


EdWISE

# Special Airway Challenges Obstetrics & Trauma

Part of Airway Management Module  
Airway Module: A4-1A

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# Introductions



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Very quick round the room to assess stage of professional development for each participant.

## General Aims

- Learn in a team setting
- Blend clinical skills with team skills
- Reflect critically on practice



## Ground Rules

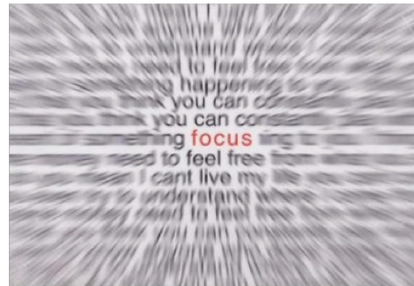
- Participation
- Privacy
- Confidentiality
- Disclaimer
- Debriefing
- Mobile phones

## Session Objectives

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

These are the aims of the A4 module. The next few slides following this are a reminder of the information given in the earlier modules to remind the participants of the material provided.

Patients don't die from failure to intubate.....they die from failure to oxygenate.



**DON'T GET FIXATED ON THE PLASTIC**

September  
2012



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Oxygenation is an absolute priority and in most cases can be achieved with simple airway manoeuvres, positioning and BVM ventilation.

This is of most importance in the RSI. The events of the Bromley case in the United Kingdom remind us of the need for situational awareness, a plan A/B and C and the need to work together in teams with effective communication to prevent poor clinical outcomes.

## Emergency Department Airways

- Assessment
  - History
  - Examination
    - Look
    - Listen
    - Feel
  - Difficulty
    - BOOTS
    - LEMON
  - Available Skills
- Management Options
  - Simple airway maneuvers
  - Nasal Prongs
  - Oxygen Masks – variable and fixed
  - Airway Adjuncts
  - Bag Valve Masks
  - Non-Invasive Ventilation
  - Laryngeal Masks
  - Intubation – 7 P's
  - Surgical Airway

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This slide reviews the principles of A1, A2 and A3 which should be re-iterated in this module as a further reminder to assess the airway for difficulty, and use simple management options where required.

A reminder of the need for assessment of difficulty and the steps of the 7 P's of intubation is brief but should be given during this presentation.

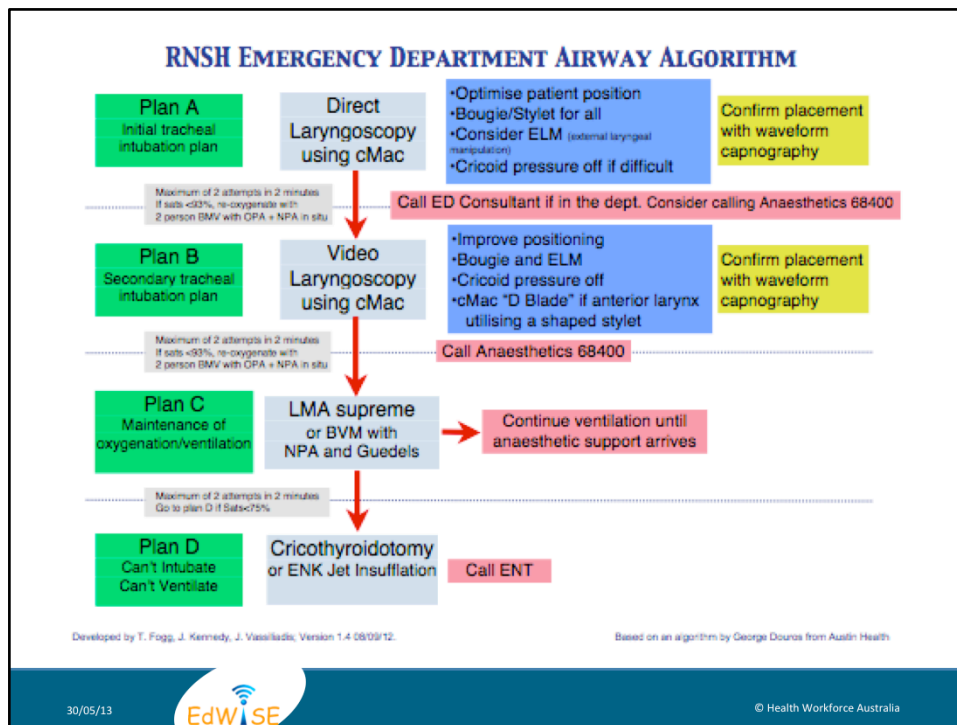
ED Intubation Checklist		
<p><b>Team</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ED Consultant aware of RSI?</li> <li><input type="checkbox"/> Out-of-hours, if difficulty anticipated, anaesthetics contacted?</li> <li><input type="checkbox"/> All members introduced by name &amp; role and each briefed in turn by TL</li> <li><input type="checkbox"/> Difficult intubation plan briefed?</li> <li><input type="checkbox"/> Difficult airway trolley at hand?</li> <li><input type="checkbox"/> Anticipated problems – does anyone have questions or concerns?</li> </ul>	<p><b>Patient</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Pre-oxygenation optimal?               <ul style="list-style-type: none"> <li><input type="checkbox"/> Add nasal prongs or NIV</li> </ul> </li> <li><input type="checkbox"/> Patient position optimal?</li> <li><input type="checkbox"/> Patient haemodynamics optimal?               <ul style="list-style-type: none"> <li><input type="checkbox"/> Fluid bolus?</li> <li><input type="checkbox"/> Pressor?</li> </ul> </li> <li><input type="checkbox"/> Does it look like it might be difficult:               <ul style="list-style-type: none"> <li><input type="checkbox"/> Difficult BVM?</li> <li><input type="checkbox"/> Difficult laryngoscopy?</li> <li><input type="checkbox"/> Difficult cricothyroidotomy?</li> </ul> </li> </ul>	<p><b>IVI/Drugs</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fluids connected, runs easily?</li> <li><input type="checkbox"/> Spare IVC?</li> <li><input type="checkbox"/> Monitor: ECG, BP, SaO<sub>2</sub>.</li> <li><input type="checkbox"/> RSI drugs drawn up, doses chosen?</li> <li><input type="checkbox"/> Post-intubation anaesthesia plan - drugs drawn up?</li> </ul> <p><b>Equipment</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Suction working?</li> <li><input type="checkbox"/> BVM with ETCO<sub>2</sub> connected</li> <li><input type="checkbox"/> OPA and NPA available?</li> <li><input type="checkbox"/> 2 x laryngoscopes working? Correct blade size?</li> <li><input type="checkbox"/> Tubes chosen, cuff tested</li> <li><input type="checkbox"/> Bougie or stylet in tube?</li> <li><input type="checkbox"/> Tube tie or tapes ready?</li> <li><input type="checkbox"/> Ventilator circuit available?</li> <li><input type="checkbox"/> LMA sized &amp; available?</li> </ul>
<p>Version 1.2 Developed by T Fogg, J Kennedy and J Vassiliadis, RNSH ED 20/04/2012</p>		

It is vital that during your preparation and planning phase, the whole team is aware of what will happen during the intubation attempt and what the back up plans are if there are any problems.

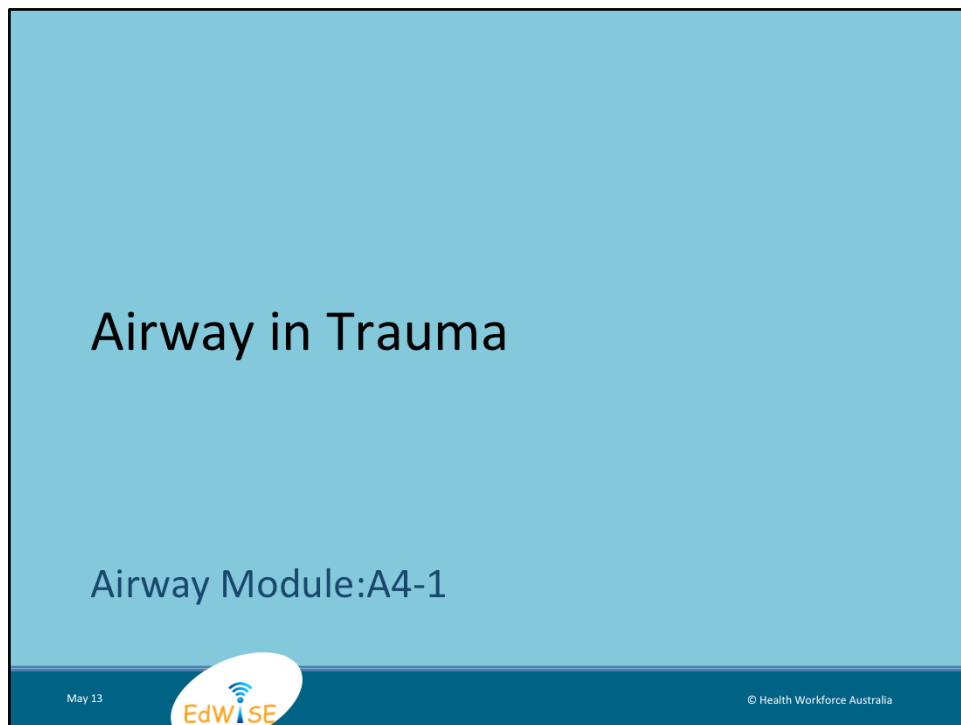
A good way to do this, is to have a team member go through a checklist prior to intubation.

The one illustrated here has been developed and used at RNSH. The nurse scribe reads out the above list and the medical and nursing members of the team confirm aloud to all the team members the answer to each of the above questions.

We would recommend that ED resuscitation room doctors use a checklist like the above one prior to each intubation.



It is vital that prior to attempting intubation in any situation the team makes plans and contingencies for failure. This needs to be done each and every time, with the whole team being aware of the back up plans. By doing so, if failure occurs, the team simply moves onto Plan B, C or D in an orderly manner rather than in panic. The above algorithm which has been developed at RNSH ED is an example of such an algorithm which has been tailored to include all the emergency equipment that is available in their emergency airway trolley. It is prudent to look at ones emergency trolley and devise a difficult airway algorithm that is specific for your institution. When developed, all the emergency team needs to practice it regularly.



This is where your slides will start. The EdWISE team will preface these with some introductions, housekeeping, orientation and learning objective slides. These will take approx 5 minutes to deliver.

Please also complete the participant handout which will include topic information, references & resources (separate word doc template)

## Airway in Trauma

- To maintain patency and protection
- To provide oxygenation and ventilation
- Stabilise airway and mid face injuries
- To avoid secondary injury
  - Hypoxia
  - Hypercapnia
  - Care with drugs causing hypotension
- Don't forget to assess the airway thoroughly

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Management of the airway in trauma is required to provide a definitive airway. The patient may need management of the airway for inability to protect the airway (often secondary to decreased GCS), poor airway patency (secondary to direct trauma, burns or head injury), inadequate ventilation or oxygenation. Intubation may also be required for transport or anticipated decline.

Consideration of 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.

Drugs used in RSI are to blunt the response to intubation (especially in head injury), provide adequate relaxation to overcome trismus and improve the view of intubation. Choices include thiopentone, midazolam, fentanyl, (very cautiously propofol if most familiar, can cause significant hypotension) and ketamine (the use of this was previously avoided in head injury, but the evidence now suggests that this is safe as it causes less hypotension than other agents).

As with all intubation attempts consideration to the best location and method of intubation should be considered – 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



## HELP!

- Trauma airways are **ALL** difficult!
- Who is available to help at your site?
  - Trauma Team
  - ED colleague
  - Anaesthetics/GP Anaesthetists
  - ICU
  - ENT
  - Retrieval

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If a trauma patient is requiring to have their airway supported – ***call for help!***  
Before your next shift have a think of who you have available to you for airway support. Here are some examples of people who might be able to help you in your hospital.

## Oxygenation over intubation

- Basic airway opening manoeuvres/ adjuncts
- Protect the Cervical Spine
- Prepare and Plan thoroughly for an intubation
  - Pre-oxygenate
  - Equipment, Drugs, Staff
  - Plan A, B and C
- Suction – There is often **blood**
- Patients die from hypoxia!
  - Do not lose situational awareness

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Although these are classified as “basic” airway manoeuvres and adjuncts they can still be difficult to perform in some situations. It is important to practice these skills of positioning, NPA, OPA 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 facial trauma and suspected base of skull fracture blind nasal equipment placement is relatively contraindicated.

In most circumstances a good jaw thrust, with an appropriate airway adjunct will provide an opening of the patient’s airway - avoiding head tilt in trauma patients with suspected C-spine injury, which almost all trauma patients with a decreased level of consciousness are). It will then be possible to oxygenate and perhaps ventilate the patient, which is our priority!

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

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 comorbidities these patients will all 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

## Cervical Spine Control

- Should be maintained in all blunt trauma until clearance from injury
- Avoid secondary injury
- Use a semi-rigid cervical collar +/- sandbags when appropriate
- Manual In-line Axial stabilisation

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Cervical spine injury should be suspected in all patients with blunt trauma, especially those with an injury above the clavicles, especially with a severe head injury (four fold increased risk). Cervical spine injury is not always clinically apparent and should be managed on suspicion until definitive clearance can be performed. Avoidance of secondary injury through hypotension and hypoxia is again essential.

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 airway team to continue with the assessment of the trauma patients Airway, neck and Breathing. If not then one of the team, at least, will be required to perform Manual In-Line Axial Stabilisation to protect the cervical spine from further potential damage. MILS will reduce the movement by approximately 60%.

The Cervical spine should be actively cleared by a senior clinician – 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.



In this picture, the airway doctor is assessing the patient whilst the airway nurse is checking and preparing equipment that may be needed for this patient.



In this picture, you can see that one of the airway team is required to apply MILS whilst the other is working around them assessing the patient.

This is part of the structured approach to trauma which is covered in the Trauma EdWISE module.

MILS is an important role in the intubation of the trauma patient. This person is responsible for maintaining neutral alignment of the patient's cervical spine whilst another person is attempting a procedure which would normally move the neck.

The role has 2 parts:

1. Physically maintaining the cervical spine in a neutral position
2. Communicating with the person intubating if the force being used is excessive

The first part can be accomplished from either the "top-end" or the "bottom-end". With both of these positions it is the mastoid process that are gripped. This allows resistance to be applied. This resistance is only strong enough to counter any forces applied by the intubator, that would result in the movement of the neck.



During intubation the mandible is moved in a caudal as well as an anterior direction. With a well fitting semi-rigid cervical collar in place it will be almost impossible to accomplish this. It is often difficult enough to even pass the laryngoscope blade into the mouth, with a collar on.

Removing the collar, or at least the anterior section will allow better access to the oral cavity as well as allowing proper movement of the mandible during the procedure. Do not make a difficult procedure even more difficult – remove the collar!

Here the airway doctor is finding it quite difficult just to insert the laryngoscope into the patient's mouth, let alone perform laryngoscopy!





As you can see here the person applying MILS is crouched to the side of the head of the bed. This is to allow the intubator as good access to the airway as possible but still being able to support the patient's C-spine.

Problems:

1. The person applying the MILS may still be somewhat in the way of the intubator
2. This is uncomfortable for the MILS person (could kneel on a sweater or pillow)
3. The person applying the MILS is to the side. This can make it difficult to be aware of how to apply resistance to the pressures applied to the patient's neck, to maintain neutrality
4. The arms of the person applying MILS are above their shoulders, which can be tiring after a while



These are pictures of how to apply MILS from the “bottom-end”. Again the hands are holding onto the patient’s mastoid process to allow resistance to be applied.

Problems:

1. In the way of the person applying cricoid – it is important to consider this during the set up process and have both these people on the same side of the patient.
2. The person applying MILS has to lean over the patient. This may be intimidating to the patient as well as possibly damaging to the MILS person’s lower back
3. The person applying MILS’ hand can get in the way of hand placement during bag-mask-ventilation



## Post Intubation Care

- Sedation and Analgesia (remember the traumatic injuries)
- Avoid the lethal triad
- Repeat the AcBCDE approach
- Manage the injuries
  - Head injury management
- Complete secondary survey
- Provide definitive care

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All patients require sedation and analgesia post intubation. Remember that these patients are trauma patients will have pain as a result of their injuries. Consider commencing an infusion of opiate or ketamine.

Avoid the lethal triad – keep the patients warm, replace coagulation factors and avoid acidaemia.

Repeat the structured approach to ensure adequate management of the entire patient. A useful method is that the team leader summarises the structured approach – AcBCDE, this will review the clinical condition and identify any ongoing management requirements for the patient.

Manage the underlying injury – head injuries need to avoid hypoxia, hypotension, be normo glycaemia, maintain normothermia, normocarbida.

Perform a head to toe secondary survey to identify other injuries and treat those as appropriate.

Provide definitive care – transfer to the operating theatre, arrange retrieval, transfer to ICU.

# THE AIRWAY IN PREGNANCY

A4.1 Special Airway Challenges

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## Airway in Pregnancy

- Expect increased difficulty on assessment
- Early involvement of specialists
- Pre-medication anticipation
- Positioning is essential
  - DON'T FORGET THE HIP WEDGE
- Prolonged Pre-oxygenation

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Assessment of the airway of the pregnant patient should always expect an increased degree of difficulty, with usual factors increasing difficulty compounding the airway assessment.

Because of the increased difficulties and risks to mother and baby specialist input should be sought early – anaesthetics and obstetrics input for both airway intervention and ongoing care is strongly advised. Again it is important to have practiced, prepared and planned a failed intubation drill.

If intervention on the airway is anticipated then pre-medication with sodium citrate and ranitidine may provide some decrease in gastric acidity, as the pregnant woman has delayed gastric emptying, increased volume and acidity which can contribute to aspiration pneumonitis.

Positioning should be performed in all expected difficult intubations and pregnant women are no exception. Ramping will have several effects including improving the laryngeal position to improve grade of view, use gravity on breast tissue to aid insertion of blade, increase the FRC by using gravity to lower the diaphragm and potentially improve gastric emptying. A wedge under the right hip is required in later pregnancy to reduce aorto-caval compression which reduces venous return and can cause cardiovascular compromise.

## Airway in Pregnancy

- Increased airway odema
- Grade of intubation higher
- Higher incidence of failed intubation
- At increased risk of aspiration after 12 weeks
- Faster Desaturation
- Cardiovascular changes
- Two patients to manage

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There is an increased progesterone levels and higher total body water, which leads to mucosal hyperemia and edema, increasing risk of traumatic bleeding and smaller airway.

Smaller tubes and suction should be prepared and the most experienced person should intubate.

Higher grade of intubation due to positioning with wedge under right hip and the laryngeal odema,

1/300 incidence of failed intubation compared with 1/3000 in general population – this is essential to consider in the preparation and planning phases of the RSI procedure.

Pregnant women desaturate faster as there is a smaller total lung capacity and functional residual capacity (20%dec and more in supine) due to the upward pressure on the diaphragm. Thus there is less oxygen reserve and the apnea time to desaturation is decreased.

There is an increased importance on pre-oxygenation and getting the tube in quickly, so having an experienced operator.



Insertion of blade is more difficult due to breast enlargement and wt gain or obesity. Consider the use of a shorter handle.

Other equipment that may be available for the increase difficulty include short handle, McCoy and Kessel blades.

The use of a video-laryngoscope such as the CMAC may also improve the view and success of intubation.

For all intubations with expected difficulty the failed intubation drill should be discussed with all members of the team and senior experiences resources should be sought.

## Airway in pregnancy

- Consider underlying cause and need for intervention
- Medications and Oxygen supplied to the baby across the placenta
- Ongoing concern for maternal and fetal wellbeing post intubation

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Consider the underlying cause and need for rapid sequence induction – is there another treatment that should be commenced, has post intubation planning taken place (including obstetrics awareness if there is a need for theatre or other intervention).

Need to obtund hypertensive response to laryngoscopy in head injury or eclampsia with appropriate agents such as fentanyl or lignocaine.

All drugs which are unionised and lipid soluble will cross the placenta ie all induction agents and analgesics. All neuromuscular blocking agents are ionised and hydrophilic thus don't cross. It is important to consider the induction and ongoing sedation drugs when intubating a pregnant patient, there is an increased level of awareness in pregnancy and this is important to consider in choosing these medications.

Continue with maternal fetal wellbeing post intubation – consider the blood flow and oxygenation of the placenta as well as management of the underlying cause.

## Scenario

### **BAT call**

50 year old man assaulted and burns from shop fire

GCS 15

BP 140/70

HR 90

RR 22

Sats 98%

ETA 1 minute

## Scenario

Queen Latifah, 22 year old woman

30 weeks pregnant, P0G1

Presented with severe hypertension, flashes of vision, headaches, right upper quadrant pain and nausea, ?eclampsia

Seizure en route with NSW Ambulance

HR 110, BP 175/110, Sats 95%, Afebrile



## Trauma Further Reading

- The Royal College of Surgeons of Edinburgh. Faculty of Pre-Hospital Care: Manual of Core Material. 1st ed. Edinburgh, UK; 2004.
- Ollerton JE. Adult Trauma Clinical Practice Guidelines, Emergency Airway Management; NSW Institute of Trauma and Injury Management; 2007.
- Carley, S et al. Rapid Sequence induction in the emergency department: a strategy for failure. Emergency Medicine Journal. 2002;19:109-113
- <http://www.itim.nsw.gov.au>
- Trauma.org

## Summary

- Spend the extra minute to optimise
- Suction where you can see (10 seconds)
- Make sure **all** the team members know that the patient is about to be intubated
- Make sure that **all** the team know what the back-up plans are
- The bougie is your BEST friend
- Blood in the airway makes a difficult airway even worse.
- Drugs are good.....and very very bad

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Some situations are very time critical and require prompt and correct treatment. In these circumstances, the team often feel more urgency and stress than at other times. It is during these times of increased stress that checks are not performed and mistakes are made. Spend the extra 60 second, perhaps whilst you are pre-oxygenating, to finish off preparation and communication with the team and the patient.

Ask your self “Do I have a bad feeling about this?”. If you do then it is often a signal that you should be calling for help. Even if they will not arrive in time if it all goes well, it is reassuring to know that help is on its way when it doesn’t go to plan. If you do have a bad feeling try to think about why you have this feeling? A missing piece of kit, a difficult patient, other??

Suction is useful and should be readily available when dealing with any airway situation. If suction is needed then suck only where you can see and only for 10 seconds at a time. This will limit the damage that can be caused by the hard plastic on the patient’s tissues. Damage can turn a difficult airway into a blood soaked, bubbling, difficult airway. Some patients will have a greater Vagal tone than others. Blind suction past the base of the tongue may trigger a Vagal bradycardia. Now you have a patient requiring airway support and cardiovascular compromise!

Communication is vital within the team! As we have said multiple times in this session – intubation of the pregnancy or the trauma patient in the ED is a difficult procedure! If this procedure is going to be undertaken then all members of the team need to be aware of this. They also need to be aware of their roles within the procedure and importantly what the plans B and C are if plan A does not work. Earlier on we decided that to perform an intubation in a trauma patient we may need 6 team members. These team members need to be coordinated and using the same mental model. Other members of the team should also know what is happening and what their potential roles may be.

The bougie is your friend!! It may save you from trouble over and over again. Become accustomed to using it. It is often advised to use the bougie as a part of your first attempt at intubation technique. With a bougie it is often possible to intubate a grade 2, 3 or even 4 laryngoscopy. Using the bougie allows the intubator to purposefully aim for a grade 2 laryngoscopy view to successfully intubate the patient. This technique limits the force applied during laryngoscopy and therefore decreases the risk of cervical spine movement and damage during this procedure.

Even a small amount of blood in the airway increases the difficulty exponentially. This is because the intubator loses many of the visual clues given by the different colour of the structures in the pharynx and larynx. When all the structures are covered in a thin layer of blood they are all red. It is more difficult to define where the, normally white, vocal cords are. If there is blood in the patient’s airway, remind yourself that these clues are not going to be present. This may help to decrease the anxiety when you first look down and do not recognise anything!

What is important is to use the appropriate drug for that patient and for that team. Do not use a drug for the first time in a likely difficult situation and without support. Know the likely consequences of using the drugs, hypotension, chest wall rigidity,

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**Topic expert author:** Jag Grewal, Morgan Sherwood

**Simulation session author:** Nadia Sawkins, Morgan Sherwood

**Module Expert Working Party and Peer Review Team:**

Alan Giles FACEM

John MacKenzie FACEM Prince of Wales Hospital

John Kennedy FACEM Royal North Shore Hospital

Michael Bastick FACEM Wyong Hospital

**Educational consultants:**

Stephanie O'Regan Nurse Educator SCSSC

Leonie Watterson Director Simulation Division SCSSC

John Vassiliadis Deputy Director SCSSC

Clare Richmond FACEM

Morgan Sherwood Simulation Fellow SCSSC

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