A Multicenter Performance Improvement Program Uses Rural Trauma Filters for Benchmarking: An Evaluation of the Findings

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METHODS

Purpose

Through our trauma outreach program, we worked with nine rural facilities to properly develop, collect, and evaluate seven PI filters to enhance the review and evaluation of patient care.

Methods

PI Filter Development

We built on key elements of Level III and IV Trauma Centers outlined in the 2014 ASCOT manual:

1. Prehospital care management
2. Adherence to admission and transfer criteria
3. Function of the trauma team
4. Emergent patient management

PI Filters Identified

1. Prehospital managed airway for patients with Glasgow coma scale (GCS) <9
2. Adherence to trauma team activation criteria
3. Evidence of physician team leader presence with 20 minutes of activation
4. Patients with GCS<9 in the ED: intubated in <20 minutes
5. ED LOS <4 hours from patient arrival to transfer
6. Adherence to admission criteria outlined in facility's scope of care
7. Appropriate documentation of GCS on arrival, discharge, or with change of status

Data Collection

A Microsoft Excel data collection tool was created to provide standardization of data for each filter. TNCs at each facility were responsible for filling out the template, and then sending it via encrypted mail to the research team every quarter.

Table 1. Filter Compliance Averages by Quarter Across All Facilities

<table>
<thead>
<tr>
<th>Filter</th>
<th>Q1 Average</th>
<th>Q2 Average</th>
<th>Q3 Average</th>
<th>Q4 Average</th>
<th>P-Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prehospital managed airway for patients with GCS&lt;9</td>
<td>9%</td>
<td>60%</td>
<td>33%</td>
<td>33%</td>
<td>0.38</td>
</tr>
<tr>
<td>Trauma team activation criteria</td>
<td>86%</td>
<td>90%</td>
<td>91%</td>
<td>94%</td>
<td>0.08</td>
</tr>
<tr>
<td>Physician leader response times</td>
<td>98%</td>
<td>98%</td>
<td>98%</td>
<td>100%</td>
<td>0.27</td>
</tr>
<tr>
<td>Intubation time (&lt;20 mins) for patients with GCS&lt;9 in the ED</td>
<td>67%</td>
<td>70%</td>
<td>56%</td>
<td>33%</td>
<td>0.18</td>
</tr>
<tr>
<td>ED LOS &lt;4 hours from patient arrival to transfer</td>
<td>84%</td>
<td>80%</td>
<td>75%</td>
<td>73%</td>
<td>0.04</td>
</tr>
<tr>
<td>Admission criteria outlined in facility's scope of care</td>
<td>98%</td>
<td>98%</td>
<td>98%</td>
<td>96%</td>
<td>0.39</td>
</tr>
<tr>
<td>Appropriate Documentation of GCS</td>
<td>65%</td>
<td>73%</td>
<td>76%</td>
<td>82%</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 2. Rank by Facility

<table>
<thead>
<tr>
<th>Facility</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>87%</td>
</tr>
<tr>
<td>2</td>
<td>86%</td>
</tr>
<tr>
<td>3</td>
<td>85%</td>
</tr>
<tr>
<td>4</td>
<td>85%</td>
</tr>
<tr>
<td>5</td>
<td>84%</td>
</tr>
<tr>
<td>6</td>
<td>82%</td>
</tr>
<tr>
<td>7</td>
<td>80%</td>
</tr>
<tr>
<td>8</td>
<td>79%</td>
</tr>
<tr>
<td>9</td>
<td>65%</td>
</tr>
</tbody>
</table>

RESULTS

- 924 patients were captured in the 2016 template; 55% transferred out; 43% were admitted; 1% died
- 4% of patients arrived with a GCS<9 and 67% of them had pre-managed airways (Table 1)
- 37% met trauma team activation criteria and 90% of them were appropriately activated
- 3% of patients had a GCS<9 in the ED and 57% of them were intubated <20 minutes
- 56% of patients were transfers and 77% were transferred from the ED <4 hours
- 97% adhered to admission criteria outlined in facilities' scope of care
- The composite rank average was 81.4% among all facilities (Table 2)

Data Collection

A Microsoft Excel data collection tool was created to provide standardization of data for each filter. TNCs at each facility were responsible for filling out the template, and then sending it via encrypted mail to the research team every quarter.

Compliance (%)

- Prehospital managed airway for patients with GCS<9
- Trauma team activation criteria
- Physician leader response times
- Intubation time (<20 mins) for patients with GCS<9 in the ED
- ED LOS <4 hours from patient arrival to transfer
- Admission criteria outlined in facility's scope of care
- Appropriate Documentation of GCS

Across all facilities, there was a significantly increasing compliance trend over time with correct documentation of GCS (P-trend = <0.001), but a significantly decreasing compliance trend towards having an ED LOS <4 hours (P-trend = 0.04, Figures 1-2).

CONCLUSIONS & IMPLICATIONS

- Our data suggests that educational efforts need to focus on airway management, among patients with severe TBIs in the field and in the ED as well as to understand if ED LOS < 4 hours is an appropriate metric for less critical transfer patients.
- Additionally, we found that the facilities are moving toward appropriate documentation of GCS.
- By applying a theoretical compliance threshold, we can see how the facilities responded to the program.
- Ranking the facilities against one another created a healthy competition and renewed enthusiasm.
- Moving forward, we will data be used to create specific compliance thresholds and corrective action plans as necessary.

Acknowledgements

The authors wish to thank all of the trauma nurse coordinators within our rural affiliates who have helped instrumentally throughout this ongoing PI project.