



Rapid Sequence Induction in the Emergency Department

For on site tutorials as part of the remote simulation program
Airway module A3
(last reviewed Oct 27th 2012)

Sponsor

This project was possible due to funding made available by



Projects within NSW are overseen by the NSW Ministry of Health on behalf of HWA



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

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These aims are the same for all sessions – please do not modify

Speakers' notes

- This session, and package as a whole, involves learning together. Learning with the teams that you work with helps that team to function more efficiently and effectively. It allows you to learn from each other, explore different perspectives and to understand the importance of all members of the team.
- We are targeting higher level learning – applied skills and performance in contextualised events. This is through team discussion and also through working through simulated scenarios as a team. It also allows you to put into practice knowledge attained from the eLearning and other solo learning environments.
- To review and reflect upon our own practice and current best practice standards. During our feedback sessions we will facilitate this but we would also encourage you to reflect on your practice and experience after these sessions.

Ground Rules

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



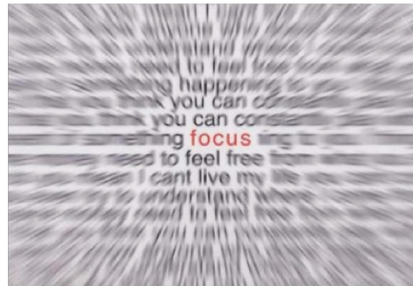
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- Challenge of video conferencing tips: don't change your seat, speak up nice & clearly
- Details collected and de-identified for reporting purposes
- Signed form, don't speak outside about how people performed as not necessarily indicative of real life, chance to try new things, don't tell anyone about the scenarios as they used again on subsequent courses.
- We try to use best evidence practice and strive to include as up-to-date material as possible. Please do refer to your local policies, guidelines and protocols.
- Debriefing is a chance to reflect upon what we did and how that translates to the workplace. Please use this time to explore the complexities of performance and decision making. Please contribute, we will all learn from each other's experiences.
- Like most things in life, the more that you put in the more you will take away with you.
- It is an open forum where everyone's ideas and thoughts are to be valued.
- If you could please switch your phones off or to silent or vibrate for the duration of the course.

Objectives

- To discuss the role of Rapid Emergency Intubation (REI) in the emergency department
- Practice skill of intubation
- Prepare and plan to perform a REI
- Use an emergency algorithm in the event intubation is difficult
- Trouble shoot problems post RSI, such as desaturation.
- Develop skills with video laryngoscopy

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



DON'T GET FIXATED ON THE PLASTIC

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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
 - Surgical Airway

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This slide reviews the principles of A1 and A2 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.

What is Rapid Sequence Induction?

It is the most common technique used in ED. In experienced hands it is a safe and successful

Fast method of securing the airway in those who have a greater risk of aspiration

Uses sedation and rapid paralysis. 3 components:

1. Preoxygenation;
2. Rapid acting muscle relaxant
3. Cricoid pressure

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This is a fast method of securing the airway in those who have a greater risk of aspiration in those who are unable to

Maintain a patent airway
Protect the airway from aspiration
Adequately ventilate or oxygenate

Or this is anticipated to occur.

7 P's of RSI

- Preparation (space, staff, stuff)
- Pre-oxygenation
- Planning
- Positioning +/- cricoid pressure
- Paralysis with induction
- Procedure
- Post ETT confirmation and care

Preparation Prevents Piss Poor Performance

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RSI traditionally means rapid sequence induction and involves no hand ventilation of the patient after the paralytic drug is given. Ideally the patient pre-oxygenates themselves with spontaneous respirations and the avoidance of any hand ventilation lessens the gastric insufflation and the risk of aspiration. The decision to hand ventilate or not after sedation (or paralysis) is controversial. Many “experts” favour a trial of hand ventilation to optimise pre-oxygenation and to ensure the patient is able to be ventilated. If the patient is able to be hand ventilated with BVM, it often reassures the operator as they know they can oxygenate the patient even if they are unable to ventilate them.

Preparation is vital

In order to perform safe endotracheal intubation in an ED you need:

SPACE—Ideally in a well equipped resuscitation room.

STAFF---At a minimum you require an airway assistant, procedure doctor and a scribe.

STUFF---The acronym **STOP I C BARS** is useful to assist you to remember.

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Preparation

- 1) Includes airway assessment and ensuring appropriate indications.
- 2) Is there an appropriate skill level for this procedure?
- 3) Ensure that RSI is the appropriate technique ie Does the patient have an upper airway obstruction, do they need an awake intubation.
- 4) Prepare patient / equipment / staff / drugs
 - 1) Patient
 - 1) If awake, explain procedure
 - 2) Assess difficulty as previous – BOOTS and LEMON
 - 3) Position with neck flexed and atlanto-occipital jt extended (sniffing position), ramping if obese
 - 4) Protect the C-spine if a trauma
 - 2) Equipment
 - 1) USE THE STOP IC BARS mnemonic (or other checklist of your choice)
 - 3) Staff
 - 1) Staff to hand equipment / give drugs / watch monitor / perform cricoid pressure / record events
 - 4) Drugs (All must be drawn up and labelled with calculated dose for patient's weight ideally written on white-board)
 - 5) **Formulated and ARTICULATED back-up plan**
 - 1) Exact nature of this will vary with skill base, but most would favour placement of LMA in patient unable to be intubated

STOP I C BARS

<p>S Suction</p> <p>T Tubes</p> <p>O Oxygen</p> <p>P Pharmacology.</p> <p>I IV access and IV Fluids</p> <p>C Connect to monitors End Tidal CO2.</p>	<p>B Blades and bougie</p> <p>A Alternative devices CMAC position</p> <p>R Rescue techniques LMA</p> <p>S Surgical technique</p>
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S---Suction. Under pillow right hand side.

T---Tubes - Check the ETT cuff and pilot line. Most people will use a lubricated stylet and shape the ETT to straighten the tube proximally and create a 30 degree upward bend just before the cuff.

O---Oxygen. Check manual resuscitator. Apply nasal prong oxygen.

P---Pharmacology. Drugs drawn and labelled.

I---IV access. 2 lines. 1 attached to pump set.

C---Connect to monitors – ECG, BP, Sats monitoring.
End Tidal CO2.

B---Blades and bougie.

A---Alternative devices. CMAC position

R---Rescue techniques. LMA

S---Surgical technique. Which and where.

ED Intubation Checklist

Team

- In hours, ED Senior Dr aware of RSI?
- Out-of-hours, if difficulty anticipated, anaesthetics contacted?
- All members introduced by name & role and each briefed in turn by TL
- Difficult intubation plan briefed?
- Difficult airway trolley at hand?
- Anticipated problems – does anyone have questions or concerns?

Patient

- Pre-oxygenation optimal?
 - o Add nasal prongs or NIV
- Patient position optimal?
- Patient haemodynamics optimal?
 - o Fluid bolus?
 - o Pressor?
- Does it look like it might be difficult:
 - o Difficult BVM?
 - o Difficult laryngoscopy?
 - o Difficult supraglottic airway?
 - o Difficult cricothyrotomy?

IVI/Drugs

- Fluids connected, runs easily?
- Spare IVC?
- Monitor: ECG, BP, SaO₂.
- RSI drugs drawn up, doses chosen?
- Post-intubation anaesthesia plan - drugs drawn up?

Equipment

- Suction working?
- BVM with ET/CO₂ connected?
- OPA and NPA available?
- 2 x laryngoscopes working? Correct blade size?
- Tubes chosen, cuff tested
- Bougie or stylet in tube?
- Tube tie or tapes ready?
- Ventilator circuit attached?
- LMA sized & available?
- Surgical airway equipment available?

Version 1.3

Developed by T Fogg, J Kennedy and J Vassiliadis, RNSH ED 25/10/2012

RSI drugs

Induction: Propofol,
Thiopentone, Ketamine

Paralysis:
Suxamethonium,
Rocuronium

Adjuncts: Metaraminol,
Opiates

Post Intubation: Sedation,
Analgesia and paralysis



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Drugs (All must be drawn up and labelled with calculated dose for patient's weight ideally written on white-board)

- 1) Most importantly – KNOW your drugs well.
- 2) Induction agent - propofol / midazolam /thiopentone/Ketamine
- 3) Consider narcotic - particularly if patient has pain
- 4) Consider a peripherally acting vasoconstrictor (eg metaraminol) in unwell patients
- 5) Paralytic agent – Most commonly suxamethonium, though could consider high dose vecuronium or rocuronium.
- 6) **NOTE → Doses must be tailored to the patient. Hypovolaemic / septic / critically unwell patients are likely to have significant hypotensive responses to most induction agents. For this reason, LOWER doses are often used (or alternative agents such as ketamine considered). Paralysis is the hallmark of RSI and gives optimal intubating conditions. Whilst induction doses of sedative agents are often lowered in the critically ill, the doses of the paralytic agents should remain unchanged. Paralysis (and RSI) are contra-indicated in upper airways obstruction**

Pre-treatment

Position and PreOxygenate



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Pre-oxygenation

All patients should be pre-oxygenated. Aim is to achieve nitrogen washout in the lungs so there is an oxygen reservoir available during the apnoea induced by paralysis for RSI. Saturations of 100% do not equate to adequate pre-oxygenation. Ideally need 5 min spontaneous breathing on high flow, reservoir mask O₂. In compliant patients, can achieve adequate pre-oxygenation by 8 vital capacity breaths using 100% O₂ and BVM with reasonable seal.

The decision to manually pre-oxygenate via BVM must be weighed against the risk of gastric insufflation and subsequent increased risk of aspiration.

Delayed sequence intubation using non-invasive ventilation is another option.

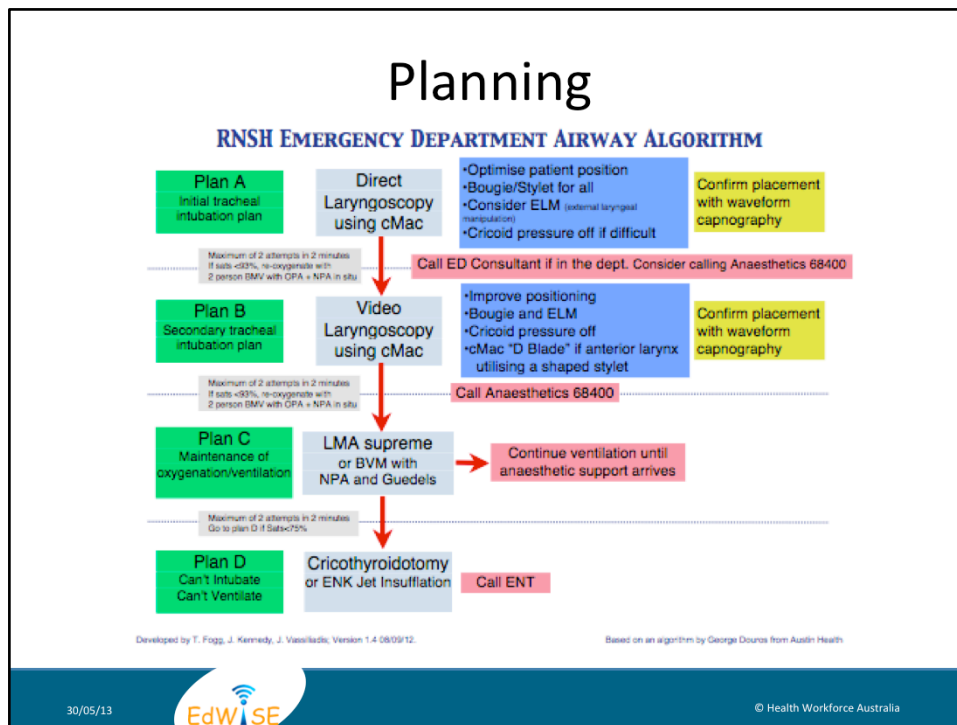
Positioning +/- pressure

Ideally the patient should be positioned with the ear to the sternal notch (the sniffing position), obese patients should be ramped to achieve this.

Cricoid pressure (sellick manoeuvre) is applied by pushing the cricoid cartilage posteriorly, The posterior cricoid ring compresses the oesophagus and hopefully prevents aspiration. It is uncomfortable for the patient, so should be applied as the patient becomes sedated with the induction agent. The use of this is controversial at this time and should be removed if this pressure impairs the view.

Bimanual external laryngeal manipulation is commonly required and involves

Planning



This is a copy of the Royal North Shore Hospital Emergency Department Airway Algorithm. You should consider your own airway algorithm based on your skills, the available resources and the patient that you are intubating. Pre-planning and rehearsing your algorithm will improve your ability to use it in the event of intubation.

Plan

It is important to plan and articulate the plan to the entire team with a pre-intubation brief.

This should include a reiteration of everyone's roles, drugs expected to give and the Plan A, B and C should there be any difficulty.

Asking if all equipment is ready and concluding the brief by opening asking if there are any questions (and answering them) is ideal.

Paralysis and Procedure



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Paralysis with induction

Paralysis is the hallmark of RSI. Muscle paralysis provides optimal intubating conditions.

Suxamethonium and high dose rocuronium are the most commonly used drugs as they have rapid onset.

It is contra-indicated in upper airway obstruction. In these settings, alternative techniques of intubation such as awake fiberoptic intubation or gaseous induction need to be considered

Procedure

Under direct vision, place ETT between vocal cords and into trachea

Check Positioning



Check correct position by seeing the chest rising symmetrically

Auscultation

End tidal CO2 colorimetric or waveform

O2 saturations

Patient colour

Misting of ETT

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Post ETT confirmation

Gold standard for confirmation of placement is the continued presence of CO₂ as detected by a normal capnograph trace.

Clinical methods (seeing ETT pass cords / auscultation of BS / fogging of tube / chest wall movement) are all useful, but capnography is the minimum standard of care in Australasia.

CXR will show the depth of the tube in the trachea. It WILL NOT confirm tracheal placement

After checking the placement ongoing sedation should be provided and analgesia given for tube tolerance and to assist in allowing adequate assisted ventilation.

Recognising a malpositioned ETT

<p><input checked="" type="checkbox"/> ☺ TRACHEA</p> <ul style="list-style-type: none"> ▪ Expired end tidal CO₂ capnograph shows a square wave for 5 or more breaths (this is the most reliable method) ▪ The ETT was witnessed to go through the cords. ▪ The ETT leak is readily obliterated with 4 - 5 ml air ▪ Chest wall excursion is easily achieved with BMV ▪ Bilateral breath sounds are auscultated in the axillae ▪ Mist forms in the ETT ▪ The SaO₂ remains above 95% 	<p>☹ MAIN BRONCHUS</p> <ul style="list-style-type: none"> ▪ Chest wall excursion is reduced on the left ▪ Breath sounds are reduced on the left ▪ The SaO₂ remains 90 – 94 % <p>ACT</p> <ul style="list-style-type: none"> •Withdraw the ETT while auscultating •Confirm with US 	<p>☹☹☹ OESOPGAGUS:</p> <ul style="list-style-type: none"> ▪ Chest wall excursion is absent in both axilla ▪ The SaO₂ falls below 90% (Can take several minutes in pre-oxygenated healthy people) ▪ A persistent burping sound escapes around cuff despite filling with air ▪ The stomach expands with ventilation ▪ Other signs of tracheal placement are absent <p>ACT</p> <p>Remove the ETT</p>
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Post Intubation Care

- Sedation and Analgesia
- Ventilator settings
- Adjuncts – NGT, IDC, Lines
- DOCUMENTATION

F - luids
A - nalgesia
S - edation
T - thromboembolic prophylaxis
H - ead Up
U - lcer Prophylaxis
G - lycemic Control

DON'T EVER FORGET THE ONGOING CARE OF THE CONDITION, SEEK THE CAUSE, MANAGE CO-MORBIDITIES and AVOID COMPLICATIONS

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Once the ETT is in place the care process needs to continue – treating the Condition, Cause, Complications and Co-morbidities.

One acronym for post intubation care that is often used in the Intensive Care unit could be used in the Emergency Department – FAST HUG

Fluids
Analgesia
Sedation
Thromboembolic prophylaxis

Head Up
Ulcer Prophylaxis
Glycaemic Control

Post procedure documentation should take place – taking note of who was involved (medical and nursing), drugs used, Cormack-Lehane view seen, Percentage of Glottic Opening (POGO), Difficulties found, and method of overcoming difficulty, Observations during procedure, post procedural care.

Documentation

What if the patient desaturates after intubation?

- Is there a disconnection?
- Is the ETT in the trachea?
- Is the ETT obstructed?
- Has the patient developed a pneumothorax or severe hypotension?
- Is there a problem with the ventilator?
- Is there breath stacking? Bronchospasm?

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One method for remembering what to do when the patient desaturates when they are intubated is to disconnect the patient from the ventilator and hand bag and then check through the DOPES procedure.

- D - Disconnection? **Check connections all the way back to the oxygen source**
Is the ETT in the trachea? **Check position as earlier---if in doubt take it out and ventilate.**
If the ETT is in the trachea is it down a bronchus? **Pull it back and ventilate.**
- O— Obstruction of ETT? Suction down the ETT.
- P - Patient developed pneumothorax or severe hypotension? **Examine the patient, treat the underlying cause.**
- E - **Equipment (ventilator) problem? Disconnect from ventilator and hand bag whilst trouble shooting**
- S - **Stacking of breath or bronchospasm? Disconnect, hand bag, feel for compliance, check the ventilator, suction, give bronchodilators**

Systematic approach to desaturation in an intubated patient

STEP 1. EXCLUDE CAUSES ABOVE THE AIRWAY

1. Check O2 supply
2. Check connection of O2 tubing to ventilation device
3. Detach patient from the ventilator and manually bag with bag-mask device
4. Consider replacing existing bag and mask device with alternative bag-mask

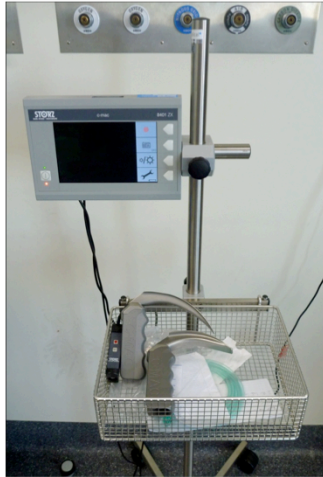
STEP 2. EXCLUDE CAUSES IN THE AIRWAY

1. Check the position of the ETT at the lips
2. Inspect the ETT for external obstruction (eg. kinking)
3. Check the filter
4. Confirm the position of the ETT in the trachea (CHECKS ETT)
5. Suction the ETT

STEP 3. EXCLUDE "PATIENT" CAUSES

1. Inadequate Minute Ventilation (V_m) – hypoventilation, bronchoconstriction
2. Alveolar gas exchange: endobronchial intubation, atelectasis, pulmonary venous
3. Congestion, aspiration
4. Space occupying lesion: eg. Pneumothorax
5. Circulation causes: hypotension, reduced venous return

Now the CMAC video laryngoscope



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Runs off battery or AC.

Most places carry a short and long Mackintosh blade. The pack slides into the hollow back of the blade and when engaged automatically starts.

Use it like a normal blade but when intubating you place the screen in front to the right of the patient so you can see it easily.

Move the blade slowly and deliberately. It is an easy technique which has a rapid learning curve.

It can take still pictures and video---both of which are on the next slides which shows intubation using a CMAC with a bougie.



Scenario

BAT call

50 year old male

Head injury – GCS 7

BP 156/78

HR 70

Sats 98%

BSL 7.2

ETA 2min

Summary

- Assessment for difficulty is essential
- Preparation and Planning provides the optimum environment for intubation
- In ED airways the first go should be the best go
- Everyone should know the Plan A/B and C
- Re-assess the patient with ABCs if there is deterioration
- Remember to continue to manage the patient

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EdWise

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