Video Laryngoscopy

A Tale of Two Trials

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Evaluation of the Storz CMAC, Glidescope GVL, AirTraq, King LTS-D™, and Direct Laryngoscopy in a Simulated Difficult Airway


Am J Emerg Med (2013), Jan 21
Method

• Ninety-four providers (16 EMT-basics, 54 EMT-paramedics, and 24 emergency medicine doctors)
• All providers attempted to place each of the 5 airway devices in a pre-randomized order
• Emesis was introduced into this mannequin’s airway when the intubator least expected it
Puke Recipe

- Canned mixed vegetables, oatmeal, Beer (Blatz), and water
- All kept at 98°
Results (summarized)

- King LTS-D was fastest
- CMAC and ETI next fastest
- Glidescope next
- Airtraq dead last
- Survey showed medics preferred CMAC
VL did not result in higher successful placement compared to DL or the King LTS-D
Comparison of Success Rates between Two Video Laryngoscope Systems Used in a Prehospital Clinical Trial


Prehosp Emerg Care, 2013 Jan-Mar; 17(1): 104
CMAC

- Non-disposable, display separate from handle
- Can be used for direct laryngoscopy
King VISION

- Disposable, channeled or non-channeled blade
- Display inserted into blade
- Indirect laryngoscopy only
Objective

Compare success and complication rates between the two scopes.
Methods

- Prospective, non-randomized, non-blinded, single crossover trial.

- Participants: Paramedics from 4 different EMS agencies.

- Setting: population 459,501; 359 square miles of urban and suburban geography.
Outcomes

• First attempt success
  • Successful placement on 1\textsuperscript{st} attempt / number of patients

• Overall success
  • Successful placement / number of patients

• Success by attempt
  • Successful placement / total number of attempts

• Complications
Results

1st Attempt
- CMAC: 54.5%
- King Vision: 39.0%

Overall
- CMAC: 79.0%
- King Vision: 51.0%

Success by Total Attempts
- CMAC: 59.8%
- King Vision: 32.3%
Results - Complications

Oral Trauma Caused by Device
AV Screen Failure
Light Source Failure
Foreign Body Obstruction
Vomiting During Insertion
Vomiting After Insertion

CMAC
King Vision
Discussion

CMAC success rate were equivalent to our historical ETI success rates.
We really liked the ability to record the procedure.
Limitations

- Non-randomized, non-blinded, single crossover design
- Relatively small number of patients
- Not a difficult airway trial
- Used only the channeled King Vision Blade
- Lack of D blade for CMAC
- Lack of timing of intubations
Conclusions

- Paramedics were much more likely to successfully intubate a patient using the CMAC video laryngoscope system compared to the King VISION channeled blade.
- Complication rates with both devices were low.
So, should I buy a video laryngoscope?
The answer is...
Advantages

• Probable higher success rate, especially in difficult situations
• Everyone can see the airway
• Improved laryngeal visualization because the camera has a better view than the intubator does
• Possible decreased need for surgical airways
• Video may have a sharper learning curve
• Can be a very useful teaching tool and medical direction/quality control and medical/legal tool
Disadvantages

- Cost
- Loss of direct ETI skills
- Fogging and secretion may obscure the view
- More stuff to carry
- May need to learn a new technique and use it in the heat of battle
- There's a new one coming out every 5 minutes (some pretty cheap)
Vividtrac
Should you get Videolaryngoscopy?

IT DEPENDS ON YOUR SERVICE!!

1. How often do you intubate?
2. Have you had problems with esoph tubes?
3. Do you do RSI?
4. What is your philosophy on supraglottic airways?
5. What else is on your wish list?

6. How many bake sales can you handle?
Thank you

Questions?
Sample Size and Data Analysis

- Sample size determined by set data collection period of 12-months

- Exact logistic regression
  - Success rate analysis

- Generalized linear mixed-effects model
  - Impact of Cormack-Lehane (CL) score on success rates
### Results - Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall</th>
<th>CMAC</th>
<th>King VISION</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Demographics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>58.4</td>
<td>56.7</td>
<td>61.3</td>
<td>0.226</td>
</tr>
<tr>
<td>% male</td>
<td>70.1%</td>
<td>71.2%</td>
<td>68.3%</td>
<td>0.829</td>
</tr>
<tr>
<td>% Caucasian</td>
<td>79.4%</td>
<td>77.3%</td>
<td>82.9%</td>
<td>0.624</td>
</tr>
<tr>
<td>% Non-Hispanic</td>
<td>6.5%</td>
<td>6%</td>
<td>7.3%</td>
<td>1</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>28.4</td>
<td>28.1</td>
<td>29</td>
<td>0.554</td>
</tr>
<tr>
<td>% Cardiac Arrest</td>
<td>73.8%</td>
<td>74.2%</td>
<td>73.2%</td>
<td>1</td>
</tr>
<tr>
<td>% Medical</td>
<td>88.8%</td>
<td>83.3%</td>
<td>97.6%</td>
<td>0.027</td>
</tr>
<tr>
<td>% Difficult Airway</td>
<td>76.6%</td>
<td>78.8%</td>
<td>73.2%</td>
<td>0.639</td>
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<tr>
<td><strong>Provider Demographics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>38.5</td>
<td>38.8</td>
<td>37.9</td>
<td>0.713</td>
</tr>
<tr>
<td>% male</td>
<td>83.5%</td>
<td>83%</td>
<td>85.0%</td>
<td>0.793</td>
</tr>
<tr>
<td>Experience (yrs)</td>
<td>11.2</td>
<td>11</td>
<td>11.5</td>
<td>0.615</td>
</tr>
<tr>
<td>Paramedic with &gt; 1 attempt during study period</td>
<td>62.6%</td>
<td>56.1%</td>
<td>73.2%</td>
<td>0.1</td>
</tr>
<tr>
<td>% Devices placed in 1st 6 months</td>
<td>53.3%</td>
<td>48.5%</td>
<td>61.0%</td>
<td>0.236</td>
</tr>
</tbody>
</table>
Discussion

However we believe there were other important benefits to CMAC that have the potential to improve the delivery of endotracheal intubation by EMS services.

1. Ability for everyone to see the airway, including the individual delivering anterior pressure (ELM)
2. Difficult airway management
3. The ability to record the procedure
### Results

<table>
<thead>
<tr>
<th></th>
<th>First Attempt</th>
<th>Overall</th>
<th>Any Individual Attempt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds Ratio</td>
<td>95% CI</td>
<td>p-value</td>
</tr>
<tr>
<td>CMAC Device (vs. King Vision)</td>
<td>2.58</td>
<td>1.14</td>
<td>5.85</td>
</tr>
<tr>
<td>Cormack-Lehane Score (per point)</td>
<td>0.379</td>
<td>0.24</td>
<td>0.61</td>
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<tr>
<td>CMAC Device (vs. King Vision)</td>
<td>3.54</td>
<td>1.51</td>
<td>8.28</td>
</tr>
<tr>
<td>Cormack-Lehane Score* (per point)</td>
<td>0.277</td>
<td>0.16</td>
<td>0.47</td>
</tr>
<tr>
<td>CMAC Device (vs. King Vision)</td>
<td>3.11</td>
<td>1.59</td>
<td>6.1</td>
</tr>
<tr>
<td>Cormack-Lehane Score (per point)</td>
<td>0.363</td>
<td>0.24</td>
<td>0.55</td>
</tr>
</tbody>
</table>
Results

• Compared with EMT-P and EMT-B, ED MDs were 2.5 times as likely to have a successful first attempt (OR, 2.50; 95% CI, 1.49-4.31) and 3 times as likely to be successful overall (OR, 3.02; 95% CI, 1.34-6.85), regardless of device type.

• Survey showed medics preferred CMAC
Funding

- King Systems and Karl Storz each provided 6 devices (disposables and technical support) at no cost.
- Funded by EMS Region
Conflicts of Interest

None of the contributing authors of these trials had any conflicts of interest.