Is Less better? Advanced Airways in Low Paramedic – Populatiion ratio Systems

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Airway Controversies

- Pre hospital Endotracheal Intubation(ETI)
- Drug Assisted Intubation(DAI)
- Pediatric Intubation

Pre hospital ETI

Best way to achieve airway control

-ability to tightly control oxygenation & ventilation

-protects airway and allows suctioning

Pre hospital ETI

- Training:
  - -national paramedic curriculum requires only 5 ETI's to graduate;
  - -EM residencies require 35
- Experience:
  - Seattle requires 12 ETI's/yr
  - some systems' medics average <1/yr

Pre hospital ETI

wide range of success and adverse event rates

-best rates are comparable to ED's:>95%success, rare esophageal intubations, desaturation or hyperventilation

-worst rates :33% success and complications in 30-40 %

Pre hospital DAI

- Indication: alive patient with clenched jaw or intact airway reflexes
- If performed well ,better success rates than ETI alone (Bulger,J Trauma, April 2005 & Domeier, Prehospital Emergency Care,Jan-March,2005)
- Used successfully in most Air ambulance services

Pre hospital DAI

- San Diego trial of RSI (DAI) vs BVM in head trauma (J Trauma,Mar 2003):
- RSI

  -significant hypocapnea

  -significant hypoxia often associated with bradycardia

  -increased mortality

Drug Assisted Intubation

- NAEMSP: "Drug Assisted Intubation (DAI) should be utilized only by EMS systems that .. possess adequate resources to develop and maintain a DAI protocol… EMS providers performing DAI should possess training, knowledge and experience in the techniques and in the use of pharmacologic agents used to perform DAI. Confirmation of proper endotracheal placement is essential…can be harmful if not performed properly..nor is it appropriate for many EMS systems" Jan 2005

Pediatric Intubation

Small #'s

Smaller the child, harder the tube

Gausche (JAMA Feb 2000):

BVM equivalent to ETI in neurological outcome and mortality in urban ,high paramedic/ population system

Boston EMS

- Boston: Population 600,000
  Day time 1,200,000
- Fire First response
- Boston EMS:
  - Third service, Two-tiered: B/B and P/P
  - 100,000 calls annually
  - 68,000 patient transports annually
  - 265 EMT-B, 70 EMT-P

The BAR (Boston EMS Airway Registry)

- Started July 1, 2006
- All ALS PCRs with ETI are reviewed by QA paramedic and physicians
- Data abstracted to registry:
  - Demographics
  - Medications used
  - ETI attempts
  - CO2 and O2
  - Complications

The Data: July 2006-June 2007 N=567

567 ETI's

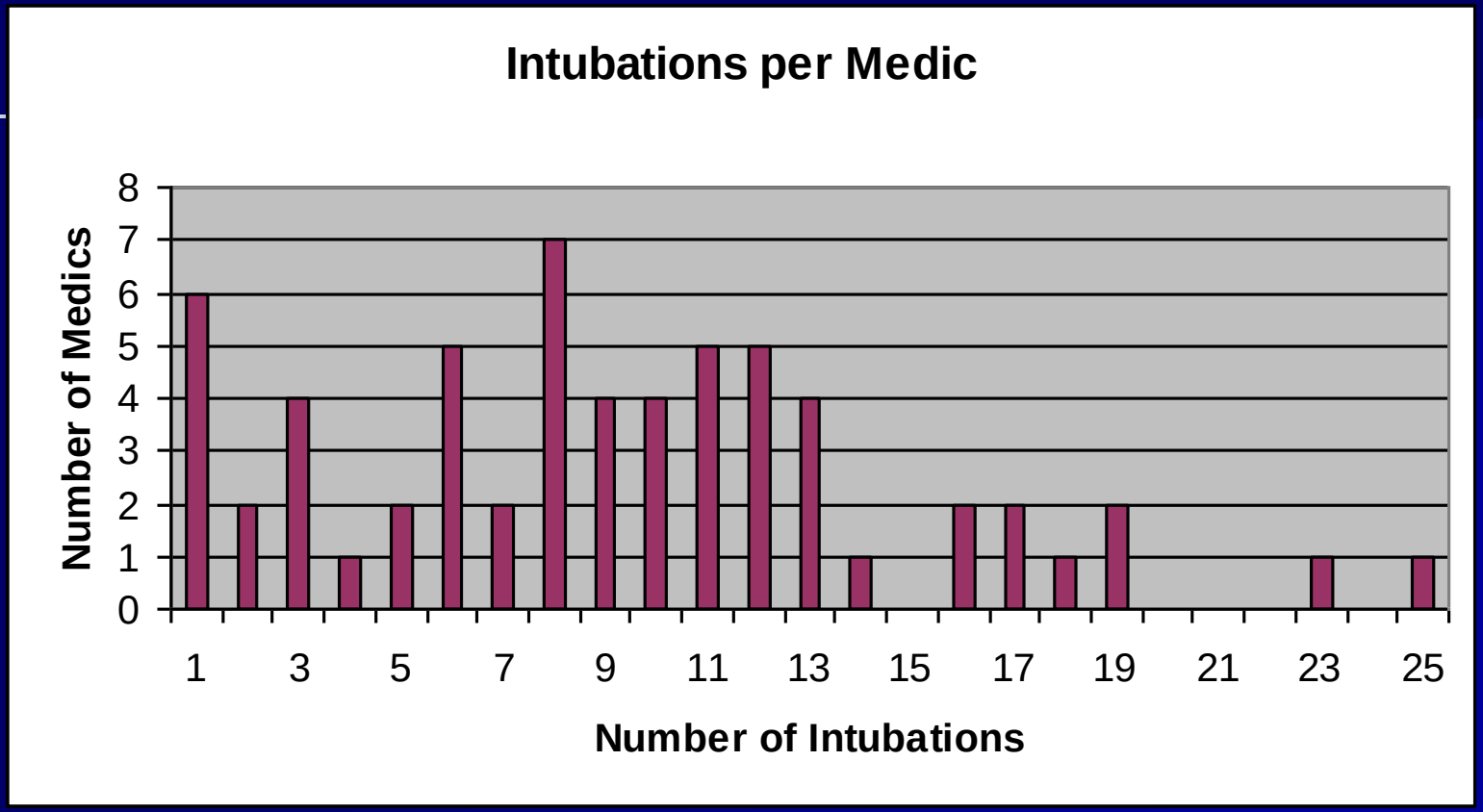
Cardiac Arrest:454 (80.3%)

Other:113 (19.7 %)

DAI : 77/113(68 % of non cardiac arrests)

Pediatrics : 11

Intubations per paramedic



- 61 street medics, all had at least 1 intubation
- Average number of intubations= 9.2 intubations per street medic
- 9 medics had 0 intubations, all were administrative medics

Rates of Successful Intubation

	1st Attempt n/N % (95% CI)	1st or 2nd Attempt n/N % (95% CI)	Any Attempt n/N % (95% CI)
All Cases	448/567 **79.0** (75.4-82.3)	538/567 **94.9** (92.7-96.6)	558/567 **98.4** (97.0-9.3)
Head Trauma	58/74 **78.4** (67.3-87.1)	71/74 **96.0** (88.6-99.2)	72/74 **97.3** (90.6-99.7)
Cardiac Arrest	364/454 **80.2** (76.2-83.8)	433/454 **95.4** (93.0-97.1)	448/454 **98.7** (97.2-99.5)
Pediatric Cases	6/11 **54.3** (23.4-83.3)	10/11 **90.9** (58.7-99.8)	11/11 **100.0** (71.5-100.0)
RSI	63/77 **81.8** (71.4-89.7)	74/77 **96.1** (89.0-99.2)	76/77 **98.7** (93.0-100.0)

Continuous CO2 Monitoring

CO2 Nadir

Non Cardiac Arrest (n=95): Mean **34.7** (SD 18.1)

Continuous Sp02 Monitoring

	Before Intubation (n=71) N (%)	During Intubation (n=57) N (%)	After Intubation (n=105) N (%)
≥95%	31 (44.3)	27 (48.2)	53 (50.5)
<95%	7 (10.0)	10 (17.9)	11 (10.5)
≤90%	9 (12.9)	6 (10.7)	20 (19.1)
≤80%	23 (32.9)	13 (23.2)	21 (20.0)
Nadir		83.4 (SD 20.1)	

Complications:

- Recognized Esophageal Intubations: 7
- Unable to Intubate: 9 (including 4 patients receiving rescue airway LMA)
- Tubes dislodged During transport: 5

Conclusions

-ETI and DAI are valuable but difficult skills and should only be performed in systems with adequate experience per medic and tight medical oversight including training, monitoring and QI

-Alternative airway devices should be considered as primary devices

-Maintenance of Basic skills (BVM) key