Visualizing Better Ways to Secure Airways

I-GEL PLACEMENT AND VIDEO LARYNGOSCOPY

Jon Jui MD, MPH
### MCEMS i-gel: January 1 to August 31, 2017

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>115</td>
<td>94%</td>
</tr>
<tr>
<td>Unsuccessful</td>
<td>7</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>122</strong></td>
<td><strong>100%</strong></td>
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MCEMS i-gel Pediatric 2017

2017 successful - 92% (13/14)
Video Laryngoscopy vs Direct Laryngoscopy
Which is Better
Old School vs. New School?

DL

VL
Warning: This is NOT a discussion on devices but on deployment and training.
Questions

- How should we deploy?
  - Experienced users
  - VS.
  - Less experienced users

- How do you deploy and train on this new technology
  - Differences in training new paramedic vs. experienced paramedic
“Is video laryngoscopy superior to direct laryngoscopy for EMS providers”
Direct Laryngoscope (DL) vs Video Laryngoscope (VL)

Direct : DL

Video : VL
Direct Laryngoscopy Advantages

- Direct Laryngoscopy
  - tried and tested method
  - portable
  - inexpensive
  - fogging and fluids have less impact on equipment function
  - Success rate of DL in expert hands approaches or is similar to VL
  - a perfect view is not necessary for successful intubation
Video Laryngoscopy Advantages

- Generally higher success rate, especially in difficult situations
- Better view when mouth opening or neck mobility is limited (e.g. c-spine precautions)
- Less risk of esophageal intubation
- Less c-spine movement when c-spine precautions in place (conflicting evidence)
Video laryngoscopy Disadvantages

- Direct laryngoscopy skills are not directly transferable to use of hyper angulated laryngoscopes
- Passage of tube may be difficult despite great view; stylet often necessary
- Fogging and secretions may obscure view
- Potential for equipment failure
- More expensive
- May lead to deskilling at direct laryngoscopy over time
- Video screen may be difficult to visualize in the brightly lit outdoor setting
VL vs DL: Conclusion

- A device with both VL and DL capability offers the best of both worlds
- Direct laryngoscopy can be performed in the usual way, with the video as an immediately available backup
Intubation: Importance of First Pass Success

![Graph showing the percentage of cases with various complications over the number of attempts. The x-axis represents the number of attempts (1, 2, 3, ≥4), and the y-axis represents the percentage of cases. The graph includes lines for complications such as at least 1 adverse event, desaturation, esophageal intubation, aspiration, mainstem intubation, accidental extubation, cuff leak, pneumothorax, laryngospasm, dysrhythmia, hypotension, and cardiac arrest.]
Experience of one Fire Service in the Deployment of Videolaryngoscopy
Lessons Learned
<table>
<thead>
<tr>
<th>Month</th>
<th>Year</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>April</td>
<td>2016</td>
<td>DL Video training and written testing of intubation techniques</td>
</tr>
<tr>
<td>May</td>
<td>2016</td>
<td>Traditional Intubation training lab 1.5 hour peds and adult</td>
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<tr>
<td>June</td>
<td>2016</td>
<td>VL Video training and written testing</td>
</tr>
<tr>
<td>July</td>
<td>2016</td>
<td>Initial McGrath training with traditional intubation training 1.5 hours Adult</td>
</tr>
<tr>
<td>Nov/Dec</td>
<td>2016</td>
<td>Mandatory Paramedic Inservice</td>
</tr>
<tr>
<td>Feb/March</td>
<td>2017</td>
<td>ACLS/PALs Pediatric and adult intubation station</td>
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<tr>
<td>Nov</td>
<td>2017</td>
<td>Pediatric McGrath and traditional Training</td>
</tr>
<tr>
<td>Nov</td>
<td>2017</td>
<td>Surgical and Needle Cricothyotomy Training to everyone including basics</td>
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<tr>
<td>Nov/Dec</td>
<td>2017</td>
<td>Mandatory Paramedic Inservice</td>
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<tr>
<td>May</td>
<td>2018</td>
<td>Intubation Lab Scheduled</td>
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GFES Overall Success July 2016 - Jan 2018
Total Number = 122 attempts
GFES 1\textsuperscript{st} Pass Success
Predictors of Failure: DL vs VL

**DL**
- High Mallampati score
- Reduced TM distance
- Obesity

**VL**
- Neck pathology
- Obesity
- Mallampati score did not predict VL failure
- Poor laryngeal view
Risk Factors for VL Failures

- Strongest predictor of failed VL intubation was
  - presence of airway pathology from previous surgery,
  - local mass
  - radiation
What does the literature tell us?
Videolaryngoscopy versus direct laryngoscopy for adult patients requiring tracheal intubation: a Cochrane Systematic Review†

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## Intubation Process

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<thead>
<tr>
<th></th>
<th>Video Laryngoscopy</th>
<th>Direct Laryngoscopy</th>
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<tbody>
<tr>
<td>First Attempt Success</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Attempts</td>
<td></td>
<td></td>
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<tr>
<td>Time for intubation</td>
<td></td>
<td></td>
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<tr>
<td>Difficulty in Intubation</td>
<td>VL easier to use than DL</td>
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<tr>
<td>Improved visualization</td>
<td>Higher number of Cormack and Lehane grade 1 views</td>
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### Airway Outcomes

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<thead>
<tr>
<th></th>
<th>Video Laryngoscopy</th>
<th>Direct Laryngoscopy</th>
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<tbody>
<tr>
<td>Failed Intubations</td>
<td>Fewer</td>
<td></td>
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<tr>
<td>Hypoxia</td>
<td></td>
<td></td>
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<tr>
<td>Mortality</td>
<td></td>
<td></td>
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<tr>
<td>Serious Airway Complications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laryngeal airway trauma</td>
<td>Fewer complications</td>
<td></td>
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<tr>
<td>Sore throat</td>
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Conclusion VL Training

- Success and deployment of any new device or protocol to EMS agencies require patience and perseverance and adequate training with periodic refreshing of skills.

- General trend for improved overall success and first pass success

- Ideally, EMS personnel should have competency with both DL and VL devices.
Conclusion: My Opinions

- VL is a major paradigm change
- DL offers major advantages to EMS providers
- EMS providers must be able to use both DL and VL
- Training is the key to successful implementation of a new device
The END