

# RSI CHECKLIST

**use BMV with PEEP to pre-oxygenate**

## SET UP

Monitoring - BP, ECG, SpO <sub>2</sub> , ETCO <sub>2</sub>	CHECK
Nasal Cannulae at 15l/min PLUS Mask O <sub>2</sub>	CHECK
Pre-oxygenation for FOUR minutes	CHECK
Suction checked working & available	CHECK
Position optimised - ASK IF RAMPING NEEDED?	CHECK

## IV & DRUGS

IV Cannula connected to fluid & running	CHECK
NIBP on contralateral arm and BP seen	CHECK
Spare cannula in situ	CHECK
INDUCTION AGENT drawn up, dose checked	CHECK
SUX or ROC drawn up, dose checked	CHECK
VASOPRESSORS drawn up, labelled	CHECK
POST INTUBATION drugs drawn up & labelled	CHECK

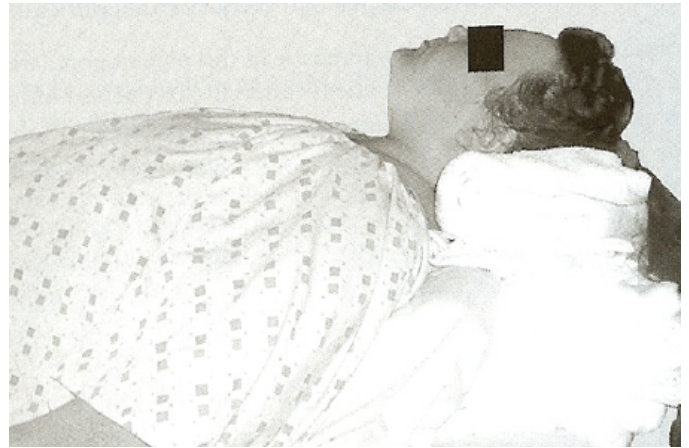
## INTUBATION EQUIPMENT

BVM connected to oxygen with PEEP valve	CHECK
Guedel airways & two NPO airways available	CHECK
Laryngoscope blade chosen, light working	CHECK
ET tube size chosen, cuff tested plus backup	CHECK
Syringe for cuff inflation	CHECK
Stylet & Bougie available	CHECK
Gooseneck, filter, inline ETCO <sub>2</sub> (or EasyCap)	CHECK
Tube Tie available	CHECK
LMA, ADJUNCTS, iLMA & SURGICAL AIRWAY AVAIL	CHECK

## TEAM BRIEF

In-line immobilisation person briefed	CHECK
Cricoid pressure brief (or decision to omit CP)	CHECK
Drug giver briefed	CHECK
Airway Plans A-B-C-D discussed & agreed	CHECK
Anticipated problems & post RSI care brief	CHECK
Ventilator settings determined & switched on	CHECK
TIME OF INTUBATION NOTED & 30 sec DRILLS	CHECK

# NODESAT



NODESAT techniques aim to maximise first pass success during intubation of the critically unwell (Weingart/Levitan 2013)

Key considerations include

- POSITION Ear-to-Sternum (unless contraindication)
- RAMPing of the obese
- Pre-load ETT with BOUGIE (Kiwi grip)
- Push dose pressor available

**USE OF HIGH FLOW NASAL CANNULAE IN ADDITION TO BAG MASK VENTILATION (use separate O<sub>2</sub> outlet at 15l/min)**

**Once mask is removed during initial intubation attempt, the nasal prongs should remain in situ and turned on to maximum FiO<sub>2</sub> (15l/min or more) to create a reservoir of O<sub>2</sub>; this will allow apnoeic diffusion oxygenation & prolong time to desaturation**

**WHEN IN DOUBT  
“BLOW SOME O<sub>2</sub>s THRO’ THE NOSE”**

# ASTHMA in ED

## Management of Life-Threatening Asthma in the Emergency Department

### Step One

- Continuous nebulized albuterol
  - Use oxygen for nebulization not room air
  - 8 liters per minute
  - Nebulizer will need to be refilled every 10-15 min
  - Dose is not important, keep making smoke
- Nebulized ipratropium bromide
  - 500 mcg, added to albuterol q20 min x 3, then q1h
  - Alternative: Dexamethasone 20 mg IM or IV
- Methylprednisolone 125 mg (1.5 mg/kg) IV
- Magnesium sulfate 2 g (50 mg/kg, max 2 g) IV
  - Give over 20 minutes

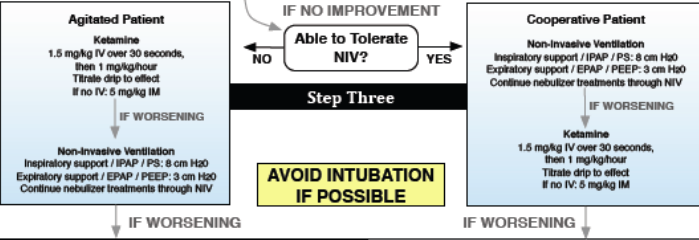
Consider the differential

- CHF
- Pneumothorax
- ACS
- Arrhythmia
- Pulmonary embolism
- Airway obstruction / Foreign body
- Pericardial tamponade

IF NO IMPROVEMENT

### Step Two

- Epinephrine 0.5 mg (0.1 mg/kg, max 0.5 mg) IM
  - Proper concentration of epi for IM injection is 1:1000 (1 mg in 1 mL), so 0.5 mg = 0.5 mL
  - May repeat q10 min, or start IV drip at 5 mcg/min and titrate to effect
  - Instant epi drip: 1 amp crash cart epi (1 mg in 10 mL) in 1 liter NS, start at 2 drops/sec, titrate up
  - Alternative to epi: Terbutaline 10 mg/kg IV bolus over 10 min, then titrate from 0.4 mcg/kg/minute
- Fluid bolus 20 cc/kg normal saline
- Diagnostics: Chest X-ray, CBC, chemistry, venous blood gas, HCG, ECG if concern for non-sinus rhythm or cardiac ischemia



### Intubation and Ventilation of the Asthmatic

**Indications**

- Progressive fatigue / respiratory failure
- Progressive deterioration of mental status
- Cardiac arrest

**Technique**

- Maximize preoxygenation
- Optimize for first pass success
- Induce while patient is upright
- Use largest ETT possible
- Be mindful of tendency to bag-mask ventilate too aggressively; this leads to breath stacking

**RSI Meds**

- Ketamine 2 mg/kg + Rocuronium 1.2 mg/kg or Succinylcholine 2 mg/kg

**Initial Vent Settings**

- Assist control / Volume control
- Respiratory rate 8 breaths/min
- Tidal volume 7 mL/kg IBW
- PEEP 2 cm H2O
- Inspiratory flow: 90 lpm (or I:E 1:3)
- FiO2 100%

Plateau pressure is measured by using the inspiratory pause function and noting airway pressure during the inspiratory hold

**Vent Management**

- Goal is plateau pressure < 30 cm H2O
- If Pplat too high, decrease rate, then tidal volume
- Continue nebulized albuterol
- Paralyze if needed, deep sedation/anesthesia preferred
- External chest compression to assist exhalation
- Can accept saturation as low as mid 80s (goal > 90%)
- Can accept high pCO2 for several hours (goal pH > 7.15)
- Aggressive airway suctioning
- Frequent electrolyte checks, watch for hypokalemia
- Consider inhalational anesthetic, heliox

**If Patient Crashes on Vent DISCONNECT VENTILATOR**

- External chest compression to assist exhalation
- Bag mask ventilation - do not overventilate
- Verify that ETT not displaced / clogged / kinked
- Bilateral thoracostomy
- Bolus fluid, epinephrine
- Consider ECMO/bypass

### IF NIPPV FAILS & FORCED TO INTUBATE

Maximise preoxygenation - Optimise first pass success

Largest ETT possible - Beware breath stacking

Ketamine 2mg/kg IV - Roc 1.2 mg/kg or Sux 2mg/kg IV

Assist control / Volume control RR 8 TV 5-7 ml/kg IBW

PEEP 2cm H2O IE 1:5 FiO2 100%

Permissive hypercarbia - Ext chest compression

Pplat < 30cm H2O - Aggressive suctioning - Check K

# ASTHMA in ED

### STEP ONE

Continuous nebulised salbutamol  
Nebulised ipratropium bromide  
Hydrocortisone 200 mg IV (4mg/kg kids)  
MgSO4 2g (50mg/kg max 2g) IV

if no improvement

### STEP TWO

Adrenaline 0.5mg IM (0.01mg/kg) = 0.5ml 1:1000  
Fluid bolus 20 ml/kg  
CXR, ECG, VBG, Electrolytes, FBC

if no improvement consider NIPPV

### AGITATED PATIENT

ketamine 1.5 mg/kg IV over 30 secs then 1 mg/kg/hr titrate to effect  
if no IV, 5mg/kg IM

### IF WORSENING NIPPV

iPAP PS 8cm H2O  
ePAP PEEP 3 cm H2O  
continue nebuliser through NIPPV

### COOPERATIVE PATIENT

NIPPV  
iPAP PS 8cm H2O  
ePAP PEEP 3 cm H2O  
continue nebuliser through NIPPV

IF WORSENING  
ketamine 1.5 mg/kg IV over 30 secs then 1 mg/kg/hr titrate to effect  
if no IV, 5mg/kg IM

### Consider the differentials

heart failure, ACS, arrhythmia, pulmonary embolism  
TENSION PTX, pericardial tamponade, obstruction, foreign body, anaphylaxis

**AVOID INTUBATION IF POSSIBLE**

# ANAPHYLAXIS

## Use IM adrenaline in advance of IV dosing

IM Adr 1:1000 (1 mg/ml) 0.01 mg/kg to max 0.3-0.5 mg IM  
Can repeat 5 minutely if not better or if worsening

AGE	DOSE ADRENALINE 1:1000 vial	VOLUME 1:1000/1ml
Adult	500 micrograms IM	0.5 ml
>12 yrs	500 micrograms IM	0.5 ml
6 -12 yrs	300 micrograms IM	0.3 ml
< 6 yrs	150 micrograms IM	0.15 ml

Don't forget to give normal saline 10-20ml/kg boluses for persistent hypotension. Salbutamol nebulisers may help with ongoing bronchospasm.

Patients on beta-blockers who do not respond to adrenaline may benefit from glucagon IV (20 to 30 mcg/kg up to a maximum of 1 mg).

IV adrenaline may be given if there is no resolution despite multiple doses of IM adrenaline — experts vary in their recommendations of how to give this. APLS guidelines suggest 0.1-5.0 micrograms/kg/min

### If resistant, I prefer this simple approach:

- grab 1 mg of adrenaline 1:10,000 from the resus trolley
- inject into 1000 ml bag of normal saline
- start infusion at 1 ml/min, which is 1 microgram/min (this would be 0.1 micrograms/kg/min for a 10 kg child)
- increase rate until resolution of severe anaphylaxis

# DSI PROTOCOL

## PRE-OXYGENATION

Reverse Trendelenburg or RAMP, ear-to-sternum  
Nasal cannulae at 10l/min  
Non-rebreather mask at 15l/min  
If SpO<sub>2</sub><90%, use NIPPV mask & CPAP via Oxylog  
If need assisted ventilation, use BMV with PEEP valve  
If agitated, give KETAMINE low dose  
Titrate PEEP according to SpO<sub>2</sub> & haemodynamics

## APNOEIC PERIOD

Push induction agent and paralytic  
Remove the face mask from the patient  
Increase the flow of the nasal cannula to 15 LPM  
Jaw thrust to maintain pharyngeal patency

If the patient is high risk (required CPAP for preoxygenation), consider leaving on CPAP during the apnoeic period or providing 4-6 ventilations with the BVM with attached PEEP valve. Maintain a two-hand mask seal during the entire apnoeic period to maintain the CPAP

## INTUBATION PERIOD

Leave nasal cannula on throughout the intubation to maintain apnoeic oxygenation (NODESAT)

# OXYLOG - NIPPV

## Continuous Positive Airway Pressure

Set up as per usual ie :TV/RR/Pmax/FiO<sub>2</sub> - **SELECT SpnCPAP mode**

The following can additionally be set on the display for SpnCPAP / PS :

- Pressure support  $\Delta P_{\text{supp}}$  above PEEP.
- Sensitivity Trigger (for synchronization with patient's spontaneous breathing efforts). Successful patient triggering is briefly indicated by an asterisk(\*) in the middle of the status alarm messages

Apnea back-up ventilation is only applicable when using the SpnCPAP mode. In the event of an apnea, the ventilator will automatically activate volume controlled mandatory ventilation (VC-CMV).

### SELECT SETTING FOR APNEA VENTILATION

- 1 Press the Settings key until page 2/3 appears.
- 2 Set Tapn with the rotary knob to a value between 15 and 60 sec.
- 3 Set RRapn and VTapn.
- 4 Set Pmax. This determines the maximum airway pressure allowed during apnea ventilation.

To switch apnea ventilation OFF

- Set Tapn to OFF (see setting apnea ventilation above)
- To end apnea ventilation
- Press the Alarm Reset key.

The ventilation time ratio I:E = 1:1.5 and the plateau time Tplat % = 0 are preset during apnea ventilation.

# OXYLOG - NIPPV



## CONSIDER ALSO

Ensure **adequate mask seal**  
(use the Draeger mask size guide)  
Use **Clausen harness**  
Draw **ABGs** and re-assess regularly  
If tiring, consider '*do I need to intubate?*'

**If combative, consider sedation & DELAYED SEQUENCE INTUBATION**

# OXYLOG - IPPV

## START in VC-CMV : typical adult settings

Set **TIDAL VOLUME** (typically 5-7 ml/kg)

Set **RESPIRATORY RATE** eg: 12

Set **Pmax** eg : 50 cmH<sub>2</sub>O

Set **FiO<sub>2</sub>** (air/O<sub>2</sub> mix ~ 40% or 100% O<sub>2</sub>)

Will start in **VC-CMV mode** (check is selected)

Select **TRIGGER MODE** - typically OFF for paralysed patient. If patient can make some resp effort, select a trigger value of 3-15 l/min to enable VC-AC mode

Select **PEEP VALUE 5-10 cm H<sub>2</sub>O** (default 5 cm H<sub>2</sub>O)

Select **I:E ratio** (range 1:4 to 3:1)

Select **Tplat**

Once ventilating, re-assess Pmax (Paw window) and reduce Pmax value as appropriate, as well as TV and RR etc

Adjust **ALARM parameters** as appropriate (inc. RESET)

**IF PATIENT IS ABLE TO BREATH, ALBEIT IRREGULARLY, SWITCH TO VC-SIMV MODE**

# OXYLOG - IPPV

## VC-SIMV

For patients with inadequate spontaneous breathing. Fixed mandatory minute volume MV is set with tidal volume VT & ventilation respiratory rate. The patient can breathe spontaneously between the mandatory ventilation strokes and thus contribute to the total minute volume. Spontaneous breathing can be assisted with PS.

Set the ventilation pattern with the controls below the display:

- Tidal volume VT.
- Respiratory Rate RR.
- Maximum airway pressure Pmax.
- O<sub>2</sub> setting FiO<sub>2</sub>.
- Inspiration time Ti.
- Plateau time Tplat %, in % of the inspiration time.
- Positive end expiratory pressure PEEP
- Sensitivity Trigger.

### Pressure support (optional) VC-PS

- Setting on page 1: Pressure support  $\Delta P_{\text{supp}}$  above PEEP.
- Setting on page 2: Pressure rise time slope