

To Intubate, or Not to
Intubate, That is the
Question!

To Intubate

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Tradition

- Intubation puts the ALS into Paramedic
 - 1960's and 1970's
 - The term comes from the TV show "Emergency"

Technique

Pace SA, Fuller FP (2000) Out of hospital succinylcholine assisted endotracheal intubation By paramedics. Annals of Emergency Medicine. Jun 35 (6) 568-72

- 150 patients intubated with SUX (adults)
- ~43% coma, 26% trauma and 31% respiratory failure
- No patient in cardiac arrest at point of intubation
- ETT success rate 92%
- 4 cases developed cardiac arrest and 3 had symptomatic bradycardia

Key messages

- Succinylcholine assisted intubation increases first time tube success
- Cardiac complications are infrequent but do happen

Wayne MA, Friedland E (1999) Pre-hospital use of succinylcholine: a 20 year review Pre-hospital emergency care. Oct-Dec (3) (4) 377-8

- To determine safety of SUX administered by paramedics
- retrospective review of 1657 patients age > 16
- Medical and trauma patients
- successful intubation of 94% of trauma patients and 98% of medical patients
- All non-intubated patients received alternative methods

Key messages

- Succinylcholine facilitates intubation
- Succinylcholine can be safely administered by paramedics

Technique

*Wang HE et al (2000) The utilisation of midazolam as a pharmacologic adjunct
To endotracheal intubation by paramedics. Pre-hospital emergency care Jan-Mar 4 (1) 14-18*

- IV Midazolam
- 683 ETT's, 72 MID assisted
- Most common indications were trismus, gag and combative
- Successful ETT achieved in 45 of the 72 cases
- Less successful for trauma patients

Key messages

- Midazolam assisted ETT may augment intubation
- Midazolam is not as successful as SUX for ETT
- Drugs may be associated with outcome

*Ochs M et al (2002) Paramedic performed rapid sequence intubation of patients
With severe head injuries. Annals of Emergency Medicine Aug 40 (2) 159-67*

- Prospective enrolment over 1 year period
- GCS 3-8, Transport time > 10 mins, Inability to ETT without RSI
- Used SUX and MID and Rocuronium
- 114 enrolled patients – 96 underwent RSI and 14 with combitube
- 1 airway failure
- On arrival at hospital mean SP02 was 99%, P02 @25kPa, PC02 3.8kPa
- On scene times higher with RSI group (26 versus 13 minutes)

Key messages

- Using specific criteria for RSI ensured appropriate use
- Using SUX and MID and ROC proved successful
- Vital parameters can be improved with adequate ventilation
- On scene times increased – but not time wasted
- Paramedics used RSI appropriately and successfully

Technique

*Bulger EM et al (2002) An analysis of advanced pre hospital airway management
Journal of Emergency Medicine Aug 23 (2) 183-9*

- 2 year retrospective review of all advanced airway procedures
- Covered techniques, RSI, methods etc
- 2700 intubations
- Medical emergency 82% and trauma in 18%
- 50% were intubated with SUX
- Overall ETT success rate was 98.4%
- Only 1.1 % of patients required surgical airway
- This is attributed to the use of paralytic agents

Key Messages

- **RSI is a technique for medical as well as trauma emergencies**
- **Increased success rate with SUX**
- **Paralytic agents reduced need for surgical airway**

Trauma

Winchell RJ, Hoyt DB (1997) Endotracheal intubation in the field improves survival in patients with severe head injury. Archives of Surgery 132 (6) 592-7

Included patients with HI – GCS < 8
1092 patients included (671 with severe HI & 351 with isolated HI)

Field intubation resulted in reduced mortality (36% to 26% for full study group)
Rate of discharge home was unaffected by field intubation

50 – 60% of patients intubated under paramedic protocol
85 – 92% intubated with drugs by aeromedical team

Key messages

- Early pre-hospital intubation in HI is associated with decreased mortality
- Pharmacologically assisted intubation was used to facilitate this

Trauma

Davis DP et al (2005). The impact of pre hospital endotracheal intubation on outcome in moderate to severe traumatic brain injury. Journal of Trauma. May 58 (5) 933-9

- 13625 head injuries
- overall mortality was 22.9%
- 19.3% underwent pre hospital ETT
- Increase in mortality with the ETT group

Key Messages

- Patients who underwent NDA ETT nearly all died
- More serious types of HI may benefit from pre hospital ETT – but may be difficult to identify
- patients with TBI should be intubated with drugs or not intubated at all

Lockey D, Davies G (2001) Survival of trauma patients who have pre-hospital tracheal intubation without anaesthesia or muscle relaxants: an observational study.

- 6 year period 1623 pre-hospital ETT's
- 143 excluded as not trauma patients
- Of the remaining
 - 492 (33.2%) were intubated without drugs
 - 275 by doctors
 - 216 by paramedics
 - data was lost for 6 patients
 - of the remaining 486 patients – 1 (0.2%) survived

Key messages

- Heavily obtunded patients can be intubated without drugs
- This is a reliable indication that survival is negligible

Tools

- GCS
- Bougie
- ETCO2
- Glidescopes

Davis DP et al (2005) The association between field Glasgow Coma Score and Outcome in patients undergoing paramedic rapid sequence intubation. Journal of Emergency Medicine Nov 29 (4) 391-7

- GCS commonly used as a 'screening tool' to identify RSI candidates
- Prospective Trial identifying GCS estimation and outcome
- 412 patients
- 81 patients extubated within 48 hours (all of them had > SP02 values pre-RSI)
- Paramedic and doctor GCS estimations were in high agreement
- Identified that GCS may not predict presence of severe TBI, severity, desaturation aspiration, ICU length of stay or survival.

Key Messages

- Paramedics can use GCS appropriately to identify candidates for RSI
- GCS has a limited role
- Other screening tools are needed to identify RSI Candidates

Davis DP et al (2005) Ventilation patterns in patients with severe traumatic brain injury Following paramedic rapid sequence intubation. Neurocritical care 2 (2) 165-71

- MID, SUX and ROC RSI patients
- Used ETCO2 values to describe hyperventilation
- Review of 76 patients
- ETCO2 values of < 3.0 were documented in 79% of patients

Key messages

- Illustrates 'vulnerability' of patients
- Illustrates 'total control' concept
- Hyperventilation is common following ETT

Training

Davis DP, stern J, Sise MJ, Hoyt DB (2005) A follow-up analysis of factors associated With head injury mortality after paramedic rapid sequence intubation

- Focus on TBI
- 352 enrolled for analysis (matched to controls)
- Hyperventilation was associated with increased mortality
- Aeromedical application of RSI was associated with decreased mortality
- Aspiration pneumonia was higher in the RSI group

Key messages

- **Illustrates the poor understanding of the role of 'ventilation'**
- **Rapid access to RSI is achieved by helicopter use**
- **Attention to technique is highlighted by aspiration**

Training

Warner KJ, Carlbom D, Cooke CR, et al. (2010) Paramedic training for proficient prehospital endotracheal intubation. Preh Emerg Care 14(1): 103-8, Jan-Mar 2010.

- ETI success rates measured
- 56 Paramedic Students
- 576 Prehospital ETI attempts
- The odds of overall ETI success were associated with cumulative ETI experience
- The odds of first-pass ETI success were associated with cumulative ETI experience

Key messages

- took an average of 29 ETIs
 - (20 of them in prehospital patients)
- 80% first-pass success
- 95% overall success rate

Fullerton JN, et al. (2009) Can experienced paramedics perform tracheal intubation at cardiac arrests? Resuscitation. Dec;80(12):1342-5.

- Paramedic tracheal intubation has been reported to carry a high failure rate and morbidity.
- Comparison of doctor and paramedic intubation at out-of-hospital cardiac arrests (OHCA)
- 286 cases of medical OHCA were identified,
- 199 (69.6%) were doctor-led
- 87 (30.4%) paramedic-led.

Key messages

- Paramedics and physicians in same air ambulance service have identical 97% success rates

Territory

- Without the above - of course poorer success rates
- area the study is from should evaluate this multi-factorial question

Paramedic Intubations?

- If the 6 T's are met?
- **TOTALLY!**