The Association between EMS Response Interval and the Rapid Acute Physiology Score

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Background and Significance

• There have been many studies examining EMS response times.
  • Time from call to 911 dispatcher to arrival of EMS personnel on scene

• Major focus on patients with cardiac arrest
  • Have shown a relationship between rapid response and survival

• Target intervals set to maximize survival for CA/RA patients
  • What is potential impact on communities that increase target intervals
Objectives

• To determine if there was a difference in the initial patient acuity upon EMS arrival when EMS response interval was > 8 minutes compared to 8 minutes or greater.

• Study Hypothesis:
Greater EMS response intervals are associated with greater initial patient acuity in cardiac arrest and respiratory arrest patients (i.e. response interval contributes to initial patient acuity)
Methods

• A retrospective analysis of a national private EMS database
  • 65 EMS systems across the US
  • 1/1/2006 to 12/31/2007

• 8,384 EMS responses for CA & RA respiratory arrest
  • Cardiac Arrests: 7,290 (87%)
  • Respiratory Arrests: 1,094 (13%)
Methods

• Inclusion criteria:
  – all patients with a primary illness/symptom of cardiac arrest (CA) or respiratory arrest (RA)

• Exclusion criteria:
  – Missing RAPS or EMS response interval data
  – Non-emergency cases as categorized by EMS personnel (Urgent, Scheduled)

• The EMS response interval dichotomized: (<8 / ≥8 minutes)

• Rapid acute physiology score (RAPS) as indicator of prehospital patient acuity
  – Pulse, blood pressure, respiratory rate, Glasgow Coma Scale
  – Ranges from 0-16 (0 = low acuity, 16 = highest acuity)

• Fisher’s exact test, t-test, Wilcoxon rank-sum test
  • $\alpha = 0.05$
RESULTS

• 948 cases (78% CA, 22% RA) had RAPS & EMS interval data
  – 713 cases (75%) had EMS response interval <8 minutes

• No significant difference in average age or gender between the response interval categories

• Response interval ≥8 minutes not significantly associated with higher initial RAPS than response interval <8.
Results

Distribution of RAPS by EMS dispatch to arrival interval

<table>
<thead>
<tr>
<th>DTAI &lt; 8 minutes</th>
<th>DTAI 8 minutes or greater</th>
</tr>
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<tbody>
<tr>
<td>median = 16, IQR = 12-16</td>
<td>median = 16, IQR = 8-16</td>
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</table>

P = 0.23
Limitations

• This study was a retrospective analysis of a national EMS database
• Only examined cases labeled “Emergency” Transport to Scene, results do not apply to those labeled “Urgent”
• Results only apply to CA/RA
• A large number of cases in the database were missing RAPS and EMS response interval data
  – Therefore, results should be interpreted with caution
CONCLUSIONS

• No significant difference in patient acuity RAPS between EMS dispatch to arrival time <8 minutes compared to ≥ 8 minutes.
• Longer intervals do not appear to be associated with more acute patients upon EMS arrival.
• Further research is necessary to explore the relationship between RAPS and EMS response interval.
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