statistically significant improvement in the postintervention period compared with the preintervention period.

Conclusions—Hospital-directed feedback to EMS was associated with improved overall compliance with state protocols and documentation of 9 out of 10 individual items. Future confirmatory studies in different locales and studies on the impact of this intervention on actual tissue-type plasminogen activator administration rates and EMS personnel knowledge and behavior are needed. (Stroke. 2014;45:2137-2140.)

Key Words: emergency medical services • feedback • stroke
The overall score for the preintervention group was 5.31 and for the postintervention group 6.42 (P<0.001). Each of the 10 items, except checking blood glucose, showed statistically significant improvement in the postintervention period compared with the preintervention period (Table 1).

Urban and rural EMS systems showed statistically significant increases in overall score in the postintervention period; however, rural EMS systems showed significant improvement...
in 4 out of 10 items compared with 9 out of 10 for urban systems (Table 2).

**Discussion**

Hospital-directed feedback to EMS was associated with improved overall compliance with state protocols. Urban systems improved more than rural systems. For all systems, there was a significant increase in hospital prenotification, which has been shown to improve door-to-imaging times, door-to-treatment times, and onset of symptom-to-treatment times in patients with ischemic stroke.10,11

The study had several limitations. First, we were unable to determine if the feedback form was transmitted from the EMS director to the provider or how the provider interpreted the results. Second, there may have been other variables, not measured by the current study, which led to improvement in performance over time. A randomized trial of feedback might better ascertain whether the tool is definitively associated with improved performance. Third, patient outcomes were not collected for the current study; therefore, we cannot determine whether improved performance on the tool was associated with faster treatment times or improved clinical outcomes. Future studies should include data on patient outcomes to assess the impact feedback to EMS has on patient outcomes.

**Disclosures**

Dr Silver received consulting fees for medicolegal expert testimony and adjudication for Women’s Health Initiative outcomes and honoraria for authorship in Medlink, Medscape, and Oakstone Publishing. The authors report no conflicts.

<table>
<thead>
<tr>
<th>Table 1. Overall Performance on Rhode Island State Protocol EMS Measures in the Pre- and Postintervention Periods</th>
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<tbody>
<tr>
<td><strong>Age (y) ± SD</strong></td>
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<tr>
<td>--------------------</td>
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<tr>
<td>74.8±14.6</td>
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<tr>
<td>Female, %</td>
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<tr>
<td>Overall score (maximum of 10)</td>
</tr>
</tbody>
</table>

**Item (% of times completed)**

- Last known well time documented: 37.7 vs 53.0, <0.001
- Seizure or head injury documented: 14.5 vs 31.7, <0.001
- Headache/neck pain documented: 24.4 vs 39.4, <0.001
- Recent surgery documented: 53.0 vs 62.2, 0.002
- Medications documented: 78.1 vs 83.5, 0.023
- Cardiac monitor: 69.8 vs 78.2, 0.0012
- IV access obtained: 76.1 vs 84.9, <0.001
- Blood glucose checked: 78.3 vs 81.5, 0.18
- Stroke scale documented: 56.9 vs 71.1, <0.001
- Prenotification given: 15.7 vs 49.6, <0.001

EMS indicates emergency medical service.

<table>
<thead>
<tr>
<th>Table 2. Comparison of Urban vs Rural EMS Performance on Rhode Island State Protocol EMS Measures in the Pre- and Postintervention Periods (n=1176)</th>
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<tbody>
<tr>
<td>Urban Preintervention (n=512)</td>
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<td>-----------------------------</td>
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<tr>
<td>Age (y) ± SD</td>
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<tr>
<td>Female, %</td>
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<tr>
<td>Overall score (maximum of 10)</td>
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</tbody>
</table>

**Item (% completed)**

- Last known well time documented: 37.3 vs 52.3, <0.001
- Seizure or head injury documented: 15.0 vs 32.1, <0.001
- Headache/neck pain documented: 26.4 vs 41.1, <0.001
- Recent surgery documented: 52.0 vs 63.0, <0.001
- Medications documented: 78.1 vs 85.2, 0.007
- Cardiac monitor: 66.6 vs 77.9, <0.001
- IV access obtained: 76.4 vs 85.7, 0.002
- Blood glucose checked: 80.7 vs 82.7, 0.42
- Stroke scale documented: 54.9 vs 72.5, <0.001
- Prenotification given: 15.3 vs 50, <0.001

EMS indicates emergency medical service.
References


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