

Sometime in the future.....

67 yr old Male

- ▶ 911 called by family for agonal respiration
- ▶ Pt with BMI >70 (~280 kg)
- ▶ Found with agonal respirations going into CA
- ▶ CPR and one defib for VF to Pea/asystoli
- ▶ BVM attempted with little success
- ▶ Video Laryngoscopy: intubation with ongoing CPR one attempt 34 sec
- ▶ Pt returned to VF and shocked to rhythm
- ▶ Transported but died in ED

“To Tube or Not to Tube that is the Question?”*

Does Video Laryngoscopy Change the Playing Field?

*with apology to William Shakespeare

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- ▶ Received equipment for research from Verathon Medical (Glidescopes and recorders)
- ▶ No financial interest
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What is Known in the Age of Change?

- ▶ Witnessed Cardiac arrest – outcomes superior to non witnessed. rates as high as 53%
- ▶ Immediate defibrillation is superior to delayed.
ROC studies
- ▶ Continuous CPR is superior to interrupted.
2010 AHA Guidelines
- ▶ Mechanical CPR may be more effective in sustaining cardiac output.
LUCAS®, Auto Pulse® (some equal, some better)

What is Known in the Age of Change?

- ▶ CPR can be effective for 90 minutes
Case studies, Minnesota pt. for several hours
- ▶ VF and VT is better than PEA /Asystoli.
Unwitnessed arrest survival 5X greater
- ▶ Therapeutic Hypothermia is beneficial.
ROSC patients not waking up
Outcomes as good as 55% with good CPC scores

What is Known in the Age of Change?

- ▶ Intubated patients have poorer results – But why?
 - DL– “gold standard” more difficult?
 - Often requires cessation of CPR
 - Multiple attempts
 - Prolonged anoxia/misplaced tubes
- ▶ San Diego – Prolonged Intubation times and desaturation in “Easy Airways”.*
 - Dunford, etal...

What is Known in the Age of Change?

- ▶ High rate of complications – Lyon et al
 - Multiple attempts, anoxia, misplacement
 - Technique, devices, monitoring?
- ▶ Japanese Study compared SGA vs. ETT
 - 1700 ETT vs. 3700 SGA
 - Outcomes identical at one month
 - Time to insertion longer with SGA

What is Known in the Age of Change?

- ▶ But is that the real answer?
 - Soiled airways are bad.
 - Vomit, aspiration, and debris common
 - BVM poorly done, fills stomach with air
 - Supraglottic airway may not be so super
- ▶ Hyperventilation is bad ↓ CO
 - Aufderheide et al
- ▶ Devices such as ITD with timing light.
 - Improve CO and control ventilatory rate
 - Best done with ETT

What is Known in the Age of Change?

- ▶ Maybe it's the device?
 - Original Direct Laryngoscope–Babington 1830
 - Kirstein added light 1895
 - More modifications, Miller, McIntosh etc.
 - Line of sight with poor views 10–20 % of the time
 - Requires significant force

Current Devices

- ▶ DL has been intubation “gold standard”
 - Curved or straight blades
 - Disadvantage– poor laryngeal views
 - Past alternatives to DL
 - Difficult to master
 - Time consuming
 - Unreliable
 - Costly

Alternative Airways

- ▶ What about Supraglottic airways?
 - LMA
 - Combitube/Easytube
 - King LTD
 - Others
- ▶ Some easy, some harder to master.
 - Variable on aspiration prevention
 - Efficacy data varies
 - Still valuable as rescue airway
- ▶ Fiber optic – not widely used.
 - Expensive
 - Difficult to master

What is needed to make change?

- ▶ **Goals**
 - Reduce multiple attempts at intubation
 - Prevent:
 - Dental, mouth & airway trauma
 - Desaturation
 - Intracranial hypertension
 - Pneumothorax
 - Pulmonary aspiration
 - Unrecognized esophageal placement

Does Video make that change?

- ▶ **Attributes:**
 - Camera lens in handle or blade
 - Image of larynx/glottis on monitor
 - Monitor attached or separate
 - Recording capabilities
 - Ruggedized for field/ED use
 - Easy to clean and maintain

Does Video make that change?

- ▶ **Attributes:**
 - Provide full view of glottic opening even in difficult patients
 - Easy to learn and master – even if used infrequently
 - Useful to monitor and as a teaching tool

Does Video make that change?

- ▶ **Video Advantages**
 - 99% Grade 1–2 view
 - Confirms tube in airway and depth
 - Video event recording–documentation
 - Education – multiple viewer/training videos
- ▶ **Training is enhanced**
 - Real time critique of procedure
 - “ETT can be carried out without interruption of CPR?”

Video Laryngoscopes

These and many more now on market



What is Known in the Age of Change?

- ▶ **So big Question...?**
 - If arrest in ED/Hospital would patient be intubated?
 - Why there but not elsewhere?
 - Stopping CPR bad everywhere
 - Misplaced tubes bad everywhere
 - Good training not limited to physicians
- ▶ **Can non-physicians do as well?**
 - Out of hospital environment difficult but not impossible
 - Training can be enhanced by technology
 - Technology allows video review for education and QM

Our studies in the age of change

- ▶ Glidescope® Ranger with stopwatch
- ▶ Glidescope® Ranger with attached DVR



Comparison of Traditional Laryngoscopy and Camera Assisted Laryngoscopy in Out of Hospital Endotracheal Intubation

Marvin A. Wayne, MD, FACEP,FAAEM*, Captain Mannix McDonnell, EMT-P*

	Video Laryngoscopy	Direct Laryngoscopy	P value
Number	315	300	Ns
Avg time	21 sec (8-43)	42 sec (28-90)	P=0.05
Attempts	1.2 (1-3)	2.3 (1-4)	P=0.05
Age	58 (10-97)	56 (8-93)	Ns
Sex	M 213 vs. F 102	M 200 vs. F 100	Ns
Trauma	50	42	Ns
Medical	265	258	Ns
Paralytics	95	96	Ns
Successful	97%	95%	Ns
Misplaced	0	0	Ns
Alternative	Combitube/BVM	Combitube/BVM	
Non ventilated Interval	37 sec	55 sec	P=0.05

Wayne, MA, McDonnell, MM, Comparison of Traditional vs. Video Laryngoscopy in Out of Hospital Tracheal Intubation, Prehospital Emergency Care, March 2010

Intubation with continuous CPR does video change the playing field?

	Video Laryngoscopy
Number	101
Avg time	32 sec (18-53)
Attempts	1.9 (1-3)
Age	58 (23-93)
Sex	M 66 vs. F 35
Standard CPR	48
Mechanical	53
VT/VF	40
PEA/Asystoli	61
Misplaced	0
Supraglottic/Cric	2/1
Non ventilated Interval	37 sec

Intubation with continuous CPR

- ▶ 23 yo M tossing FB with friend with sudden collapse.
- ▶ Long time for friend to get phone and call 911.
- ▶ Telephone CPR, EMS, EMS supervisor, EMS MD.
- ▶ Continuous CPR with intubation and defib.
- ▶ Transport to ED, Cath Lab Th Hypothermia
- ▶ Stimulant induced VF.
- ▶ Now works with drug prevention program.

Intubation with continuous CPR

- ▶ 64 yo M with sudden collapse at home.
- ▶ Dispatcher CPR.
- ▶ First response CPR/AED/ ITD with no shock indicated.
- ▶ ALS with LUCAS and intubation.
- ▶ Resuscitation 30 min ETCO₂ <10 mm/hg.
- ▶ Ceased resuscitation.

A lot more than just CPR

- ▶ Is tube in right place?
- ▶ Foreign body removal.
- ▶ Airway burns.
- ▶ Can't intubate can't ventilate...hope you never see this one again!



Video Laryngoscopy as an Airway Resource

- ▶ 99% grade 1 and 2 views are attained.
- ▶ Why struggle with line of sight DL with poor views 10–20 % of the time?
- ▶ Improved use of PEEP, ITD, etc.
- ▶ Event recording of all airway placements possible.
- ▶ Conclusion: Video will replace standard laryngoscopy.

Unanswered Questions?

- ▶ Will expeditious intubation have any positive effect on outcomes?
- ▶ Can we now safely intubate kids?
- ▶ How much “effective ventilation “ comes from: Manual CPR vs Machine CPR ?
- ▶ Does the Airway matter at all?

Conclusions

- ▶ Video Laryngoscopy provides the means for ETT during uninterrupted CPR.
- ▶ ETT will prevent ongoing aspiration more effective ventilation than without.
- ▶ There are more options with an ETT in place (ITD, PEEP, ETCO₂).
- ▶ However, no proof that these measures can or do affect outcome – YET!

“Nothing endures but change.”

Heraclitus
540 BC – 480 BC