

Airway Management in Trauma

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The First Step

- Oxygen is essential to life!
- Assurance of an airway is the first step in all emergency medicine protocols.

Why manage a trauma airway?

- Two reasons:
 - physical disruption of the airway
 - *eg* facial fractures, laryngeal trauma
 - patient has lost ability to maintain an otherwise normal airway
 - diminished consciousness : shock, head injury
 - anaesthesia/analgesia to manage the injuries

(Insert gory picture here!)

- Physically disrupted airway is obviously a major challenge
 - vast spectrum of management possibilities may be required :
 - modified techniques, surgical airway, bronchoscope
- I will focus on the challenges of managing a normal airway in a trauma patient without resorting to a surgical airway.

The Gold Standard

Endotracheal Intubation

(ETI)

Why?

- ETI guarantees the passage of air into the bronchial tree
- Adds a *margin* of protection
 - NOT absolute!
 - Aspiration will occur past the cuff eventually

The problem

- ETI is a moderately difficult skill in any patient
 - requires training and practice
 - live patients better than manikins
 - anatomically difficult airways are not uncommon
- More difficult in trauma
 - patients unstable; less time to “play around”
 - concern about cervical spine injury

The first controversy

Is ETI always necessary?

Risk:benefit ratio

- Inept attempts at ETI can lead to patient being “intubated to death”
- Need good training, practice and protocols to get around this
- Sometimes it is deemed to be essential
- ETI MUST NOT BE THE GOAL
 - oxygenation is the goal!!

Non-ETI based techniques

- Multiple studies in infrequent intubators (especially prehospital) show adequate outcomes with other methods
 - simple manual airway control
 - alternate tools (LMA, OTC)
 - not always practical in South Africa
- If ETI is not working, protocols must allow a Plan B to be rapidly adopted

The second controversy

ETI and the cervical spine

The fact is...

- You need to move the cervical spine to get good visualization
 - need MAXIMAL EXTENSION at the atlanto-occipital joint
 - need FLEXION at in C3-C7
 - head must be lifted anteriorly
- Any C-spine protective technique impairs vision

Protective techniques

- Manual Inline Stabilization
 - widely advocated, so DO IT!
 - but it does not guarantee safety
- Hard collars
 - limit flexion and mouth opening
- Caliper traction
 - limits A-O joint movement

Tips for South Africa

- Good technique (no levering &c) with curved MacIntosh blade
- Cricoid *manipulation* (Backward, Upward, Rightward Pressure)
 - but beware pressure on C-spine
- Straight blade for anterior larynx
- INTRODUCER with slight hockey-stick bend

Toys in the rest of the world

- Gum elastic bougie
 - easier to direct; a big hit in the UK
- Various funny laryngoscopes (Bullard &c)
- Light wands &c
- Fibreoptic laryngoscopy
 - takes time; blood obscures view

Non-visualizing techniques

- Digital intubation : neck moves, requires practice and flat patient
- Blind nasal : excellent if patient breathing - and flattish - needs practice
- Retrograde : useful : needs practice
- **AN EMERGENCY IS NOT THE TIME TO PRACTISE!!**

Remember

Go with what you know works!

The third controversy

Pharmacological adjuncts to ETI

The usual cocktail

- Lots of midazolam, plus some morphine
- GREAT for sedation
- LOUSY for intubation

Midazolam

- Excellent sedative
- But does not depress consciousness enough to allow airway manipulation
- Is a vasodilator
 - so get hypotension when a big enough dose used
 - this kills bleeding patients!

A practical alternative

- Anaesthetic induction agent and a muscle relaxant
- Definitely gives better intubating conditions
- But no fall-back to spontaneous breathing if you fail
- Training dependent

CHBH ICU protocol

- Induction agent : ETOMIDATE 0.3mg/kg
- Relaxant : SUCCINYLCHOLINE 1mg/kg
 - onset 45seconds, duration <10minutes
 - remember contraindications :
 - hyperkalaemia, burns/paralysis over 24 hours old, ("scoline apnoea")
 - malignant hyperthermia risk
 - must be kept cold longterm

Alternates to succinylcholine

- VECURONIUM 0.1mg/kg
 - onset 2.5min, duration 30min
- ROCURONIUM 1.2mg/kg
 - onset 1 min - but lasts over an hour

My personal feeling

- “Anaesthetic” approach gives better, safer conditions
 - but staff must be competent to intubate
 - they must know the drugs
 - muscle relaxants are not sedatives!!

The fourth controversy

ETI is often not possible.
What can we use instead?

Alternates to ETI

- Multiple airway devices are marketed; most are useful
- None supplants ETI
 - but can offer an alternative if
 - ETI is impossible
 - Staff cannot be trained to do ETI
- I will discuss only 2 of the many options

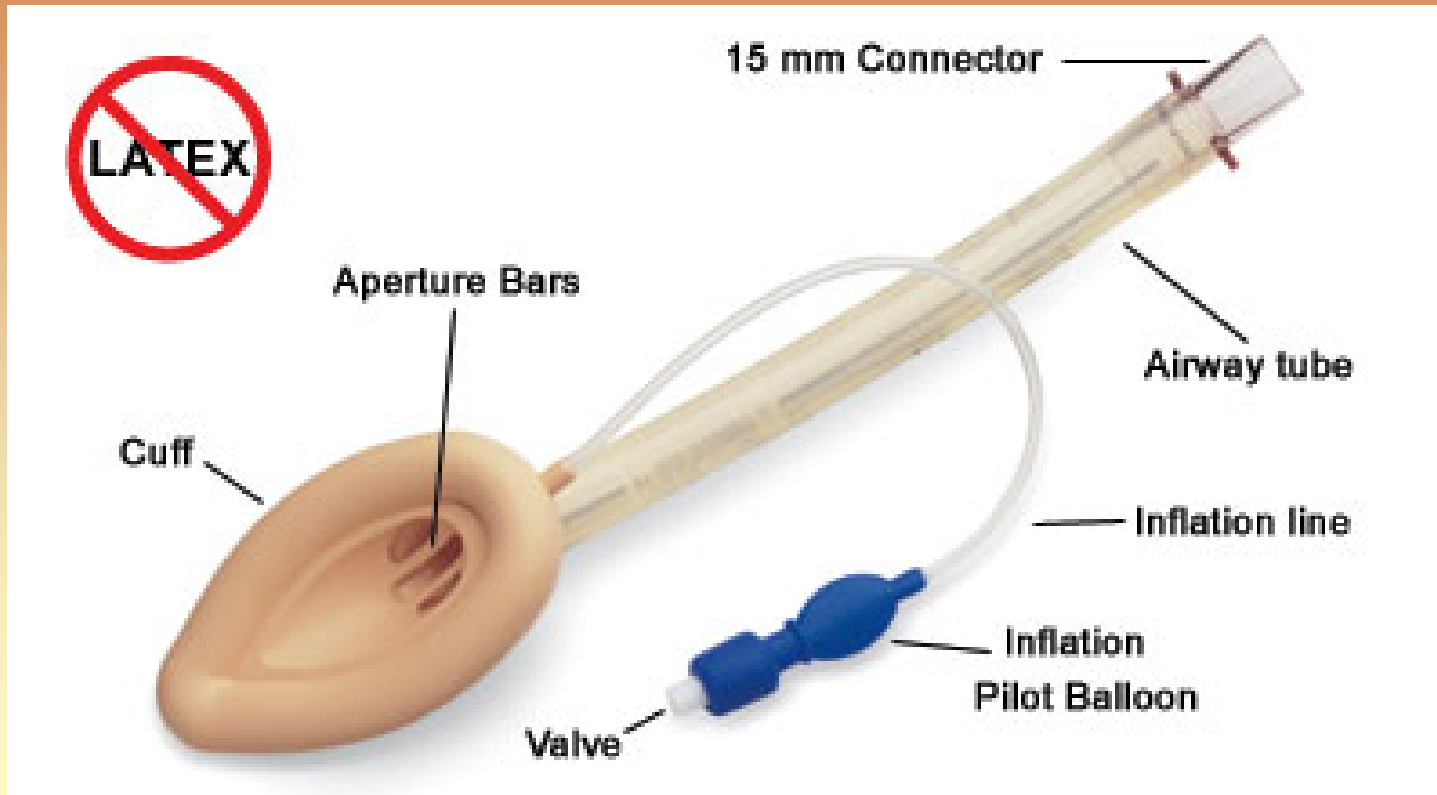
Just remember...

- A GUEDEL AIRWAY IS NOT AN ADEQUATE ALTERNATIVE!
 - if tolerated, it indicates the need for better management!

Laryngeal Mask Airway

- Developed by Dr Archie Brain and the Laryngeal Mask Company
- Is a supraglottic device
- Allows spontaneous and controlled ventilation (if pressures $<20\text{cmH}_2\text{O}$)
- Relatively easily placed; several sizes; reusable
- Used as sole airway in many anaesthetics

The Classic LMA



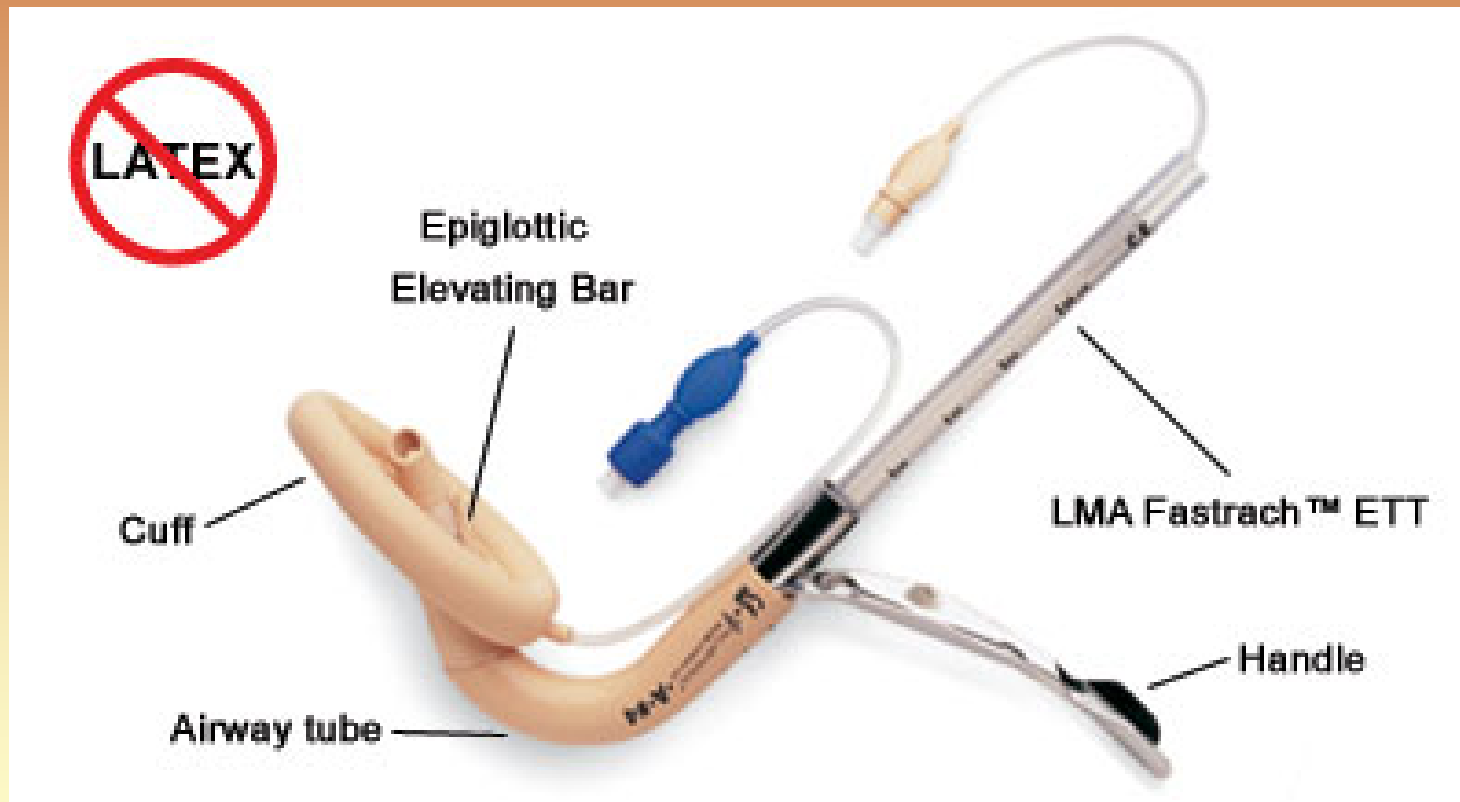
LMA (2)

- It forms part of the ASA difficult airway protocol to allow ventilation when ETI has failed
- Has been used prehospital in several studies and works well to allow ventilation and oxygenation
- Does not protect airway from aspiration (though new “LMA ProSeal”[®] better)

Intubating LMA

- Opening of standard LMA adjacent to laryngeal opening
 - small ETT can be passed through it
 - especially in generic versions without aperture bars
- Now ILMA (“LMA Fastrach” ®)
 - can be used as main route for intubation for ETT up to 8.5mm

LMA Fastrach



ILMA (2)

- Usually special flexible ETT used
- Can be done without visualization
- Can be done with LESS neck movement than standard ETI
 - but cuff definitely presses on vertebrae around C3-4
- Definitely validated in studies
- Costly

ILMA (3)

- My personal feeling is that it is a good tool as a Plan B
- Still requires training, but shallower learning curve than ETI
- For cost reasons alone will not supplant ETI in South African trauma

Oesophageal-Tracheal Combitube®

- Double lumen, double balloon PVC tube, 37 or 41Fr (usually use larger)
- Placed blindly - no visualization, limited neck movement required
- Could go into oesophagus (90%) or trachea (10%)
 - drill to identify which lumen to use

Combitube



Trauma Airway Management
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OTC (2)

- Usually functions as an oesophageal obturator
 - excellent ventilation; possibly better oxygenation (PEEP effect)
 - will need replacement for longterm
- If in trachea : great!

OTC (3)

- Excellent Plan B; is in the ASA algorithm
- Used in field trials with success
- Has a learning curve
- Pharyngeal cuff exerts considerable pressure on lower C-spine
- **EXPENSIVE! SINGLE-USE!**

Alternate toys

- LMA, ILMA, OTC not the only toys on the market
- But do work, and have trials to back them
- Seriously consider one of them
- They may save a patient's life when ETI not possible.

To sum up

- There is no controversy about the need to guarantee an airway.
- There is no controversy that ETI is ideal - but not always possible.
- Protocols must allow:
 - Plan B if ETI not possible
 - oxygenation must always be seen as the goal

Summing up...

- Protocols must also allow:
 - use of alternate devices
 - progression to surgical airway when appropriate
- The biggest single challenge is probably training and practice.