



The Effectiveness of Manual Ventilation in Intubated Helicopter EMS Transported Trauma Patients

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Disclosures

- No disclosures

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Background

- Prehospital intubated trauma patients
 - Mode of ventilation varies
 - No evidence to guide decision

Objective

- Effectiveness of BVM ventilation in severely injured trauma patients
- Hypothesized manual ventilation provides adequate support to maintain physiologic ETCO₂

Methods

- Prospective, observational, proof of concept study
 - June 2015 to December 2015
- Inclusion criteria
 - Trauma patients endotracheally intubated on scene and transported by HEMS
- Exclusion criteria
 - Interfacility transfers
 - Non-scene calls
 - Supraglottic devices

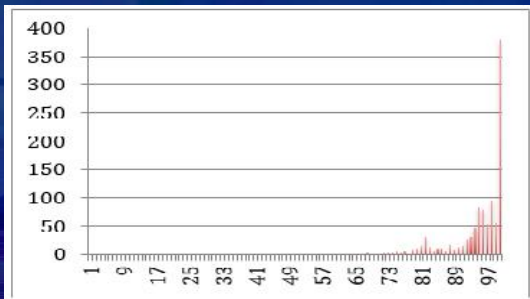
Results

- 1,466 time points representing 733 minutes of manual ventilation
- 16 males and 4 females
 - All with blunt trauma
 - 17 with head injuries

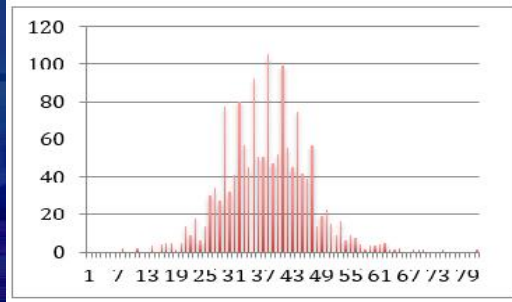
Results

- 83.6% adequately oxygenated
 - $PO_2 \geq 90\%$
- 48.7% within physiologic $ETCO_2$
 - 34.6% below 35 mmHg
 - 16.7% above 45 mmHg

PO₂ versus Cumulative Time Points



ETCO2 versus Cumulative Time Points



Discussion

- Adequate oxygenation occurred the majority of time
- Inadequate ventilation, though, occurred majority of time
 - Hypocapnia twice as often as hypercapnia
 - Primarily due to hyperventilation

Limitations

- No consideration of power
- Small sample size
- Limited demographic variation
- Geographic isolation
- Provider variation

Limitations

- Multisystem trauma
- Obesity
- Transport
- Consideration of other causes of ETCO₂ change

Conclusion

- When controlled for hypoxia and outliers, hyperventilation induced hypocarbia is pervasive
- Manual ventilation does not provide adequate ventilatory support
