



## CLINICAL PRACTICE STANDARD — Aeromedical Operations AO.CLI.18 – Advanced Airway Assessment and Management

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**Associated Policy Directive/s and/or Operating Procedures/s**

N/A

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**Author Branch**

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**Summary** This procedure provides guidance on the appropriate application of Advance Airway during retrieval missions

**Applies to** NSW Ambulance Aeromedical Doctors

**Review Date** Jan 2025

**Previous Reference** Nil

**Status** Active

**Approved by** Executive Director, Aeromedical Operations

**Related Legislation** Nil

**Related Documents** Nil

**Compliance** with this operating procedure is **mandatory**



## CLINICAL PRACTICE STANDARD – Aeromedical Operations AO.CLI.18 – Advanced Airway Assessment and Management

### 1. Introduction

NSW Ambulance Aeromedical Operations is frequently tasked to retrieve patients from hospitals or small medical facilities with limited capabilities in airway assessment and management. The overwhelming majority of patients can be intubated successfully using our routine practice of direct or video-laryngoscopy following rapid sequence intubation<sup>1</sup>. A small but significant subset of patients have expected difficult laryngoscopy or morphological/pathological conditions which contra-indicate rapid sequence intubation techniques. Such patients may be best managed by alternative airway techniques.<sup>1,2</sup> The service carries a range of advanced airway equipment to assist with the assessment and management of these patients.

### 2. Purpose

To describe the indications for and use of the advanced airway equipment for bedside airway assessment, “awake” intubation, intubation following general anaesthesia, and for rescue intubation following unsuccessful laryngoscopy preferably via a supraglottic airway(SGA).

### 3. Procedure

#### 3.1 Equipment

In addition to the CMAC-Pocket Monitor Video Laryngoscope in the prehospital pack, the service carries a range of equipment in the inter-hospital pack to manage patients with “difficult” direct or video laryngoscopy in addition to standard intubation equipment.

- CMAC D blade - a hyperangulated non-channeled laryngoscopy blade (non-disposable)
- Ambu “aScope” Flexible Optical Scope – Screen with charger (non-disposable) and scopes (disposable)
- Equipment for airway topicalisation – Lignocaine, Atropine, Co-phenylcaine spray, long mucosal atomiser etc.
- Reinforced/flexible tubes for nasal intubation
- Aide memoire cards/checklists covering awake nasal intubation, topicalisation and intubation through SGA

Referring institutions often have video laryngoscopic equipment (such as the hospital Storz CMAC) which, if familiar to the retrieval physician, can be utilised as alternative options.

#### 3.2 Patient Selection

“Difficult” Airway.

The term “Difficult Airway” refers to one or more actual or expected challenges of bag mask ventilation, supraglottic airway insertion, intubation or surgical airway (see below):<sup>3,4,5</sup>

Evolving definitions of difficult intubation include anatomical difficulty, physiological difficulty and context/team difficulties<sup>4,8</sup>. The advanced airway equipment should be considered when there is expected difficulty with these conventional airway management options, either to manage the airway or gain further information about the airway. Despite best efforts, and evolving prediction methods<sup>5</sup>, difficulties with any technique can be unexpected.



### 3.2.1 **Difficult Bag-Valve-Mask (BVM)**

Mask seal problematic - beard, facial deformity, edentulous, elderly  
Obesity – BMI > 26  
Pregnancy - 3rd trimester  
Obstruction - neck swelling, angioedema, hematomas, upper airway tumours  
Stiff lungs - severe asthma, COPD, pulmonary contusions

### 3.2.2 **Difficult Laryngoscopy / Intubation**

Morphological - short neck, reduced thyro-mental distance, large tongue, large teeth, restricted mouth opening  
Obstruction – angio-oedema, airway burns, stridor, upper airway mass  
Neck immobility  
Desaturation with apnoea

### 3.2.3 **Difficult Supra-Glottic Airway (SGA) insertion**

Restricted mouth opening  
Disrupted, distorted or obstructed upper airway  
Stiff lungs - severe asthma, COPD, pulmonary contusions

### 3.2.4 **Difficult Cricothyrotomy**

Previous neck surgery  
Neck deformity – hematoma, swelling, tumour  
Obesity  
Radiation distortion

### 3.2.5 **Difficult awake nasal or oral intubation**

Combative  
Time critical management  
Aerosol risk to staff (topicalisation coughing)  
Fluid contamination obscuring flexible optic or VL camera lens

## 3.2 **Decision Making**

Advanced airway equipment can be employed in the following settings:

- Nasoendoscopy/bedside airway assessment
- Awake intubation – oral or nasal (video laryngoscopy or flexible optical scope)
- Rescue Intubation through SGA
- Alternative laryngoscope after unsuccessful laryngoscopy at RSI
- Bronchoscopy of intubated patients
- In the assessment & management of dislodged tracheostomy

SGA insertion and surgical airway remain essential alternatives in the setting of “Can’t intubate”, “Can’t ventilate” situations.

The Duty Retrieval Consultant should be phone conferenced whenever an awake technique is planned to assist with decision-making.



Individual practitioner experience and competence will vary and form part of the decision making process.

An airway plan should always be articulated and equipment prepared if it may be necessary for that patient.

Service provision of advanced airway techniques includes online training, mannequin training, scenario simulation practice and refresher currencies, checklist use and clinical governance review. Individuals are encouraged to self-direct their learning<sup>7</sup>.

Awake intubation and airway topicalisation are considered higher risk Aerosol Generating Procedures (AGP) and would usually not be advised in infectious cases e.g. COVID-19.

The flexible optic scope equipment often needs a power supply and is less robust than other retrieval equipment so it may not be reliable in the prehospital environment. This document primarily refers to inter-hospital missions, with the caveat that successful nasoendoscopy via nasopharyngeal airway for airway assessment has been performed en-route for a prehospital burns case.

### **3.3 Bedside airway assessment**

Often requires less complete airway topicalisation for nasoendoscopy (aScope) or oral VL (video laryngoscopy) compared to intubation.

Can inform as to pathology e.g. cause of stridor, and ease of RSI.

It is recommended that patients with contra-indications to RSI should have an attempt at gaining adequate laryngeal view using VL following airway topicalisation and light sedation unless limited mouth opening or other features preclude its use. Different VL blades may be an option in some patients with limited mouth opening.

If a good view is obtainable then full anaesthesia and neuromuscular paralysis can be administered with a very high degree of confidence in the success of tracheal intubation with the same device.

### **3.5 Awake Tracheal Intubation**

Intubation of the trachea can be achieved without general anaesthesia or neuromuscular paralysis by the use of airway topical anaesthesia and light sedation/analgesia employing either video laryngoscopy or flexible optical scopes<sup>6,7</sup>.

Awake Tracheal Intubation (ATI) can be oral or nasal.

Awake surgical airways may be arranged with surgical colleague assistance.

The main advantage is that it significantly reduces the risk of failure to oxygenate or ventilate the apnoeic patient following RSI, when upper airway management is not possible.



The major disadvantage is the time taken to perform the procedure (often underestimated) and it should not be used for patients who need immediate airway management.

For those with only limited experience of the technique awake VL using the C-MAC Pocket Monitor following topicalisation is the suggested initial approach but if a good view is not obtainable then awake intubation using flexible optical scope should be performed.

### 3.6 Rescue Intubation through Supraglottic Airway (SGA)

The iGel SGA is the ideal conduit for the aScope. If in situ then the Ambu “aScope” can be used to guide a tracheal tube into the trachea.

On occasion an alternative SGA is already in situ on arrival of the retrieval team. There is a wide range of SGA types and many have aperture bars (LMA Unique etc) or “wings” (LMA Supreme etc.) which impede the railroading of a tracheal tube through the SGA. It is important at this point that the type of SGA is identified and another one of the same make and size opened and examined closely.

If SGA other than an iGel is in place, options include:

- Optimised RSI attempt - after considering reasons for original difficulty with local intubation (if attempted). Backup option would then include iGEL insertion and rescue intubation through iGEL
- Flexible optical laryngoscopy to pass the aScope down the SGA, intubate the trachea directly and railroad a tracheal tube if possible.
- Exchange current SGA/LMA for iGEL to allow intubation through iGEL

## 4. References

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## APPENDICES

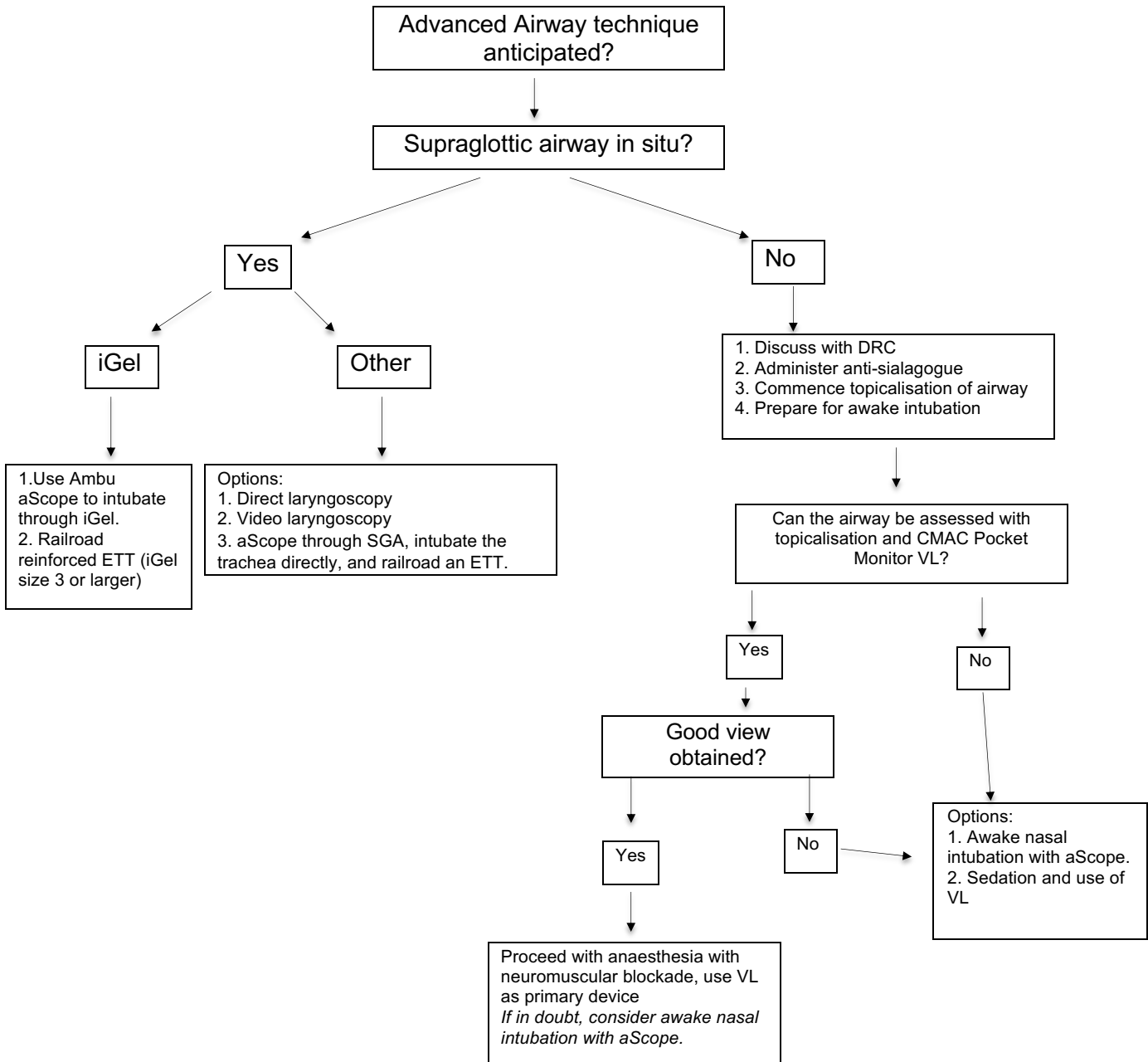
1. Advanced Airway Algorithm
2. Advanced Airway Checklists/Procedures

## REVISION HISTORY

Version (Document #)	Amendment notes
Version 3.1	Hyper angulated Blade added Updated topicalisation
Version 3.0 Issued 29 July 2020 WI2020-083	Amendments to equipment including CMAC Pocket VL Updated algorithms and checklists Updated references Approved by A/Executive Director, Aeromedical Operations
Version 2.0 Issued September 2016 (WI2014-xxx) – issued by Corporate Records	Minor Amendments and transition to new format.  Approved by Executive Director, Health Emergency & Aeromedical Services.
Version 1.0 Issued July 2014 (WI2014-xxx) – issued by Corporate Records	Approved by Executive Director, Health Emergency & Aeromedical Services.



APPENDIX 1 - Advanced Airway Algorithm







APPENDIX 2 - Advanced Airway Checklists/Procedures

## AWAKE NASAL INTUBATION CHECKLIST

**Consider Other Options**
*DISCUSS with DRC - Call 9709 6856*

- Primary Surgical Airway under LA
- Optimised RSI with CMAC/KingVision with double set-up for Surgical Airway
- Optimised RSI with LMA backup

**Relative Contra-indications to Awake FOI :**

<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Time-critical clinical condition</li> <li><input checked="" type="checkbox"/> Fluid in airway</li> <li><input checked="" type="checkbox"/> Laryngeal disruption</li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Combative patient</li> <li><input checked="" type="checkbox"/> Severe glottic obstruction</li> </ul>
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**PREPARATION CHECKLIST**

- Standard RSI Checklist completed
- PPE- eye protection
- Suction – Y- catheter sized for tube
- aScope connected to aView, turns on, flexs/extends & picture clear
- Syringe adapter (luer lock) inserted in aScope
- Atropine 10mcg/kg or Glycopyrolate 4mcg/kg **GIVEN**
- 2% Lidocaine 20mL mixed with 2mL 8.4% NaHCO<sub>3</sub>
- Nebuliser with 8mL of 2% lidocaine @ 8L/min **STARTED**
- 5mL syringes each with 1mL lidocaine mixture / air
- MADJIC atomiser
- Co-phenylcaine with spray nozzle
- Analgesia/Sedation - Ketamine, Fentanyl/Midazolam
- Post-intubation paralysis and maintenance
- 6.0 re-inforced tube lubed
- Room set-up optimised - iview Screen visible to aScope operator at end of bed or in front of patient
- Patient briefing
- Apnoea Plan briefed
- Team briefing and role allocation

**TOPICALISATION CALCULATIONS**

- Nebuliser 8ml 2% lidocaine via neb at 8lpm O<sub>2</sub>
- Co-phenylcaine spray x 6 one nostril + MADJIC 2% lidocaine x 1mL
- Co-phenylcaine spray x 4 to posterior throat
- MADJIC 1ml 2% lidocaine x 3 sprays towards larynx

**Remaining Maximum dosing**

Lean Body Weight	Max Volume of 2% Lidocaine
50kg	8mL
60kg	12mL
70kg	17mL
80kg	21mL

NSW AMBULANCE GREATER SYDNEY AREA HEMS  
VERSION 1.0 3/2018



# INTUBATION through LMA PROCEDURE



**Consider Other Options**  
 - Optimised RSI with LMA as backup  
 - Primary Surgical Airway under LA  
 - Transport with LMA in situ

*DISCUSS with DRC - Call 9709 6856*

## If non-iGel LMA in situ test suitability as conduit for intubation

Feed 6.0 R ETT through same make/size LMA -> 2 black lines on ETT protrude

**CONSIDER CHANGING LMA TO iGEL**

## PROCEDURE

### Standard RSI Checklist completed

Pre-oxygenating on 100% O2 +/- PEEP/BiPAP

aScope connected to aView, turns on, flexs/extends & picture clear

Deep Analgesia/Sedation +/- muscle relaxation

6.0 re-inforced tube lubed and check cuff fully deflated

Room set-up optimised - aView screen visible to aScope operator at head of bed

Team briefing and role allocation

Failed Intubation Plan Discussed

Insert 6.0 Reinforced ETT into LMA until slight resistance felt  
(~17cm for iGel #4)

Insert aScope via ETT/LMA – identify cords

Scope to carina – railroad ETT

Remove aScope whilst securing ETT

Inflate cuff and Confirm ETCO2 waveform

Confirm tube depth

Secure both tube and LMA

Consider gastric tube via LMA gastric port - 12F into iGel #3/4





# AWAKE NASAL INTUBATION PROCEDURE

- Pretreat with Anti-sialogogue and nebulised topicalisation (20min)
- Assign Team Leader to view vital signs monitor
- Assign Airway Assistants - Tongue/Jaw Thrust + Topicalisation
- Assign Assistant for Patient Supervision/Explanation (e.g. nurse)
- Topicalisation - check max dose calculations
- Consider Analgesia/Sedation - Ketamine or Fentanyl/Midazolam
- Test topicalisation in nose and pharynx and re-optimize
- Insert 6.0 Reinforced Tracheal tube into nose (est. depth 14cm adults)
- Insert aScope into tube and view glottis
- Protrude tongue/jaw thrust to improve view
- Advance aScope to view carina
- Advance tube into trachea
- Inflate cuff and confirm ETCO2 and correct depth
- Exclude R main bronchus intubation (suggested nasal depths 26cm F 28cm M)
- Secure tube, Sedate and Muscle Relax

TROUBLESHOOTING	ACTIONS
Gagging/Coughing (Inadequate topicalisation)	Additional lidocaine via aScope - 1mL lidocaine in 5mL air sprayed rapidly.
View obscured by secretions	Suction. Wipe scope.
Inadequate view	Tongue protrusion/ jaw thrust. Withdraw to visible landmarks.
Patient movement/resistance	More topicalisation. Consider low dose analgesia/sedation.
Tube catches on arytenoids	Withdraw and rotate while advancing

