The effects of didactic and in-situ high fidelity training in the management of perioperative medical urgencies on orthopaedic resident performance and comfort level in a standardized patient scenario

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Investigation performed at The Medical University of South Carolina

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### Background

- The practice of orthopaedic surgery requires the knowledge and application of not only preoperative assessment and surgical expertise, but also skill in the management of the post-operative patient, including the management of perioperative medical urgencies.
- The employment of hospitalist services has been reported to improve care through a multidisciplinary approach especially in higher risk patients. However, one unintended consequence of this new resource is the potential for orthopaedic resident education to be marginalized in the management of perioperative medical urgencies.
- Importantly, divergence from ACLS guidelines during in-hospital cardiac arrest is associated with poor clinical outcome.
- The management of perioperative medical complications is not a commonly taught topic during orthopaedic resident training.
- There is little known about the best pedagogical approach to this domain of learning for the orthopaedic resident.
- Orthopaedic training programs often defer to BLS or ACLS training mandated for most hospital appointments to educate residents in these areas or to the general intern year.
- The orthopaedic interns will now spend six months on orthopaedics and are not able to take 24-hour overnight call. As such, their exposure to these rare scenarios will be limited.
- Teaching residents the appropriate management of these patients will likely need to be accomplished during their time on an orthopaedic rotation and will now be the responsibility of the orthopaedic program.

### Study Aim

Assess the effect of formal didactic instruction and high-fidelity in-situ simulation with structured debriefing on the performance of orthopaedic residents in the management of perioperative medical urgencies.

### Hypothesis

Implementation of a multidisciplinary didactic curriculum to educate orthopaedic residents on the approach to the medically unstable perioperative patient will significantly improve performance and communication during in-situ simulations of perioperative emergencies.

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### Methods

- Three acute postoperative clinical scenarios (COPD exacerbation, STEMI, and acute altered mental status (AMS)) that had been previously designed and validated by one of the co-investigators were used.
- Residents were evaluated as to their effectiveness in assessment and management of the scenario. Previously validated and published checklists were incorporated and used in this process.
- There was a standardized presentation of the patient history and clinical presentation prior to each scenario. Each participant functioned as the primary responder at least 2 times during the study period.
- The intervention evaluated was a formal didactic lecture on the management of unstable perioperative patients and was given by anesthesia and hospital medicine faculty between the two scenarios.
- The scenarios were graded according to the valid and reliable checklists developed for each scenario. Pre and post test scores were evaluated.
- Additionally, a pre-training and post-testing survey was administered that examined the self-reported comfort level of resident participants in assessing and managing the unstable patient.
- Six weeks after a didactic session, each resident underwent repeat in-situ simulation testing with standardized patients. This time was chosen to minimize recall bias. The setting was the exact same as what was used in the pre-test session. The clinical stem presented to the resident for each underlying disease state was different in order to prevent recall and repetition bias.
- All scenarios were independently graded. As noted above, the grading consisted of using previously validated checklists developed through a modified Delphi technique in order to record adherence to published guidelines, as measured by correct and incorrect actions.
- All participants were given a pre-course and post-course survey that evaluated their experience in the managing perioperative medical urgencies as well as whether the course objectives were met.

### Results

- Resident in a simulated scenario while grader observes and scores performance.
- **Scenario**
  - COPD
  - STEMI
  - AMS

#### Significance (Pre to post test)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>p-value</th>
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<tbody>
<tr>
<td>COPD</td>
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<tr>
<td>STEMI</td>
<td>.070</td>
</tr>
<tr>
<td>AMS</td>
<td>.001</td>
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</tbody>
</table>

### Discussion

- Residents showed improvement in performance and management of simulated perioperative emergencies in all three scenarios following debriefing and formal lectures. The improvements in COPD and AMS were statistically significant. The residents tended to perform well in STEMI prior to the lecture/debriefing which may account for the modest improvement in that scenario.
- As resident comfort level in addressing medical urgencies in perioperative orthopaedic patients improved they were less likely to feel that the medical consultant should be the first call physician.
- In situ patient care simulation combined with didactic lectures is an effective way to improve resident performance in the management of perioperative medical urgencies.
- As resident exposure to these perioperative problems becomes more limited either through the utilization of medical consultants or from decreased exposure from internship rotation schedule and work hour restrictions, residency programs may expand the role of patient care simulation and didactic teaching as a viable method of educating residents on this important area of patient care.

### Disclosures

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