Background

- Anaphylaxis is poorly recognized in pre-hospital settings, particularly if the presentation does not include cutaneous findings of urticaria or angioedema (atypical anaphylaxis).  
- Retrospective studies reveal only 19-54% of qualifying cases received epinephrine in the field.  

Methods

- A simulation scenario focusing on atypical anaphylaxis was provided to a large metropolitan emergency medical services (EMS) agency. 
- 2-year-old with a known nut allergy. 
- Parent called EMS from a party following rapid onset of emesis with unknown ingestion. 
- Wheezing was present on initial exam. 
- If the crew did not treat anaphylaxis by 3 minutes, the patient then developed change in behavior and hypotension. 
- Debriefing followed which focused on reviewing diagnostic criteria, use of IM epinephrine use as initial treatment, epinephrine dosing, and demonstration of epinephrine auto-injector (EAI) use.

Organizational Structure of the EMS Agency
- EMS agency has 34 stations divided into 7 battalions. 
- Each station has at least 1 Engine and 1 Medic crew every shift. 
- Each Engine and Medic have at least 1 paramedic at all times. 
- All members of the crew hold a valid EMT card and are BLS trained.

Simulation Sessions (SIMS) 
- SIMS were run by 1 physician and 1 simulation coordinator at 4 stations in different battalions each half day for 2 subsequent days. 
- One crew at a time was called out of service from the battalion every 20 minutes for SIMS.

Acknowledgements

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Table 1: Simulation Performance Assessment

<table>
<thead>
<tr>
<th>Simulation Performance Variable</th>
<th>Results</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epinephrine: Initial Therapy</td>
<td>Yes</td>
<td>45 (66%)</td>
</tr>
<tr>
<td>Epinephrine: Dose Correct</td>
<td>Yes</td>
<td>13 (19%)</td>
</tr>
<tr>
<td>No</td>
<td>23 (34%)</td>
<td></td>
</tr>
<tr>
<td>NA (used auto-injector)</td>
<td>46 (68%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>6 (4%)</td>
<td></td>
</tr>
<tr>
<td>Epinephrine: Correct Site of Administration</td>
<td>Yes</td>
<td>58 (85%)</td>
</tr>
<tr>
<td>No</td>
<td>6 (9%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>4 (6%)</td>
<td></td>
</tr>
<tr>
<td>Medication Double Check</td>
<td>Yes</td>
<td>27 (40%)</td>
</tr>
<tr>
<td>No</td>
<td>27 (40%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>14 (20%)</td>
<td></td>
</tr>
<tr>
<td>Correct Medication Administration Technique</td>
<td>No</td>
<td>28 (41%)</td>
</tr>
<tr>
<td>Yes</td>
<td>36 (53%)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>4 (6%)</td>
<td></td>
</tr>
</tbody>
</table>

Results

- 507 providers completed the simulation in 68 separate interactions. 
- A diagnosis of anaphylaxis was made in 21 (31%) of SIMS. 
- Mean time to decide to give epinephrine was 3:21 minutes. 
- Mean time to administration of epinephrine was 4:22 minutes. 
- In 54 SIMS (79%) the crew asked for the patient’s epinephrine auto-injector. 
- Two SIMS gave epinephrine subcutaneously, none gave medication intraosseous or intravenously. 
- Five SIMS gave epinephrine in a location other than the lateral thigh.

Discussion

- While EMS members gave epinephrine in a majority of SIMS, one-third did not treat with epinephrine as initial therapy. 
- A majority administered the epinephrine in the correct location, but errors were noted in administration technique for both EAI and drawn-up epinephrine doses.

Limitations

- SIMS were not offered to all EMS members during the sessions. 
- Some simulations were offered to more than one crew at the same time due to time constraints. 
- Not all data points had complete documentation.

References