

## Topic Overview: A4.1 Special Airway Challenges: The Trauma Airway

### Module A4.1

Last updated: November 4th 2012

#### Objectives

- Preparation and planning in predicted difficult airway management.
- To recognise potential airway compromise.
- To co-ordinate team to manage the potentially difficult trauma airway.
- To recognise need for senior specialist help early.
- To manage patients in the context of available resources.

#### Management of the Airway in Trauma

Managing the airway in the trauma patient requires an understanding of the considerations that contribute to the need for definitive airway control. The situation may require rapid airway intervention to maintain patency and protection of the respiratory tract. Common airway reflexes are lost through alteration in level of consciousness or physiological changes related to trauma. If they are predicted to be lost in the future, then the intubation should be performed early to reduce the risk associated with rapid deterioration. Airway control will provide improved oxygenation and ventilation, aiming to avoid the hypoxia and hypercapnia that contribute to secondary injury in trauma. In cases of midface fractures, intubation will allow stabilisation of the unstable fractures which threaten the airway. Burn victims should be intubated early, in anticipation of airway oedema, or to allow adequate analgesia for humane management of extensive burns.

#### Trauma Airway Assessment

As with all trauma, it is important to assess the patient with a thorough AcBCDE primary survey and manage the patient in the context of their injuries and co-morbidities. The EdWISE trauma modules will provide a review of these principles. For the airway the LEMON and BOOTS assessment for airway difficulty is advised, with an understanding that the cervical spine immobilisation used in trauma will increase the difficulty of intubation. If the cervical spine can be cleared clinically or radiologically prior to induction this risk is reduced.

A rapid neurological assessment must be completed prior to the procedure, as these clinical findings will be masked by sedation and paralysis. Clear documentation of these findings will aid in the ongoing management of the patient.

#### Airway Management in Trauma

Rapid Sequence Induction (RSI) is the method of choice in trauma, with manual inline stabilisation (MILS). Sedatives and analgesics are used to blunt the response to intubation (especially in head injury), provide adequate relaxation and analgesia to overcome trismus and improve the view of intubation. Induction agents include thiopentone, propofol, midazolam, fentanyl, (be cautious with the dose of propofol and thiopentone as both can lead to significant hypotension) and ketamine (the use of this was previously avoided in head injury, but the

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evidence now suggests that this is safe as it causes less hypotension than other agents). The doses of these medications may need adjustment, as they contribute to physiological changes that may cause adverse effects.

Avoidance of secondary injury is important in trauma, especially neurological injury where hypoxia, hypercapnia and hypotension have been shown to have a significant effect on morbidity and mortality.

As with all intubation attempts, consideration of location and method of intubation should be made – for example unstable C-spine injuries are often best managed with awake fibre optic intubation to reduce movement (if available in a timely manner), airway burns need management before there is excessive oedema and there needs to be consideration of the need for escharotomies for ventilation requirements.

## **Remember - Trauma airways are *ALL* difficult!**

### Principles of Management

- A co-ordinated team approach
- The 7 Ps of intubation for any Rapid Sequence Induction
- Basic airway opening manoeuvres/ adjuncts
- Protect the Cervical Spine
- Prepare and Plan thoroughly for an intubation
- Equipment, Drugs, Staff
- Preoxygenation is essential
- Plan A, B and C
- Suction Immediately available – there is often blood
- Patients die from hypoxia!
- Do not lose situational awareness

### The Team Approach

The co-ordinated team approach to trauma management should be continued through the airway intervention, with the team leader providing situational awareness during the procedure.

Who is available to help at your site?

- Trauma Team
- ED colleague
- Anaesthetics/GP Anaesthetists
- ICU
- ENT
- Retrieval Team

It is important to allocate roles to all the team members. Common roles include

- Airway doctor
- Airway nurse
- Person to apply MILS

- Person to apply cricoid pressure/laryngeal manipulation
- Person to administer drugs
- Team leader/person to maintain situational awareness and to monitor patient

This is not always possible and at times roles need to be discarded or shared within the team.

It is important that the team is focused on the intubation until it has been successfully completed, however a degree of situational awareness is essential. It is also important that all the team are aware of the back-up plans, if plan A fails what the plan B and C are. In this way all the members of the team will know what to do and it will be less stressful for everyone. The airway drill advised suggests this is articulated before the start of the procedure.

The 7 Ps of intubation discussed in the Airway Submodule A3 apply in the management of the airway in trauma.

### Basic Airway Manoeuvres

Although BVM ventilation is classified as a “basic” airway manoeuvre it can still be difficult to perform in some situations and continual assessment of its effectiveness is required. It is important to practice the skills of positioning, nasopharyngeal and oropharyngeal airway insertion, BVM ventilation and LMA insertion as often as possible. These have been discussed in the e-learning and in Airway modules 1 and 2.

In most circumstances a good jaw thrust, with an appropriate airway adjunct will provide an opening of the patient’s airway. Head tilt is avoided in trauma patients with suspected C-spine injury, which includes almost all trauma patients with a decreased level of consciousness. It will then be possible to oxygenate and perhaps ventilate the patient, which is our priority. It should be noted that in patients with facial trauma and suspected base of skull fracture blind nasal equipment placement (including NPA) is relatively contraindicated.

### Protect the Cervical Spine

The Cervical spine should be actively cleared by a senior clinician where possible, often applying the Canadian C-Spine rules or NEXUS criteria or through imaging of the Cervical spine with CT or MRI. Until there has been active clearance performed, the C-spine should be protected by collar application or manual stabilisation, this is often not possible in major trauma. Cervical spine control is a great example of using equipment to allow the “freeing-up” of a person. The appropriate use of a collar and, if needed, sandbags and tape can allow the team to continue with the assessment of the trauma patients and preparation for intervention. Manual In-Line Axial Stabilisation (MILS) should be used to protect the cervical spine from further potential damage, reducing the movement by approximately 60%. The collar should be removed during intubation attempts. In those with spinal cord injury, hypoxia and hypercapnia will, as with all neurologic injury increase morbidity.

### Prepare and Plan thoroughly for an intubation

***If you fail to prepare then you should be prepared to fail!***

All emergency airways require preparation and planning. This includes the team, the equipment and the drugs. Suction and End Tidal CO<sub>2</sub> are commonly forgotten, but essential equipment for performing the procedure safely.

A clear briefing of Plan A, B, C and D prior to induction should be communicated to the entire team, with all staff aware of the focus on the procedure, whilst maintaining some situational

awareness. Because of the increased difficulty of airway management in trauma it is important to be extra vigilant when preparing.

## Preoxygenation

Pre-oxygenation is vital in any intubation to increase the time to desaturation by washing out the nitrogen with oxygen. With blood loss, injury and co-morbidities trauma patients have an increased metabolic rate and an increased need for high levels of oxygen within their blood stream. Unfortunately with blood loss, lung injury and airway compromise the ability to supply the body with normal, let alone higher, levels of oxygenation are often compromised. Thorough pre-oxygenation will at the least give you (and the patient) more time to perform a difficult procedure. At the most it will improve the physiology of the patient prior to the further insults of administering sedative and paralyzing agents as well as the physiological responses to laryngoscopy and intubation. Hypoxia and hypercapnia increases morbidity and mortality in traumatic injury.

15L of oxygen through nasal prongs during the intubation process is used for apnoeic oxygenation which again increases time to desaturation.

As we have stressed in the other airway sub-modules, patients do not die from not being intubated – they die from lack of oxygen. Even in difficult trauma airways, it is the simple manoeuvres that will be the most use in the majority of cases, and should be used until the RSI can be performed safely by the team.

## Paralysis and Placement

Intubation in the trauma patient requires the use of adequate paralysis, sedative and analgesia. The placement of an endotracheal tube should be performed using MILS where indicated, cricoid pressure (as there is significant risk of aspiration) and external laryngeal manipulation to improve visualisation of the cords. The routine use of a bougie is advised and videolaryngoscopy will often improve the view where lack of cervical movement has contributed to increasing challenge of intubation.

## Post intubation Care

Ongoing management of the condition, cause, complications and co-morbidities is required in trauma. Post induction sedation, analgesia and adequate ventilation need to be rapidly initiated. Further investigation and transfer to definitive care should be expedited, with early notification of retrieval services if required at your centre.

A repeat AcBCDE assessment should be performed in the immediate few minutes after intubation, and a secondary survey once stabilisation has been achieved.

Avoidance of secondary injury includes adequate oxygenation and ventilation, the lethal triad will contribute to increased mortality, thus correction of coagulopathy, acidosis and hypothermia should be a focus of care. The patient may require massive transfusion protocols to be activated.

The transfer from the emergency department to definitive care will depend on injuries, hospital services and location, as well the need for ongoing treatment. Options for care include damage control surgery, angiography, definitive surgery and watchful waiting, amongst others.

Clear documentation of all injuries and interventions should be clear and concise, especially if the care in the emergency department is expedited due to the significant of the injuries.

## Summary

- A coordinated team approach is essential in management of the airway in trauma.
- Assessment of the trauma patient requires a AcBCDE approach.
- The 7 Ps of intubation should be used in trauma.
- Cervical Spine protection should be considered.
- Avoidance of secondary injury involves avoiding hypoxia, hypotension, hypercapnia and the lethal triad.
- Manage the patient condition as well as the airway.

## References

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