Call for help! Creating an efficient emergency response protocol in an outpatient imaging center

Villett LOVING MD MMM, Shay Dupras RN BSN, Brian Johnston MD, Krist Blackhurst RT, Joseph Rush RT, Mariann Figuli AAS ARRT

Banner MD Anderson Cancer Center, Division of Diagnostic Imaging, Gilbert, Arizona

The Problem

In 2015, a patient at our Outpatient Imaging Center (OPIC) experienced an anaphylactic reaction to intravenous contrast. The CT technologist yelled for help. Multiple staff responded, though many were uncertain of their role in the response. Medication and supplemental oxygen administration was delayed, and IV fluids were difficult to locate. Multiple staff simultaneously called 911 (Fig. 2), and the paramedics had difficulty distinguishing OPIC from the surrounding office buildings.

The Plan

1. Design an Emergency Response Poster to outline the steps of our new protocol
   - Benefits of this poster:
     - Simplified response protocol, per ACR Manual on Contrast Media
     - Staff role delineation - color coded for specific staff positions
     - Medication dosing
     - Facility access to assist 911 callers
   2. Designate location for the emergency response kit (medications, supplemental oxygen)
   3. Install intercom system to facilitate rapid contact from CT/MRI to nursing
   4. Initiate regular mock drills to reinforce understanding of the protocol
   5. Use a survey to measure success of the new protocol. Employ Likert scales (range 1-5; 1=not comfortable/unknown, 5=very comfortable/well known). We aimed to achieve scores of 4-5 to demonstrate high competence with the protocol. The survey consisted of three questions:
     - How comfortable do you feel if you had to respond to an emergency in the imaging center?
     - Do you know your role during an emergency response?
     - Do you know your resources if you have questions about the emergency response procedure at the imaging center?

The Method

The PDSA Method (PDSA) methodology to improve our emergency response process1. The name of the method is self-explanatory in regards to its four phases:

- **Plan**
  - Plan = Develop a change to improve a process
- **Do**
  - Do = Test the new change on a small scale
- **Study**
  - Study = Analyze the test results
- **Act**
  - Act = Determine if the change needs refinement. If so, initiate another PDSA iteration; if not, widely implement successful changes

Measureable data and documentation is key, since these results will quantitatively dictate if the change is sufficient or requires improvement.

The Study

Pre- and post-intervention survey scores are as follows:

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-Intervention (n=118)</th>
<th>Post-intervention immediately after first meeting (n=118)</th>
<th>After mock drill (n=95)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question Question</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Mean</td>
<td>2.9</td>
<td>3.1</td>
<td>3.7</td>
</tr>
<tr>
<td>SD</td>
<td>1.0</td>
<td>1.2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Mean Likert scores increased significantly after the initial protocol review meeting (> 0.0001 for all three survey questions). After the mock drill, mean Likert scores did not significantly change relative to the initial post-review meeting survey (p = 0.4, 0.49, 0.3, respectively).

In the study phase of the mock drill, the QI team discussed areas for improvement. We discovered that the intercom system had a nonfunctional battery.

The ACT

The emergency protocol implementation was deemed successful based on the persistent high comfort level observed on the QI survey (Fig. 7). In fact, several weeks after the mock drill, the QI team further proved their competence by using the protocol to efficiently and safely respond to a true contrast reaction. During the Act phase, the QI team initiated next steps:

1. Distributed copies of the protocol poster throughout the remainder of OPIC
2. Designed a technologist to replace the intercom battery quarterly
3. Scheduled semi-annual mock drills to reinforce understanding of the protocol and educate newly hired staff

Conclusions

Our emergency response QI project highlights several take home points for other institutions:

1. A successful PDSA cycle requires team engagement, measurable data, and continued improvement
2. In emergency situation, role delineation is critical to minimize confusion and errors
3. A standardized and simple protocol decreases variability in emergency response, improves safety, and team efficiency, and promotes adherence to professional organization guidelines

References