Q. RAPID SEQUENCE INTUBATION – ADULT (NEW '20)

1. Rapid Sequence Intubation (RSI) Optional Supplemental Program

a) Indications

(1) Inability to tolerate laryngoscopy, and:
  (a) GCS less than or equal to 8 with respiratory rate less than or equal to 8 or greater than or equal to 35 or
  (b) GCS less than or equal to 8 with oxygen saturation less than or equal to 90% on non-rebreather face mask

(2)  On-line medical direction for RSI may be requested in the following situations:
  (a) GCS less than or equal to 8 with clenched jaw or inability to adequately suction airway, and without above respiratory parameters
  (b) Respiratory extremis with contraindication to noninvasive ventilation (CPAP)
  (c) Burns: inhalational burn with objective signs of developing airway compromise
  (d) Critically ill or severely injured patient with imminent airway compromise

b) Contraindications

(1) Patients who have not yet reached their 15th birthday

c) Preparation

(1) Pre-oxygenate with nasal cannula oxygen 15 lpm and bag valve mask attached to high-flow oxygen
(2) Monitor vital signs q5min, continuous pulse oximetry, $ETCO_2$, and cardiac rhythm
(3) Ensure functioning IV/IO and fluid therapy as per protocol.
(4) Evaluate for difficult airway.
(5) Perform focused RSI neurologic exam.
(6) Prepare equipment
  (a) Intubation equipment
  (b) Bag-Valve-Mask (BVM)
  (c) ET tube introducer (bougie)
  (d) Suction
  (e) RSI medications
  (f) Alternative airway device
  (g) Cricothyroidotomy equipment
  (h) Video laryngoscopy equipment

d) RSI Procedure

(1) Sedation
  Adequate sedation must be provided to prevent awareness during paralysis from neuromuscular blockade.

Etomidate may be used for sedation in patients who are aware of their surroundings.

Initial dose: Administer 0.3 mg/kg IVP over 30–60 seconds. If the patient is hypotensive or the clinician suspects hypovolemia, the initial dose will be 0.15 mg/kg IVP over 30–60 seconds.

Repeat dose: May repeat 0.15 mg/kg IVP in 2–3 minutes if inadequate sedation.

OR

Ketamine is preferred for patients who are aware of their surroundings or have hypotension or possible hypovolemia.

Initial dose: Administer 2 mg/kg IVP over 60 seconds.

Repeat dose: May repeat dose of 2 mg/kg IVP over 60 seconds in 2-3 minutes if inadequate sedation.

OR

Midazolam can be considered for patients with isolated head injury and elevated blood pressure, especially with possible seizure activity. Midazolam should not be used for patients with hypotension, and should be avoided with possible hypovolemia.

Dose: Administer 0.1 mg/kg IVP over 1–2 minutes.

Maximum single dose is 5 mg.

Only one sedative agent should be administered prior to succinylcholine unless otherwise directed by medical consultation.

(2) In-line cervical spine stabilization shall be maintained by second caregiver for trauma patients.

(3) Administer paralytic medication.

Succinylcholine: Administer 1.5 mg/kg rapid IVP/IO. Maximum single dose is 200 mg. If inadequate paralysis after 2-3 minutes, verify IV/IO patency. Repeat succinylcholine 1 mg/kg IVP/IO. Maximum single dose is 200 mg.

Contraindications for succinylcholine:

(a) Burns greater than 24 hours old
(b) Spinal cord injury greater than 24 hours old
(c) Known neuromuscular disease (Guillain-Barre syndrome, myasthenia gravis, amyotrophic lateral sclerosis, muscular dystrophy)
(d) Chronic renal failure on hemodialysis/Presence of hemodialysis access
(e) Malignant hyperthermia

OR

Vecuronium: 0.1 mg/kg IVP/IO; if inadequate paralysis after 2-3 minutes, verify IV/IO patency. Repeat vecuronium 0.05 mg/kg IVP/IO. Vecuronium is the preferred paralytic for patients with a history of malignant hyperthermia or contraindications for succinylcholine.

WHEN VECURONIUM IS USED, MAINTENANCE OF SEDATION MUST BE ASSURED. THE PATIENT MAY NOT SHOW TRADITIONAL SIGNS OF VENTILATORY BUCKING.

(4) Intubate trachea and verify ET placement.

e) Successful Endotracheal Tube Placement

(1) Secure ET.
(2) Ventilate the patient at a rate that maintains an $ETCO_2$ of 35-40 mmHg. For the head-injured patient with signs/symptoms of herniation, target $ETCO_2$ of 30 mmHg.
(3) If significant resistance to ventilation occurs as succinylcholine wears off (4–5 minutes), refer to Ventilatory Difficulty Secondary to Bucking Protocol.

f) Unsuccessful Endotracheal Tube Placement

(1) Place an airway adjunct (OPA or NPA) and apply high-flow oxygen by nasal cannula (no desat).
(2) Resume BVM ventilation for at least 30 seconds and attempt to correct hypoxia, if present. If unable to ventilate, see "If Unable to Ventilate" below.
(3) Reevaluate airway strategies and consider additional oral ET intubation attempt.
(4) If unsuccessful, resume BVM ventilation.
(5) Insert an approved alternative airway device (refer to Laryngeal Mask Airway Optional Supplemental Program or Laryngeal Tube Airway Device procedure).
(6) Attach capnography and ventilate to $ETCO_2$ level of 35-40 mmHg. For head-injured patients with signs/symptoms of herniation, target $ETCO_2$ of 30 mmHg.
(7) If significant resistance to ventilation occurs as succinylcholine wears off (4–5 minutes), or if patient exhibits difficulty in tolerating an approved alternative airway device as succinylcholine wears off, refer to Ventilatory Difficulty Secondary to Bucking Protocol.

g) If Unable to Ventilate

Insert an approved alternative airway device (refer to Alternative Airway Device Protocol).

h) If still unable to ventilate using an approved alternative airway device, remove it and perform cricothyroidotomy (refer to Cricothyroidotomy Protocol). **(NEW '20)**

2. Ventilatory Difficulty Secondary to Bucking or Combativeness in Intubated Patients

a) Indication

Patients successfully intubated with an endotracheal tube, an approved alternative airway device, or cricothyroidotomy, for whom the ability to provide manual or mechanical ventilation is impaired secondary to bucking or combativeness

b) Contraindication

Unsecured airway

c) Procedure

(1) Consider additional sedation

Etomidate

Dose: Administer 0.3 mg/kg IVP over 30–60 seconds. If the patient is hypotensive or the clinician suspects hypovolemia, the initial dose will be 0.15 mg/kg IVP over 30–60 seconds.

May repeat 0.15 mg/kg IVP every 15 minutes to a total of 3 doses.

OR

Ketamine may be preferred for patients who have hypotension or possible hypovolemia, or if ventilatory difficulty is thought to be the result of pain response.

Dose: Administer 2 mg/kg IVP/IO over 60 seconds. May repeat 2 additional doses of 1 mg/kg for IVP/IO every 10–15 minutes to a total of 3 doses as needed.

Additional doses require medical consultation.

OR

Midazolam can be considered for patients with isolated head injury and elevated blood pressure, especially with possible seizure activity. Midazolam should not be used for patients with hypotension, and should be avoided with possible hypovolemia.

Dose: Administer 0.1 mg/kg IVP over 1–2 minutes, titrated to abate bucking and relax ventilation while maintaining systolic BP greater than 90 mmHg (110 mmHg if injuries include a suspected head injury). Maximum single dose is 5 mg.

Additional doses require medical consultation.

(2) If ventilatory difficulty is thought to be the result of pain response, **Ketamine may be used as above.**

OR

Opioid may be used per Pain Management Protocol in addition to, or instead of, midazolam, ketamine, or etomidate. Titrate to abate bucking and relax ventilation while maintaining systolic BP greater than 90 mmHg.

ALERT SEDATION MUST BE PROVIDED PRIOR TO VECURONIUM FOR A PATIENT WHO IS EITHER RESPONSIVE TO STIMULUS, OR WHO MAY BECOME RESPONSIVE TO STIMULUS DURING NEUROMUSCULAR BLOCKADE. USE OF VECURONIUM REQUIRES FUNCTIONING $ETCO_2$ MONITORING. VECURONIUM MAY ONLY BE USED IF CONTINUOUS, BREATH TO BREATH $ETCO_2$ MONITORING CAN BE PROVIDED.

(3) If significant resistance to ventilation continues despite adequate sedation and analgesia, the paramedic may administer:

(a) Vecuronium 0.05 mg/kg IVP. Maximum single dose is 10 mg.

(b) Dose may be repeated in 2-3 minutes, if necessary.

(c) **Maintenance of amnesia**

Follow above dosing of either **etomidate** or **ketamine** with required repeat dosing every 10–15 minutes.

(4) Continue to monitor oxygen saturation and ventilate to desired $ETCO_2$.
(5) Obtain on-line medical direction if further problems present.

3. Protocol for Cricothyroidotomy (Surgical and Needle)

a) Indications
(1) Inability to ventilate despite having tried BVM with oropharyngeal/ nasopharyngeal airway, ET placement, and an alternative airway device (if not contraindicated)
(2) Inability to place ET in the setting of life-threatening upper airway hemorrhage
(3) Foreign body completely obstructing upper airway that cannot be removed via BLS maneuvers or Magill forceps with direct visualization

b) Contraindications
(1) Patients under the age of 8 should not receive surgical cricothyroidotomy. They may receive only needle cricothyroidotomy. **(NEW ’20)**

c) Preparation
(1) Prepare suction and cricothyroidotomy kit.
(2) Begin at sternal notch and locate cricoid cartilage.
(3) Palpate cricothyroid membrane anteriorly between cricoid cartilage and thyroid cartilage.
(4) Prepare skin with betadine or alcohol swabs.

d) Surgical Cricothyroidotomy
(1) Clinicians must use a designated technique and procedure for establishing the airway through the cricothyroid membrane that has been approved by the program medical director.
(2) Insert a 6.0 mm cuffed ET tube, using the natural curve of tube.
(3) Insert ET tube to just beyond cuff.
(4) Inflate cuff and ventilate patient.
(5) Monitor oxygen saturation and $ETCO_2$ level.
(6) Secure ET tube. (Do not cut or trim ET tube.)
(7) If significant resistance to ventilation develops, or if patient develops difficulty in tolerating successful cricothyroidotomy, refer to Ventilatory Difficulty Secondary to Bucking or Combativeness Protocol.

Protocol for Cricothyroidotomy (Continued)

e) Needle Cricothyroidotomy

(1) Insert 12- or 14-gauge over-the-needle catheter through the cricothyroid membrane at a 45-degree angle toward the feet. Aspiration of air with a syringe indicates tracheal entry.
(2) Hold needle in place and advance catheter, then remove needle.
(3) Attach catheter hub to intermittent jet oxygen insufflator valve.
(4) Manually secure catheter at hub at all times to prevent kinking or displacement.
(5) Monitor oxygen saturation.
(6) If significant resistance to ventilation develops, or if patient develops difficulty in tolerating cricothyroidotomy, refer to Ventilatory Difficulty Secondary to Bucking or Combativeness Protocol.