Thunderstorm Asthma
(What??)

Kathleen Schrank, MD, FACEP, FACP
City of Miami & Key Biscayne Fire Rescue
Rare 'thunderstorm asthma' kills 4 in Australia

Ambulance Victoria responded to more than 1,870 cases, which was six-times the usual workload for a Monday evening

Nov 23, 2016
Melbourne, Australia

- Population 4.4 million
- Hot sunny day in November then 6 pm thunderstorms
- Emergency call to 000 (911) every 4.5 seconds
- 8500 patients treated in < 24 hrs
- 9 died
Thunderstorm asthma outbreaks

- Birmingham, England: 1983
- Italy: 2004 & 2010
- Iran: 2013
- Kuwait: Dec. 2016 with 844 ED visits (5 dead)
Perennial rye grass pollen:
- If water-logged, pollen ruptures into tiny particles & gets inhaled deep into lungs
- How common is hay fever/seasonal rhinitis?
EMS Treatment?

If you want to know more:

Advanced Airway Reservations: What’s the Best Supraglottic to Use?

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Office of the Medical Director
NMAS and the HC EMS Council
Minnesota Resuscitation Consortium
DISCLOSURE STATEMENT

• CME Speaker for ZOLL Circulation/Alsius Corp
• Specializing in Resuscitative Hypothermia and Emergency Medicine related issues
• Board Member, MN Resuscitation Consortium
The History of the SGA

• The esophageal obturator airway (EOA) was introduced for clinical use in 1973, and was the clinical forerunner of the modern SGA.

• While a revolutionary device, it had multiple hazards:
  – Tracheal intubation (commonest)
  – Esophageal perforation
  – Failure to pass tube
  – Failure to seal the mask
  – Obstruction to intubation
The History of the SGA: The Laryngeal Mask Airway (LMA)

- He felt the need for an airway that could be inserted easily, rapidly, and without any trauma even by the unskilled.
Classification of SGAs

• First generation
  – These are defined as SGAs without a separate channel for the drainage of gastric contents.

• cLMA
• LMA Flexible
• LM Solus
• LM Portex Soft Seal*
• LM Aura Once*
• Cobra PLA*
• Laryngeal Tube (LTS)
• LMA Aura-I*
• Air-Q intubating LA*
Classification of SGAs

• Second generation
  – These are defined as SGAs with a separate channel for the drainage of gastric contents.

• ETC (Combitube)
• EasyTube
• LTS-D (King Airway)
• ProSeal LMA*
• Supreme LMA*
• SLIPA
• I-gel*
• AuraGain LM*
OR use versus the pre-hospital setting

- OR patients usually have been fasted and premedicated prior to SGA placement; pre-hospital patients are not.
- OR patients usually do not require higher airway pressures for ventilation; pre-hospital patients may.
- OR patients usually do not have low-flow cardiovascular states; pre-hospital patients may (cardiac arrest, shock, etc).
- OR has the time to adequately prepare the patient (BVM ventilation, adequate positioning, etc.); pre-hospital providers may not.
- OR may have other rescue airway devices and procedures; we may not.
Characteristics of good pre-hospital SGAs

- Single use (disposable)
- Reliable ease of use
- Low complication rate
- High placement success rate
- Short elapsed time of placement (and verification)
- Airway sealing pressure (higher airway pressures)
- Ability to protect against gastric insufflation and regurgitation
- Ability to provide gastric decompression
- Protection against aspiration
- Minimize compression (or damage) to cervical structures
- Wide age/weight range
- Compatibility for intubation
- PRICE!!
SGA as primary airway versus rescue airway

- Primary airway
  - In cardiac arrest
  - In respiratory arrest
  - In inaccessible patients
  - In remote/austere environments

- Rescue airway
  - In failed ETT placement
  - In failure of DL/VL equipment
  - In failed MAAM/RSI
  - In significant facial/mandibular trauma
Cuffed SGAs: Oropharyngeal-esophageal balloon devices

- ETC (Combitube)
- EasyTube
- Laryngeal Tube (LTS)
- LTS-D (King Airway)
Cuffed versus Non-cuffed SGAs: LMA type devices

• Cuffed SGAs by their nature and design seal over the supra-glottic area by “enveloping” this area and also sealing (to certain degrees) the upper esophagus.

• Inflatable devices can provide higher airway sealing pressures, but at the price of compressing (or damaging) cervical structures.

• In addition, passive outflow from the cranial circulation can be impeded, causing increased venous pressure and passive venous congestion in the brain.
Cuffed versus Non-cuffed SGAs: LMA type devices

- cLMA+
- LMA Flexible
- LM Solus
- LM Portex Soft Seal*
- LM Aura Once*
- Cobra PLA*
- LMA Aura-I*
- Air-Q intubating LA*

- No Esophageal/gastric venting

- ProSeal LMA+
- Supreme LMA*
- I-gel*^*
- SLIPA^*

- With Esophageal/gastric venting
Cuffed versus Non-cuffed SGAs: LMA type devices

• I-gel airway
  – Made from a medical grade thermoplastic elastomer that is designed to create a non-inflatable, anatomical seal of the pharyngeal, laryngeal and perilaryngeal structures.
  – Body heat from the patient activates the gel component of the airway, which expands to fill the void in the hypopharynx where the device rests.
ETCO2 Waveform in I-gel versus ETT
NMAS SGA Experience

- **04/15-10/15/2015**
  - King airway: 184
  - ET intubation: 617
  - King airway placed in @ 23% of all airway interventions
  - King Airway success rate: **87.21%**

- **10/15/2015- 8/30/2016**
  - King: 67
  - I-gel: 401
  - Intubation 1017
  - I-gel airway placed in @ 27% of all airway interventions
  - I-gel airway success rate: **92.91%**
CONCLUSIONS

• The SGA selected should have:
  – Reliable ease of use
  – Low complication rate
  – High first-passage success rate
  – The ability to protect against gastric insufflation/regurgitation
  – The ability to provide gastric decompression and protect against aspiration
  – Minimize compression (or damage) to cervical structures
  – Have a wide age/weight range
  – Capability for in-line intubation without device removal (if possible)
Special Thanks to: Alex Trembley, NREMTP Field Training Officer, Quality Management Specialist

The King with the King, demonstrating the proper technique