A Multidisciplinary Approach to Simulation-based Advanced Pediatric Airway Management
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Background:
Advanced airway training is an integral part of several subspecialty training programs including anesthesia, critical care, otolaryngology and emergency medicine. However, learning the skills required to communicate with other specialties that deal with pediatric airways is rarely taught in any structured format.

Objectives:
Design and assess a multi-disciplinary simulation-based advanced airway management course to instill the importance of communication and cooperation across subspecialties, familiarize trainees with the use of different airway adjunctive equipment, and increase understanding of airway management as it relates to different subspecialties.

Methods:
Fourteen pediatric trainees (Table 1) participated in a one-day workshop (Table 2) consisting of lectures, skill stations, roundtable case discussions, and complex difficult airway simulations (Figure 1). All teaching groups were a blend of trainees from all subspecialties. Those trainees with skills in one area were encouraged to teach those in other subspecialties. Emphasis was placed on open communication and the sharing of concerns related to each specialty. Pre and Post-workshop questionnaires were completed. Also, a post-workshop discussion was held on ways that this course could be improved in the future.

Table 1: Demographics of Trainees

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>PGY levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia:</td>
<td>ENT:</td>
<td>EM:</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4-6</td>
<td>3</td>
<td>4-5</td>
</tr>
</tbody>
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Results of Pre and Post –course questionnaires for skills and confidence are shown in Table 3. The majority (92%) felt the multidisciplinary format helped develop team communication skills and preferred it to single discipline training.

Results:
Simulation-based airway management education courses are not unique, but are typically single specialty. Pediatric respiratory failure is frequently managed by multiple subspecialists and successful care requires smooth multidisciplinary teamwork. Complex hand-offs make an understanding and an appreciation of another subspecialist’s concerns a valuable asset in that communication.

This teaching format allowed all 4 subspecialties, in a single venue, to discuss the hospital’s difficult airway protocol and assured that all were informed of the location of their respective airway equipment. Interestingly, we found advanced anesthesia trainees (PGY 4-6), though not benefiting much from the Basic Airway Skills, felt that their ability to communicate patient specific concerns to others outside their own specialty did improve. Alternatively, those specialists (PICU and ER) who frequently communicate with other specialists, still benefited from the communication/collaboration portion by teaching those same interactive skills to others. Also, PICU and ER trainees benefited from exposure to alternative airway adjunctive equipment used by Anesthesia and ENT. By the end, all trainees felt that the course positively impacted their ability to communicate concerns to other sub-specialists.

Discussion:

Table 2: Schedule

Welcome: (8:00-8:15AM)
Pre-course evaluation
Didactics: (8:15-9:45AM)
Break: (9:45-10:00 AM)
Skills stations: (10:00-12:15PM)
Basic Airway Skills
Advanced Airway Skills:
- Videoscope, flexible fiberoptics
- Rigid Laryngoscopy/Bronchoscopy
Lunch with case discussions
Large Group Simulations (1:30-3:30PM)
Wrap up: (3:30-4:00PM)
Post-course Evaluation/Debriefing

Table 3: Knowledge and confidence before and after workshop

<table>
<thead>
<tr>
<th>Location of advanced airway equipment</th>
<th>Pre</th>
<th>Post</th>
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<tbody>
<tr>
<td>ER</td>
<td>42%</td>
<td>84.6%</td>
</tr>
<tr>
<td>Coordination of following hospital airway protocol</td>
<td>35%</td>
<td>92.3%</td>
</tr>
<tr>
<td>Confidence in effective communication skills</td>
<td>76%</td>
<td>100%</td>
</tr>
<tr>
<td>Confidence in airway skills</td>
<td>75%</td>
<td>87%</td>
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</table>

Figure 1: Large Group Simulations

Simulation 1 (Group A participating, Group B observing/debriefing)

ER
- Traumatic Tracheal Injury
- Recognition
- +/- Therapy
- Stabilization
- Coordination of Anesthesia & ENT
- Definitive airway management
- Report/Transfer of Care

OR
- Airway / vent management
- Medical management

PICU
- Airway / vent management
- Medical management

Simulation 2

(3:30PM-5:00PM)

Group A & B role reversal

Neck Abscess
- Recognition
- +/- Therapy
- Stabilization
- Coordination of Anesthesia & ENT
- Definitive airway management
- Report/Transfer of Care

Discussion:
Multidisciplinary training in advanced airway management, teamwork, and communication skills is effective, preferred by learners and possible to achieve despite training differences. This format highlighted unrecognized knowledge gaps between disciplines and emphasized the benefits of collaboration. Multidisciplinary educational programs have the potential to be a valuable addition to training programs as they prepare trainees to provide the integrated care required in their professional careers.