

Aims

- Define indications for pre-hospital anaesthesia
- Describe the procedure for performing rapid sequence induction (RSI)
- Describe the procedure for failed intubation
- Define the training plan and final assessment for RSI

Background

Rapid Sequence Intubation (RSI) is a complex procedure, which should only be carried out by appropriately trained staff. There are special risks involved in doing it in the field, and it will only succeed if a team approach is used. It remains a controversial procedure in the pre-hospital environment, so should not be undertaken lightly.

This SOP represents the GNAAS protocol for PRSI. It is based on best available evidence and the shared experiences with London HEMS and equates to a joint service experience of approximately 4000 pre-hospital inductions. The algorithm has been developed to be straightforward and safe. For many years the algorithm consisted of RSI and surgical airway for failed intubation. This led to a surgical airway rate of around 2% - approximately half of which followed failed intubation and half performed as primary procedures (where intubation was not attempted). This compares well with emergency room surgical airway rates for several injured patients. We have added alternatives in the new algorithm because of developments in airway management but still expect the vast majority of our patients with airway compromise to either be intubated or get a surgical airway. We have no recorded cases of patients dying as a result of failed airway management after induction of anaesthesia. We mainly see two types of patients who require drug assisted intubation – those who can have a controlled procedure with a few minutes of preparation and a small group who require immediate intervention with little or no time for preparation. Training should prepare the pre-hospital physician/ paramedic team for either situation.

Appendix 2: PRSI Check List

Etomidate is used as an induction agent, Suxamethonium and Pancuronium as muscle relaxants and Midazolam and Morphine for sedation, maintenance and analgesia. Ketamine with Midazolam is used for procedural sedation and analgesia. These particular drugs are used because of their relative haemodynamic stability and their relatively wide therapeutic margin – a 10% or 20% overdose is unlikely to cause significant problems (which is relevant in a working environment where patient weight is usually estimated). Pancuronium is used for its sympathomimetic actions and relatively long duration of action (the vast majority of patients will only require one dose of Pancuronium to transport them to hospital).

Policy

Indications for RSI

1. Actual or impending airway compromise
2. Ventilatory failure
3. Unconsciousness
4. Humanitarian indications
5. Injured patients who are unmanageable or severely agitated after head injury
6. Anticipated clinical course

The decision to anaesthetise patients should be made on the basis of an 'on-scene risk; benefit assessment' in every case i.e. In each specific situation do the potential benefits of RSI outweigh the potential risks?

RSI Algorithm (see appendix 1)

- Scene safety issues should be addressed as described in the scene safety SOP before RSI is considered
- Access to the patient should be optimised prior to RSI. Where possible establish 360 degrees of access to the patient. This may involve moving the patient to another part of the scene or on to an ambulance (at waist height). Even in patients in near or absolute cardiac arrest this may be the first manoeuvre. Do not attempt intubation or RSI in confined or cramped conditions unless there is simply no alternative.
- Monitoring should be commenced with the 'Lifepack 12' (Ecg, SpO₂, NIBP) (The Nonin monitoring device provides a reserve SpO₂) End tidal CO₂ monitoring must be connected behind the HMEF *prior* to intubation. This monitoring satisfies the recommendations of the Association of Anaesthetists for in-hospital anaesthesia and the draft guidelines for pre-hospital anaesthesia.
- Preparation for RSI: These should be automatic and absolutely standard. Everything should be aimed at optimising the first attempt at intubation. The flight paramedic should establish monitoring and rapidly provide a standard, laid out 'kit dump' of equipment. Before commencing induction the doctor and flight paramedic should rapidly 'talk through' the **PRSI Check and List**.

Appendix 2: PRSI Check List

- After administration of induction agent and Suxamethonium the trachea is intubated and tube position is checked by the following: direct vision (tube seen passing through cords), 'easy cap' colorimetric CO₂ detector and continuous in-line CO₂. Auscultation in both axillae confirms adequate ventilation of both lungs. The length of tube at the lips should be noted for future reference. This will help if accidental advancement of the tube and right endobronchial intubation is suspected during transfer.
- Where an adequate view of the vocal chords cannot be obtained the '30 second' drills should be carried out. These are named to indicate that they should be easily completed long before an normal pre-oxygenated patient starts to desaturate (see Failed intubation).

Pre RSI Sedation

In agitated patients it may be necessary to use small amounts of sedation to facilitate pre-oxygenation. Small doses (1-2mg of Midazolam) should be titrated to effect. In patients who are obviously hypovolaemic/ hypotensive and in the elderly, even smaller doses should be used.

In non head injured patients with severe limb trauma Ketamine (0.25 small mg/kg titrated to effect) can be used along with 1-2mg of Midazolam to reduce adverse psychogenic effects.

Failed Intubation

The Proseal LMA (see below) is the default device for ventilation following a failed intubation attempt. This device has been demonstrated to leak less at higher airway pressures than the standard LMA. Airway pressures of up to 30cmH₂O can be achieved whilst minimising gastric inflation (due to the gastric drainage port) and the subsequent risk of aspiration. It is therefore preferable to BVM or standard LMA.

There will be occasions when adequate ventilation is not possible with the Proseal LMA (poor seal/ bronchospasm/ severe chest injuries). In these patients a surgical cricothyroidotomy will be required (see Surgical Cricothyroidotomy SOP).

Proseal LMA

The Proseal LMA is less rigid than a standard LMA and for this reason, insertion by a 'standard' technique can be more difficult. The Proseal therefore comes with a metal introducer, the end of which fits into the base of the LMA tube where it connects to the mask and the gastric and ventilation tubes fit either side of the introducer further up. The Proseal LMA should then be inserted using the introducer handle (which is based on the Intubating LMA) following the curve of the hard palate. The posterior surface of the LMA mask should be lubricated prior to insertion.

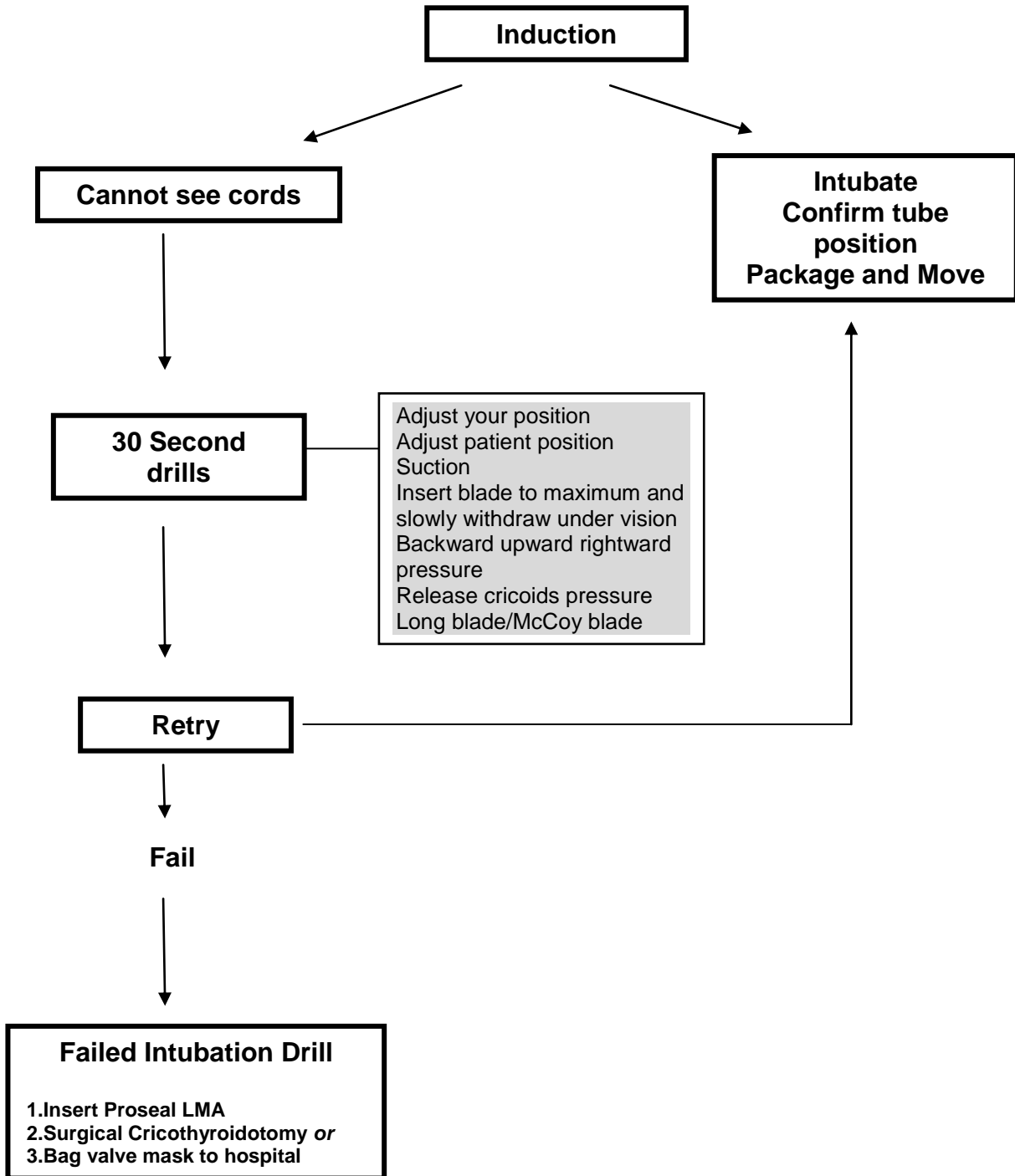
Appendix 2: PRSI Check List

An alternative insertion method is to mount the LMA on an intubating bougie via the gastric port. The bougie is straightend and lubricated with aqueous jelly. It is then inserted retrogradely up the gastric drainage channel of the LMA. The bougie is inserted into the oesophagus under direct vision and the Proseal railroaded into position over it.

Paediatrics

Paediatric RSI is discussed in the **Paediatric RSI SOP**.

HEMS Intubation Algorithm



GNAAS pre-RSI challenge-response check list

1. Pre-Oxygenated		
Taking place and adequate oxygen available.....		Check
2. Preparation		
Baseline obs		Check
Cannula	Connected to fluid and runs easily.....	Check
Suction	Working.....	Check
	Back-up suction available.....	Check
Airway adjuncts (or escape ventilation)		
	Guedel airway.....	Check
	2 nasopharyngeal airways.....	Check
Ventilator or BVM connected to oxygen.....		Check
Emergency Airways LMA and Cricothyroidotomy set.....		Check
Tape or tie (of appropriate length).....		Check
Heat Moisture Exchanger (HME)		Check
Endotracheal tube		
	Size chosen.....	Check
	Cuff tested.....	Check
Drugs Induction agent dose chosen.....		Check
	Suxamethonium dose chosen.....	Check
	Drug giver briefed.....	Check
Angle piece or catheter mount.....		Check
Monitoring , including ECG, NIBP, SpO ₂ ETCO ₂		Check
Stethoscope		Check
Elastic Bougie		Check
Laryngoscope blade sized chosen & bulb working.....		Check
Syringe 10mls for cuff.....		Check
3. Premedication if required.....		Check
4. Paralysis and sedation		
In-line immobiliser briefed.....		Check
Cricoid pressure person briefed.....		Check
5. Passage of the tube		Check
6. Post intubation management		Check

Note: This checklist is for stable patients. Time should not be wasted on agonal patients who require precipitant RSI (i.e., where pre-oxygenation and obtaining a set of obs may not be possible)