“Simulation Based Assessment for Pediatric Anesthesiology: a prospective, multicenter study”

Dr. Bruno C. R. Borges
This Presentation

- Talk about the importance of educational research
- To present my study
Why educational research?

- Because of my own history
- Care for Excellence (my own, my colleagues’, my students’)
- As a teachers, we should honestly want students (residents) to be better than us
- To be able to influence the next generation of anesthesiologists
Today,
It’s a Different Residency

- Less OR time, smaller number of procedures
- **Skill shortfall** at the end of residency?
- **Assessment deficits** - case load not enough to detect low performance
- Same pressure from society to have good, competent physicians coming out of residencies.

No Different for Staff!

- Emergency procedures are rare (cricothyroidotomies)
- Human nature is to get comfortable
- Same pressure from society to CONTINUE being a good physician

There’s no Turning Back: We have to adapt. How?

- ‘Teach them better’
- ‘Test them harder’
- ‘Look after them when they are new consultants’

Simulation in Education

‘Teach them better’

Become a better teacher when you “debrief”
Simulation in Education

- ‘Test them harder’

A simple model of competence

Bottom Line

We are going to see more and more simulation throughout our careers.
“Simulation Based Assessment for Pediatric Anesthesiology: a prospective, multicenter study”

Dr. Bruno C. R. Borges
Primary Research Question:

- Can simulation based assessment checklists differentiate between different levels (3) of training?
  - Residents that have NOT rotated in Pediatric Anesthesia
  - Residents that have rotated in Pediatric Anesthesia
  - Consultant Anesthesiologists with at least 50% pediatric case mix
Hypothesis

- Expert pediatric anesthesiologists will perform better than anesthesiology trainees, as assessed by MEPA scenario-specific checklists.
The Scenarios

**Managing Emergencies in Pediatric Anesthesia (MEPA) course:**

- Well established course in the UK
- Scenarios’ construction were collaborative, evidence-based, already peer-reviewed!
- Seven scenarios, so far
The Scenarios

1- Loss of airway post tonsillectomy
2- Complete obstruction of breathing circuit
3- Hypovolemia
4- Laryngospasm
5- Anaphylaxis
6- Local anesthetic toxicity after a caudal anesthetic
7- Malignant hyperthermia
The Scenarios

**Possibilities:**

- Implement MEPA course at McMaster/HHS?
- CME for McMaster Children’s Staff?
- Make it part of the Pediatric rotation?
Secondary Objectives of Study

- Validating assessment checklists using existing assessment tools
- Formative feedback to participants
- To measure effectiveness of the course
- Improve assessment aspect of simulation*
Checklists Being Validated

- ANTS (Anesthesia non-technical skills)
- MEPA course skills checklists
- GIOSETS checklist (CANMeds adaptation from Univ. of Ottawa for simulation)
Example Assessment
MEPA/GIOSETS Checklist

<table>
<thead>
<tr>
<th>Action</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ensure delivery of high concentration of oxygen</td>
<td>0</td>
<td>1</td>
<td>2</td>
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<td>2. Visually inspect the airway</td>
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<td>3. Optimize head and neck position, employ a jaw thrust maneuver</td>
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<td>4. Apply CPAP via appropriate circuit, e.g., Jackson Rees modification</td>
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<tr>
<td>5. Attempt to insert airway device e.g., correctly sized OPA or LMA</td>
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<td>1</td>
<td>2</td>
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<tr>
<td>6. Prepare for emergency re-intubation (drugs and equipment)</td>
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<tr>
<td>7. Proceed to laryngoscopy (remove throat pack)</td>
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<td>8. Establish manual ventilation (± intubate)</td>
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<td>1</td>
<td>2</td>
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<tr>
<td>9. Make plans for on-going care (if paralysed provide interim anaesthesia)</td>
<td>0</td>
<td>1</td>
<td>2</td>
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</tr>
</tbody>
</table>

Medical Expert Competencies

1. Situation Awareness, Attention / Vigilance: Frequent scan of environment (monitors), anticipates likely events.
2. Medical history, Information, medical history.
6. Medical Therapeutic: Compensatory and specific agent or medication, time, dose, route and response.
7. Procedure Therapeutic: Compensatory and specific procedure / intervention, time, technique and response.

Non-Medical Expert Competencies

9. Communicator: Clear / Concise, verbal and non-verbal, closed loop technique, share information / think about, orient new members, exchange information, listen, learn, lead.
10. Collaborator: Should stay calm and in control during crises, demonstrate authority and leadership, clear understanding of his/her roles. Support each other.
11. Manager: Formulate a plan in advance, establish priorities with appropriate utilization of key resources, ask for help appropriately.
12. Professional: Maintain standards of care, mutual respect, ethics and legal codes. Team members refer to established protocols. Disagreements or conflicts among team members are addressed.
13. Health Advocate: Attention to patient’s / team safety risks and needs.
Multicenter Study

- Fourteen Centres in the UK;
- McMaster was the 9th centre to be involved in Canada. Other canadian centres involved:
  - CHEO
  - SickKids
  - Kingston General
  - Royal University Hospital (Saskatoon)
  - Alberta Children’s
  - Stollery Children’s (Edmonton)
  - Montreal’s Children’s
  - Memorial University Hospital (Newfoundland & Labrador)
Randomization of Scenarios:

- Staff will run all 7 scenarios in one day, debriefing is only optional.
- Two residents per day. Each will run either 3 or 4 scenarios, randomly assigned and randomly sequenced.
- The “hot seat” resident is debriefed.
- The “resting” resident will observe and participate in the debriefing.
Videos and Raters

- Videos from Canadian sessions will be encrypted and sent to simulation expert raters in UK and vice-versa.

- Raters will be trained by main principal investigator (discussion of scenarios and watching videos of varying levels of performance)

- MEPA checklist inter-rater reliability will be initially tested with pilot data (40 initial videos) in 3 Canadian centers and 3 UK centers.
Sample Size

- No prior data for MEPA and GIOSETS checklists
- On the basis of unequal groups, with a trainee to non-trainee ratio of 4:1.
- With a 2-tailed alpha error of 0.05, 80% power, Cohen’s effect size of 0.5:
  - 40 non-trainee subjects
  - 160 trainee subjects
At Mac:

- Goal: 2 simulations days per month with 2 participants subjects in each
- Data collection of study ends theoretically in August
- Next Session: April 23rd!
“Stealing” residents from wednesdays teaching sessions is not working

No consistent day of week NCD for me

Another staff/fellow always needed to run scenarios with me (debriefing videos will also be data for a secondary study)
Recent Improvements

- SimCentre seems to be way better staffed now
- I finally understood how scheduling works at HHS
- Willingness of residents to participate is a non-issue. How can I make it official, though?
Thank you