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

EAGLES X February 2008
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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

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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 PCR 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
• 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
<table>
<thead>
<tr>
<th></th>
<th>1st Attempt</th>
<th>1st or 2nd Attempt</th>
<th>Any Attempt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N % (95% CI)</td>
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<tr>
<td><strong>All Cases</strong></td>
<td>448/567 79.0 (75.4-82.3)</td>
<td>538/567 94.9 (92.7-96.6)</td>
<td>558/567 98.4 (97.0-9.3)</td>
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<tr>
<td><strong>Head Trauma</strong></td>
<td>58/74 78.4 (67.3-87.1)</td>
<td>71/74 96.0 (88.6-99.2)</td>
<td>72/74 97.3 (90.6-99.7)</td>
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<tr>
<td><strong>Cardiac Arrest</strong></td>
<td>364/454 80.2 (76.2-83.8)</td>
<td>433/454 95.4 (93.0-97.1)</td>
<td>448/454 98.7 (97.2-99.5)</td>
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<td><strong>Pediatric Cases</strong></td>
<td>6/11 54.3 (23.4-83.3)</td>
<td>10/11 90.9 (58.7-99.8)</td>
<td>11/11 100.0 (71.5-100.0)</td>
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<td><strong>RSI</strong></td>
<td>63/77 81.8 (71.4-89.7)</td>
<td>74/77 96.1 (89.0-99.2)</td>
<td>76/77 98.7 (93.0-100.0)</td>
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Continuous CO2 Monitoring

CO2 Nadir

Non Cardiac Arrest (n=95): Mean 34.7 (SD 18.1)
## Continuous Sp02 Monitoring

<table>
<thead>
<tr>
<th></th>
<th>Before Intubation (n=71)</th>
<th>During Intubation (n=57)</th>
<th>After Intubation (n=105)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥95%</td>
<td>31 (44.3)</td>
<td>27 (48.2)</td>
<td>53 (50.5)</td>
</tr>
<tr>
<td>&lt;95%</td>
<td>7 (10.0)</td>
<td>10 (17.9)</td>
<td>11 (10.5)</td>
</tr>
<tr>
<td>≤90%</td>
<td>9 (12.9)</td>
<td>6 (10.7)</td>
<td>20 (19.1)</td>
</tr>
<tr>
<td>≤80%</td>
<td>23 (32.9)</td>
<td>13 (23.2)</td>
<td>21 (20.0)</td>
</tr>
<tr>
<td>Nadir</td>
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<td>83.4 (SD 20.1)</td>
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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