Conseil Cri de la santé et des services sociaux de la Baie James

Cree Board of Health and Social Services of James Bay

Rapid Sequence Intubation Guide - Adult

This document serves as a guide for Rapid Sequence Intubation (RSI) for physicians to use in preparing to intubate a patient and for nurses who assist the physician(s). However, the final clinical decision-making and procedure is the responsibility of the attending physician, in the context of the medical history and the condition of the patient.

Indications

A. GCS <8, quickly deteriorating GCS or loss of airway protection
B. Trauma with significant facial trauma and poor airway control
C. Burns with suspected inhalation/airway injury
D. Respiratory exhaustion (CHF, COPD, Asthma: Attempt BiPAP first if available: example settings 12 cm inspiratory pressure, 5 cm H20 PEEP)
E. Hypoxia
F. Transport, if clinical deterioration is a possibility during transport
G. Severe sepsis (can reduce acidosis by reducing respiratory efforts)

1. Preparation of equipment

A. Place cardiac monitor, BP, continuous O2 sat, 2 large-bore IVs.
B. Bag-valve-mask (BVM), nasal cannula and nasal/oral airway.
C. Endotracheal tube (ETT) (Size 7.0,7.5 women and 8.0,8.5 men): inflate/deflate cuff to check for leaks, insert stylet into ETT and slightly kink the tip like a 'hockey stick', apply lubricant jelly on tip of ETT.
D. Laryngoscope of appropriate size (curved blade 3-average, or 4-large), check that light is functioning well.
E. Suction (Yankauer and catheter), BVM plugged to 02, oral/nasal airways on standby, C02 detector (colourmetric or end-tidal).
F. Have difficult intubation kit nearby (Videoscope eg: Glidescope or other), LMA, bougie, combitude, cricothyroidotomy kit).
G. Medications are ready.
H. Position head in 'sniffing' position (folded towels or pillow under head).
I. Remove dentures; assess if difficult intubation (anticipate that all are difficult).
J. Protective gear/goggles/mask for doctor.
K. Prepare settings for ventilator if available.
L. Material to fix ETTube (pink tape, trach ties or fixator).

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2. Pre-treatment (Time to intubation: –7 min)

A. **Pre-oxygenation: Give patient 100% FiO2 non-rebreather mask (and consider added nasal canula/airway with high flow 02) for 3 to 5 minutes.** If patient requires immediate intubation, give 5-8 BVM breaths and do not delay.
B. Keep patient in sitting-up position if possible, to improve air entry until ready to intubate.
C. If suspect difficult intubation, keep the nasal canula/airway with high flow 02 (15L) **even during intubation**. This will help with passive oxygenation and prevent desaturation during intubation.
D. Optional: Consider Fentanyl 50 mcg IV as pretreatment to decrease pain related to intubation and to avoid elevation of intracranial hypertension. Do not give if hypotensive.
E. Lidocaine – no evidence to support its use.

3. Induction Medication (Time to intubation: -2 min)

Give medications as IV push followed by NS flush. Consider clinical context:

Context	Choice	Comments
Trauma Head Injury	Propofol Or Ketamine or Etomidate (if available) if patient is hypotensive or has risk of hypotension	Give NS bolus to avoid hypotension with propofol Ketamine is now considered safe in head trauma. Etomidate is not always available
Status Epilepticus	Midazolam or Propofol	
Respiratory distress (Consider BiPAP first, if available)	Ketamine or Propofol	Ketamine has a bronchodilator effect and keeps airway patent, may increase secretions
Shock or hypotension	Ketamine Etomidate (if available in Chisasibi)	Avoid Ketamine if ischemic cardiogenic shock is suspected or if patient known for CAD Avoid Etomidate in sepsis
Other	Any induction agent	

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Recommended Induction Agents and Dosing				
Meds	**Doses**	**Range**	**Example 70 kg**	**Example 100kg***
Propofol	1.5mg/kg IV	1-2mg/kg IV	100 mg	150mg
Ketamine	2 mg/kg IV	1-2 mg/kg IV	140 mg	200mg
Midazolam	0.3 mg/kg IV	0.2-0.3mg/kg IV	15-20 mg	20-25mg
Fentanyl	4 mcg/kg IV	2-5 mcg/kg IV	300 mcg	300-400mcg
Etomidate	0.3mg/kg IV	0.2-0.6mg/kg IV	21mg	30mg

***** There are no clear guidelines for max doses in obese or morbidly obese patients; clinical judgement needs to be used. Often times, the dose for 100kg patients can be considered an adequate dose for patients weighing more than 100kg. Also correlate with the patient's present status, for example is the patient already very sedated or comatose. If so, the full induction dose is not always warranted.

4. Paralysis (Time to intubation: -1 min)

Give immediately *after* the induction agent.
Pretreatment with a nondepolarizing neuromuscular blocking agent, such as rocuronium, is no longer recommended.
Paralysis will increase the success rate of intubation. However, it is the physician's responsibility to assess the benefit vs risk of intubation and paralysis. Assess for difficult airway, and for any difficulty in Bag Valve Mask ventilation, prior to paralysis and intubation.

A. **Succinylcholine**
   a. Dose 1-1.5mg/kg IV (example 70kg: 70-100mg)
   b. Onset of action: 45-60 sec, Duration: 5-9 min
   c. Note: This med will increase serum K+ by 0.5.
   d. Contraindications:
      i. Hyperkalemia
      ii. Myopathies
      iii. Rhabdomyolysis
      iv. History of malignant hyperthermia
      v. Increased intra ocular pressure
      vi. Acute phase of injury >*72h following*: major burns, multiple trauma, extensive denervation of skeletal muscle or upper motor neuron injury

B. **Rocuronium**
   a. Use rocuronium instead, if succinylcholine is contraindicated.
   b. Dose 1mg/kg IV (example 70kg: 70mg)
   c. Onset 1-3 min, Duration 30-45 min.

C. After paralytic med given, wait 45-60 seconds before intubating. Check "eyelash test" – patient does not react or blink when eyelashes touched.

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D. Cricoid pressure (Sellick's maneuvre): is no longer recommended as it impairs Bag Valve Mask ventilation and ETTube insertion. Remains optional.

5. Intubation (Time: 0 min)

Perform intubation:

A. Application of back-up-right-pressure (BURP) on thyroid cartilage by an assistant may help bring vocal cords into view.
B. Tilt head back with right hand (NOT if in C-Spine precaution: jaw thrust only. Collar can be removed if another professional is holding the c-spine secure). Insert, hold and pull the laryngoscope (or videoscope) in left hand with a forward motion; suction with right hand if needed; find the vocal chords. Then introduce ETT with stylet using right hand. (
C. Insert and visualize ETT cuff passing through the vocal cords and remove stylet.
D. If fail to view ETT going through vocal cords: reposition and reattempt; if fail again: remove ETT and bag patient. Start difficult intubation options, as per physician preference:
    a. Videoscope (eg Glidescope), if available
    b. Bougie:
        i. Insert tip, aiming up, along epiglottis and advance.
        ii. If you sense the tracheal rings until resistance is felt, the bougie is placed correctly. Insert ETT over bougie to appropriate depth and remove Bougie.
        iii. If resistance is not felt, the bougie is in the esophagus, then remove it immediately.
    c. Laryngeal mask airway (LMA)
    d. Combitube
    e. Cricothyroidotomy (Needle or Surgical)

6. Confirmation:

Check tube placement immediately after intubation.

A. **Use CO2 detector*:***
    a. **Colourimetric "yellow is gold*"***, check minimum x 5 breaths.
    b. Use end-tidal CO2 if available.
B. Check air entry bilateral lung fields and that no air sounds are heard in epigastric region.
C. Inflate ETT cuff with 5-10 cc air, or until little balloon slightly tense.
D. Secure ETT with tape, ties or fixator devices.
E. Maintain appropriate depth at lips or teeth:

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a. **20-21cm at teeth for women**
b. **22-23cm for men**

F. If patient is desaturating and having bradycardia, this indicates possible esophageal intubation. Consider "DOPE":

a. **D**isplaced in Right mainstem bronchus or esophagus.
b. **O**bstruction (kinked, bitten, mucous).
c. **P**neumothorax.
d. **E**quipment problem or in **E**sophagus.

7. Post-intubation Management

A. Monitor patient closely, including vital signs and responsiveness.
B. If patient is hypotensive:
   a. Give NS fluid bolus(es)
   b. Phenylephrine PRN (if available)
      i. Safe to give small 'push doses' via peripheral IV
      ii. To prepare: Take 1ml (1amp) of the 10mg(10000mcg)/ml 1% and dilute it in a 100ml NS bag; each 1 ml of this diluted solution now contains 100mcg of phenylephrine (100mcg/ml).
      iii. Give small dose of 100mcg (1ml) IV push bolus at a time.
C. **Sedation maintenance perfusions**:
   a. Prepare prior to intubation if possible.
   b. Start low and titrate up to response.
   c. Additional bolus may be given if patient wakes or gets agitated which is common if succinylcholine is used.
   d. Refer to Section 3.Induction above to aid in medication choice.
   e. Two medications are often combined (eg benzo+analgesic).

Sedation Med	Dose	Infusion* (example 70 kg)
Propofol	0.30 – 4.80 mg/kg/hr	21 – 330 mg/hr
Midazolam	0.04 – 0.20 mg/kg/hr	3 – 14 mg/hr
Fentanyl	0.70 – 10.0 mcg/kg/hr	50 – 700 mcg/hr
Morphine	0.05 – 0.70 mg/kg/hr	5 – 49 mg/hr
Ketamine	0.5 – 2.0 mg/min	35 – 140 mg/hr

*Can start the titration using patient's ideal weight; if morbidly obese or if patient is a heavy alcohol or drug abuser they might need higher doses. Clinical judgement needed.

   f. Consider bolus doses of rocuronium 1mg/kg q 45min during transport.
   g. Ensure patient has sufficient sedation if you decide to paralyze for prolonged time. Hypertension and tachycardia are signs of inadequate sedation.
D. Insert orogastric tube (orogastric is better than nasogastric tube).

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E. Elevate head of bed 30 degrees if possible (reverse Trendelenburg if patient needs C-spine precautions).
F. Check periodically that ETT remains secure and positioned at appropriate depth.
G. Do **stat portable CXR** if available, to:
    a. Assess tube depth and placed 2cm above carina.
    b. Rule out right mainstem bronchus intubation.
    c. Rule out pneumothorax.
    d. Tip should be below claviclular line.

7. Ventilator (if available)

Initial settings:
A. Assist/Control or SIMV mode (or bag).
B. Begin with 100% Fi02, then titrate down to maintain adequate 02 saturation.
C. Tidal volume 10ml/kg of ideal weight (average 600-700ml).
D. Resp rate 10-12 breaths/min (correlate clinically and with blood gases results).
E. Inspiration/expiration ratio 1:2 (1:3 if bad asthma/COPD).
F. PEEP 5cm H20.
G. Inspiration flow rate 60L/min.
H. Goal: Keep inspiratory peak pressure under 35cm H20.

8. Blood Gas Goals

If available, check 30 min. after intubation. Venous blood gas is sufficient, but arterial blood gas is preferred.
A. pH 7.35-7.45
B. Pa02 60-90mmHg (if arterial gas)
C. PaCO2 40mmHg (venous or arterial gas)
D. O2 saturation
    a. Titrate to keep above 92% if no arterial blood gas available
    b. Titrate down Fi02 if possible (example: titrate from 100% down to 21-40%Fi02)

References

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