Society for Airway Management Annual Meeting

Philadelphia, PA

September 22nd, 2013

VL vs. DL
FOR
EMERGENCY INTUBATION
...FROM THE PATIENT’S PERSPECTIVE

John C. Sakles, M.D.
Professor
Department of Emergency Medicine
University of Arizona
Tucson, AZ, USA
Conflict of Interest
I always try to give my patients the best care I can
A Conversation with a Patient...
DR. SAKLES:

“Mr. Jones, you are very sick and I need to place a breathing tube into your airway.”
THE PATIENT:

“‘How will you do that?’”
DR. SAKLES:

“First, I will give you medicines to put you to sleep and to paralyze all your muscles.”
DR. SAKLES:

“Then I will insert a device into your mouth to visualize your airway and place a tube between your vocal cords.”
THE PATIENT:

“That’s sounds kind of scary. What type of instrument will you place in my mouth to see my airway?”
DR. SAKLES:

“‘It’s called a laryngoscope. I have 2 different ones available to use, a direct laryngoscope (DL) or a video laryngoscope (VL).’”
THE PATIENT:

“Which one are you going to use on me?”
DR. SAKLES:

“"It’s up to you Mr. Jones, whichever one you prefer."
THE PATIENT:

“Well, which one works better?”
DR. SAKLES

“‘It’s funny you should ask, I have been collecting data on that for the last 6 years.’”
THE PATIENT:

“Well, I’d like to see your data.”
The University of Arizona

Emergency Department

6 YEARS (JULY 2007-JUNE 2013)
NEARLY 3000 ED INTUBATIONS
UNIVERSITY OF ARIZONA MEDICAL CENTER

- 61 ED beds
- 70,000 ED visits/year
- 3 Year EM residency - PGY 1, 2, 3 (50+ residents)
- DL, GVL, CMAC, FFO, I-LMA, Cric
- Half of ED Intubations DL, Half VL
- 100% Capture Rate (94%+6%)
Dr. Sakles’ Airway CQi Form

Date

Attending: ________________
Resident: ________________

☐ Trauma ---> Mechanism ________________
 Trauma Dx, ________________
☐ Medical ---> Diagnosis ________________

Age: ______
Sex: ☐ M  ☐ F
### Dr. Sakles' Airway CQI Form

**Date**

**Patient Sticker**

- **Attending:**
- **Resident:**
- **Age:**
- **Sex:** M / F

**Diagnosis**

- **Trauma:**
- **Mechanism:**
- **Trauma Dx:**
- **Medical:**
- **Diagnosis:**

**Was there a FAILED intubation attempt?**

- **No:**

**IF YES, then:**

- **NRB:**
- **BVM:**
- **Comtrol:**
- **Cric:**
- **Crr:**
- **Esophageal intubation:**

**Pre-oxygenation (min):**

- **0 min:**
- **30 sec:**
- **60 sec:**
- **90 sec:**
- **2 min:**

**Chest Performed:**

**Apneic Oxygenation (L/min):**

- **0 L/min:**
- **2 L/min:**
- **4 L/min:**
- **6 L/min:**

**Chest/Resus:**

**CPR:**

**Starting Sat % (PRIOR to intubation):**

**Lowest Sat % (During intubation):**

**Reason for intubation:**

- **Airway Protection:**
- **Respiratory Failure:**
- **Pneumonia:**
- **Patient Control:**
- **Cervical Arrest:**

**Reason for Initial Device Selection: (Check ONE):**

- **Standard Device:**
- **Difficult Airway Suspected:**
- **Educational Purposes:**

**Difficult Airway Predictions (check ALL that apply):**

- **Cervical Immobility:**
- **Facial/Head Trauma:**
- **Obesity:**
- **Cricoid Edema:**

**Intubation Attempt:**

**If more than 3 attempts, please attach an additional Airway Form:**

- **Attempt 1:**
  - **Device:**
  - **Device Type/Size:**
  - **Stylet Type:**
  - **Outcome (Check ONE):**
    - **SUCCESS:**
    - **FAILURE:**

- **Complications:**
  - **Diaphragm:**
  - **Pneumothorax:**

- **Tracheal Intubation:**
  - **Cricoid:**
  - **Mucous:**

**Cormack-Lehane Grade of Laryngoscopic View**

<table>
<thead>
<tr>
<th>Grade</th>
<th>View</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**Dl View (Attempt #):**

**Vl View (Attempt #):**

**Stylet Used:**

- **Standard:**
- **Suction:**
- **NONE:**
- **Blade Used:**
- **Yes:**
- **No:**
- **Evacuation or Rescue:**

**If using CRAC or CRT DIRECT (select ONE):**

- **Used as DL Only:**
- **Used as VL Only:**
- **DL to VL Switch:**
- **VL to DL Switch:**

**Clarity (hazing) of Optical View**

<table>
<thead>
<tr>
<th>Grade</th>
<th>View</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Lens Contamination</th>
</tr>
</thead>
</table>

- **NONE:**
- **Moderate (foggy):**
- **Severe (tinted, obstructed):**

**Please provide any important comments regarding the intubation:**

**Weight:**

**BMI:**

**See Other Side**

Please call Dr. Sakles with any questions: 288-3660
<table>
<thead>
<tr>
<th><strong>Was there a FAILED intubation attempt PREHOSPITAL?</strong></th>
<th>○ No</th>
<th>○ Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>IF YES, then:</td>
<td>○ NRB</td>
<td>○ BVM</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Did the patient fail BiPAP in the ED? ____</td>
<td>If YES, for how long? ____</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Pre-oxygenation (min):</td>
<td>○ 1 min</td>
<td>○ 2 min</td>
</tr>
<tr>
<td>Apneic Oxygenation (L/min):</td>
<td>○ 5 L/min</td>
<td>○ 10 L/min</td>
</tr>
<tr>
<td>Starting Sat: ____ % (PRIOR to intubation)</td>
<td>Lowest Sat: ____ % (DURING intubation)</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Reason for Intubation:</strong></td>
<td>○ Airway Protection</td>
<td>○ Respiratory Failure</td>
</tr>
<tr>
<td>Drugs Used:</td>
<td>○ Succinylcholine</td>
<td>○ Etomidate</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Reason for Initial Device Selection</strong> (Check ONE):</td>
<td>○ Standard Device</td>
<td>○ Difficult Airway Suspected</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Difficult Airway Predictors</strong> (check ALL that Apply):</td>
<td>○ Cervical Immobility</td>
<td>○ Small Mandible</td>
</tr>
<tr>
<td></td>
<td>○ Facial/Neck Trauma</td>
<td>○ Obesity</td>
</tr>
<tr>
<td></td>
<td>○ Airway Edema</td>
<td>○ Large Tongue</td>
</tr>
</tbody>
</table>
## Intubation Attempts

*If more than 3 attempts, please attach an additional Airway Form*

<table>
<thead>
<tr>
<th>Attempt #1</th>
<th>Attempt #2</th>
<th>Attempt #3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intubator:</strong></td>
<td><strong>Intubator:</strong></td>
<td><strong>Intubator:</strong></td>
</tr>
<tr>
<td><strong>Device:</strong></td>
<td><strong>Device:</strong></td>
<td><strong>Device:</strong></td>
</tr>
<tr>
<td><strong>Device Type/Size:</strong></td>
<td><strong>Device Type/Size:</strong></td>
<td><strong>Device Type/Size:</strong></td>
</tr>
<tr>
<td><strong>Stylet Type:</strong></td>
<td><strong>Stylet Type:</strong></td>
<td><strong>Stylet Type:</strong></td>
</tr>
</tbody>
</table>

### Outcome (Check ONE)
- [ ] SUCCESS!
- [ ] **FAILED Attempt, Reason:**
  - [ ] Esophageal Intubation
  - [ ] Can’t See Cords
  - [ ] Can’t Direct Tube
  - [ ] Tube Wouldn’t Pass
  - [ ] Equipment Failure

### Complication(s) (✓ ALL that apply)
- [ ] NONE
- [ ] Desaturation
- [ ] Extubation
- [ ] Mainstem
- [ ] Aspiration
- [ ] Dental Injury
- [ ] Laryngospasm
- [ ] Dysrhythmia
- [ ] Cuff Leak
- [ ] Hypotension
- [ ] Cardiac Arrest
- [ ] Pneumothorax
- [ ] Other

<table>
<thead>
<tr>
<th>Outcome (Check ONE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] SUCCESS!</td>
</tr>
<tr>
<td>[ ] <strong>FAILED Attempt, Reason:</strong></td>
</tr>
<tr>
<td>[ ] Esophageal Intubation</td>
</tr>
<tr>
<td>[ ] Can’t See Cords</td>
</tr>
<tr>
<td>[ ] Can’t Direct Tube</td>
</tr>
<tr>
<td>[ ] Tube Wouldn’t Pass</td>
</tr>
<tr>
<td>[ ] Equipment Failure</td>
</tr>
</tbody>
</table>

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- [ ] Desaturation
- [ ] Extubation
- [ ] Mainstem
- [ ] Aspiration
- [ ] Dental Injury
- [ ] Laryngospasm
- [ ] Dysrhythmia
- [ ] Cuff Leak
- [ ] Hypotension
- [ ] Cardiac Arrest
- [ ] Pneumothorax
- [ ] Other

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- [ ] NONE
- [ ] Desaturation
- [ ] Extubation
- [ ] Mainstem
- [ ] Aspiration
- [ ] Dental Injury
- [ ] Laryngospasm
- [ ] Dysrhythmia
- [ ] Cuff Leak
- [ ] Hypotension
- [ ] Cardiac Arrest
- [ ] Pneumothorax
- [ ] Other
<table>
<thead>
<tr>
<th>Grade</th>
<th>All Cords</th>
<th>Partial Cords</th>
<th>Epiglottis only</th>
<th>Tongue only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade II</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade III</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade IV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DL View (Attempt #):**

- 
- 
- 
- 

**VL View (Attempt #):**

- 
- 
- 
- 

**Stylet Used:**

- Standard
- Saturn
- NONE

**Bougie Used?**

- Yes
- No

If using **CMAC** or **GVL DIRECT** (select ONE):

- Used as DL Only
- Used as VL Only
- DL to VL Switch
- VL to DL Switch
Clarity (fogging) of Optical View
(Videoscopes, Fiberoptics, and Optically-Assisted Devices)

Please label each attempt

Lens Contamination
- None
- Mild (Contaminated, cords easily visible)
- Moderate (Moderate Contamination, cords still visible)
- Severe (Contaminated, cords NOT visible)
DR. SAKLES:

“So Mr. Jones, here’s what I found…”
A Comparison of the C-MAC Video Laryngoscope to the Macintosh Direct Laryngoscope for Intubation in the Emergency Department

John C. Sakles, MD, Jarrod Mosier, MD, Stephen Chiu, BA, Mari Cosentino, BS, Leah Kalin, BS

From the Department of Emergency Medicine, University of Arizona, Tucson, AZ (Sakles, Mosier); and the University of Arizona College of Medicine, Tucson, AZ (Chiu, Cosentino, Kalin).

## CL VIEW

<table>
<thead>
<tr>
<th>Device</th>
<th>CL I</th>
<th>CL II</th>
<th>CL III</th>
<th>CL IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL (n=495)</td>
<td>48.3%</td>
<td>34.6%</td>
<td>12.9%</td>
<td>4.2%</td>
</tr>
<tr>
<td>VL (n=255)</td>
<td>79.2%</td>
<td>14.4%</td>
<td>4.8%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>
THE PATIENT:

“Well what exactly does that mean?”
DR. SAKLES:

““It means that if I use a DL device I will have a 83% chance of seeing your airway (CL I &II) and if I use a VL device I will have a 94% chance of seeing your airway (CL I &II).””
THE PATIENT:

- “Is it important to see my airway to put a tube in it?”
DR. SAKLES:

“‘Yes, in general when you are doing a medical procedure, it’s better to see what you are working on.’”
THE PATIENT:

- “Ok, well tell me which device is more likely to be successful.”
Comparison of video laryngoscopy to direct laryngoscopy for intubation of patients with difficult airway characteristics in the emergency department

John Constantine Sakles · Asad E. Patanwala · Jarrod M. Mosier · John Michael Dicken

Sakles et al. *Int Emerg Med* 2013
# FIRST PASS SUCCESS

<table>
<thead>
<tr>
<th># of DACs</th>
<th>DL (n=1048)</th>
<th>VL (n=1375)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>82.0%</td>
<td>90.8%</td>
</tr>
<tr>
<td>1</td>
<td>69.4%</td>
<td>85.1%</td>
</tr>
<tr>
<td>2</td>
<td>65.8%</td>
<td>80.5%</td>
</tr>
<tr>
<td>&gt;=3</td>
<td>54.1%</td>
<td>68.9%</td>
</tr>
</tbody>
</table>
THE PATIENT:

- “What does that mean for me?”
DR. SAKLES:

“Well Mr. Jones, by my evaluation you have 1 difficult airway characteristic (DAC), so if I use a DL device I will have a 69% chance of getting the tube on the first pass but if I use a VL device I will have a 85% chance of first pass success.”
THE PATIENT:

““So what you are telling me doctor is that you are 15% more likely to get the tube in on the first pass with a VL device?”
DR. SAKLES:

“"Yes, Mr. Jones."
THE PATIENT:

“Why is getting the tube in on the first attempt so important?”
DR. SAKLES:

“Well, the more attempts it takes me to put the tube in, the more likely you will experience a complication such as having a low oxygen level in your blood, having an abnormal heart rhythm or aspirating your stomach contents into your lungs.”
THE PATIENT:

“That doesn’t sound very good. Can you give me some numbers on that?”
DR. SAKLES:

“Sure, I have some data on that.”
Original Research Contribution

The Importance of First Pass Success When Performing Orotracheal Intubation in the Emergency Department

John C. Sakles, MD, Stephen Chiu, MD, Jarrod Mosier, MD, Corrine Walker, MD, and Uwe Stolz, PhD, MPH

Sakles et al. Acad Emerg Med 2013
# ADVERSE EVENTS

$n=1828$

<table>
<thead>
<tr>
<th># of Attempts</th>
<th>Adverse Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14.2%</td>
</tr>
<tr>
<td>2</td>
<td>47.2%</td>
</tr>
<tr>
<td>3</td>
<td>63.6%</td>
</tr>
<tr>
<td>$\geq 4$</td>
<td>70.6%</td>
</tr>
</tbody>
</table>
THE PATIENT:

“That’s quite frightening. It looks like if you don’t get the tube in me on the first attempt my chance of a complication more than triples from 14% to 47%.”
DR. SAKLES:

“‘Yes, that’s correct Mr. Jones.’”
THE PATIENT:

- “I’m thinking I would like you to use a VL device.”
DR. SAKLES:

- “It’s really up to you Mr. Jones, whatever you think is best.”
THE PATIENT:

“Well tell me what you think is the most serious complication of you doing this procedure?”
DR. SAKLES:

 “The worst thing that could happen is that I can’t see your airway very well and accidentally place the tube into your esophagus.”
THE PATIENT:

- “Why is that so bad?”
DR. SAKLES:

“Well then I will be delivering oxygen to your stomach instead of your brain. If this continues unrecognized it can cause permanent brain damage and potentially death.”
THE PATIENT:

“"I don’t want that to happen to me! What’s the risk of esophageal intubation with each device?"
Video Laryngoscopy Reduces the Rate of Esophageal Intubations Performed by Emergency Medicine Residents Compared to Direct Laryngoscopy
# Esophageal Intubation

<table>
<thead>
<tr>
<th>Device</th>
<th>Esophageal Intubations</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL (n=1230)</td>
<td>6.2%</td>
</tr>
<tr>
<td>VL (n=1239)</td>
<td>1.2%</td>
</tr>
</tbody>
</table>
THE PATIENT:

“Are you telling me that if you use a DL device you are 5X more likely to incorrectly place the breathing tube into my esophagus?”
Dr. Sakles:

“‘That’s what the data would suggest Mr. Jones.’”
THE PATIENT:

“\text{It sounds like VL is better. What’s the data like at other institutions?}”
Seattle EMS

- 615 Field Intubations
  - 300 DL
    - Mean # of Attempts 2.4
    - TTI 42 seconds
  - 315 GVL
    - Mean # of Attempts 1.2
    - TTI 21 seconds

VL > DL

Wayne et al. *Prehosp Emerg Care* 2010
CALIFORNIA ED

- 280 ED Patients
  - 63 GVL
    - FPS 84%
    - TTI 42 seconds
  - 217 DL
    - FPS 81%
    - TTI 30 seconds

Platts-Mills et al. *Acad Emerg Med* 2009
OREGON OR

- 300 OR Patients with Difficult Airways
  - 149 CMAC
    - FPS 93%
    - TTI 46 seconds
  - 147 DL
    - FPS 84%
    - TTI 33 seconds

VL > DL

Aziz et al. Anesthesiology 2012
GERMANY ICU

- 274 ICU Patients with one DAC
  - 117 CMAC
    - FPS 79%
  - 113 DL
    - FPS 55%

VL>DL

Noppens et al. *Crit Care* 2012
Baltimore Trauma CTR

- 623 Trauma Patients
  - 303 GVL
    - Survival 91%
    - FPS 80%
  - 320 DL
    - Survival 93%
    - FPS 81%

VL = DL

Yeatts et al. *J Trauma* 2013
THE PATIENT:

“So it looks to me like VL is better than, or at least equivalent to DL?”
DR. SAKLES:

“Yes Mr. Jones, that’s a fair statement. So what’s your preference?”
THE PATIENT:

- “I’m not sure why we’re even having this discussion. I want you to use a Video Laryngoscope!”
OTHER ADVANTAGES OF VL
SUPERVISION
REMOTE ASSISTANCE
IMPROVED DOCUMENTATION
SUMMARY

- Do what’s best for your patient
sakles@aemrc.arizona.edu

520-289-3660
The End