Tucson Medical Center
Base Hospital
Airway Protocols

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Tucson Medical Center Base Hospital
Airway Protocols

Guidelines:

1. Airway Management Protocol (13 years old and over)
2. Airway Management Protocol (Under 13 years old)
3. Automatic Transport Ventilator Protocol
4. CPAP
5. Cricothyroidotomy Protocol
6. Medication Facilitated Intubation
7. Supraglottic Airway Protocol
8. Tracheostomy Protocol

Introduction

RETURN TO TABLE OF CONTENTS

Tucson Medical Center (TMC) Base Hospital Airway Protocols are offline procedures approved by TMC Base Hospital Medical Director. Each set will be reviewed by all EMCTs working under TMC Medical Direction. These evidence-based guidelines will be used to provide the care to the best of their education, experience and within their full scope of practice. TMC Base Hospital members will receive the full support of the Medical Director when providing care to this level.

Protocol Deviation Statement

It is not reasonable to expect any single document to cover all situations where providers may make an assessment that indicates a deviation from these protocols may be necessary. These guidelines are not meant to be absolute treatment doctrines nor are they a substitute for the judgment and experience of the provider. Providers are expected to utilize their best clinical judgment and deliver care and procedures according to what is reasonable and prudent for specific situations. Under rare circumstances deviation may be necessary.

In circumstance where it would not cause further harm and the provider believes a patient may clinically benefit from an intervention, or that following the protocol would be harmful or not in the best interest of the patient, the following procedure should be followed:

1. The EMCT on scene is responsible for performing a complete assessment and determining if a protocol deviation is warranted. Providers must be able to demonstrate they were aware of, and considered the guidance provided with TMC protocols, and understand the risks associated with deviating from protocol.
2. When considering a protocol deviation, a peer with the appropriate level of expertise should be consulted (if available) or call medical direction.
3. ONLY if a provider is comfortable performing the deviation and treatment is consistent with their level of training, may they proceed with the deviation. Documentation must include the reasons for the deviation, all clinical data validating safety, mitigating risk, and the response/effects. The provide must advise the receiving physician of the deviation and document it clearly on the PCR. In all cases providers are expected to deliver care within the scope of practice for their certification.
4. Any protocol deviations will be reported to their Supervisor, Agency EMS Coordinator and Base Hospital Manager within 24 hours. This serves as a safeguard to remind providers that protocol deviations are considered a rare necessity. All deviations are subject to review to determine whether or not it was appropriate.

Airway Management Protocol (13 years old and over) (1/2)

RETURN TO TABLE OF CONTENTS

Audience
- EMT-Basic
- Paramedic

Purpose
Provide guidelines for airway management in patients who need assistance with ventilation and oxygenation.

Indications
- Respiratory distress
- Respiratory failure
- Apnea

Contraindications
- Age < 13 years old

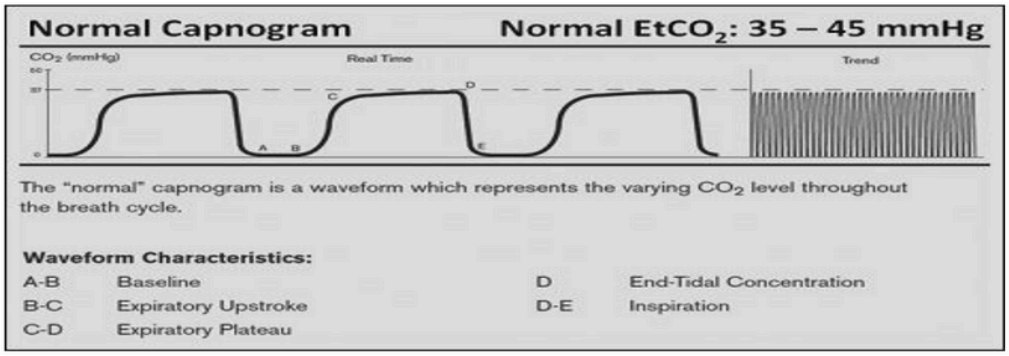
Procedure
1. Assess patient's oxygenation and ventilation status
2. Place on continuous SpO2 and EtCO2 monitoring
3. Initiate supplemental oxygen via nasal cannula or non-rebreather mask
4. Consider initiating Continuous Positive Airway Pressure (CPAP) in patients with shortness of breath likely secondary to asthma, COPD, pulmonary edema, or CHF - Refer to **CPAP Protocol**
5. If patient is unable to maintain appropriate ventilation, assist ventilations via BVM
    a. Use airway adjuncts (e.g. OPA, NPA) as tolerated by patient
6. Consider placement of supraglottic airway - refer to **Supraglottic Protocol**
7. **[Paramedic only]** If endotracheal intubation is indicated, assess for difficult airway characteristics prior to intubation attempt(s). Several methods of evaluating airway are related to anatomy. One commonly used mnemonic in emergency airway care is "LEMON":
    i. **L**ook externally: assess for facial hair, anatomy, dentition
    ii. **E**valuate 3-3-2 rule: Three fingers able to be placed in vertical axis of mouth; Three fingers able to be placed between chin apex and top of neck; Two fingers able to be placed between top of neck and top of thyroid cartilage
    iii. **M**allampati score: Class I (Soft palate, uvula, fauces, pillars visible); Class II (Soft palate, uvula, fauces visible); Class III (Soft palate, base of uvula visible); Class IV (Only hard palate visible)
    iv. **O**bstruction: consider conditions that may obstruct airway (e.g. foreign body, thermal injury, oral infection, angioedema)
    v. **N**eck mobility: consider conditions that may limit neck mobility (e.g. trauma with cervical collar, arthritis, obesity)
8. **[Paramedic only]** Steps to endotracheal intubation:
    - Choose appropriate size equipment and assess for equipment integrity.
    - Ensure appropriate head positioning
    - Perform laryngoscopy with left hand, advancing incrementally until visualization of laryngeal structures (ideally the epiglottis and vocal cords)
        - MAC: blade should be placed into the vallecula and engage the hyoepiglottic ligament
        - Miller: blade should pick up the epiglottis
    - Insert ETT between vocal cords, ensuring passage of balloon cuff 1-2cm past cords
    - Remove stylet and inflate cuff with 10cc syringe
    - Secure tube in place and note tube depth at the teeth
    - Confirm placement with EtCO2 waveform capnography (Gold Standard)
9. **[Paramedic only]** In patients who cannot be oxygenated/ventilated with all other methods of airway management interventions and require a definitive airway, perform cricothyroidotomy - refer to **Cricothyroidotomy Protocol**

Airway Management Protocol (13 years old and over) (2/2)

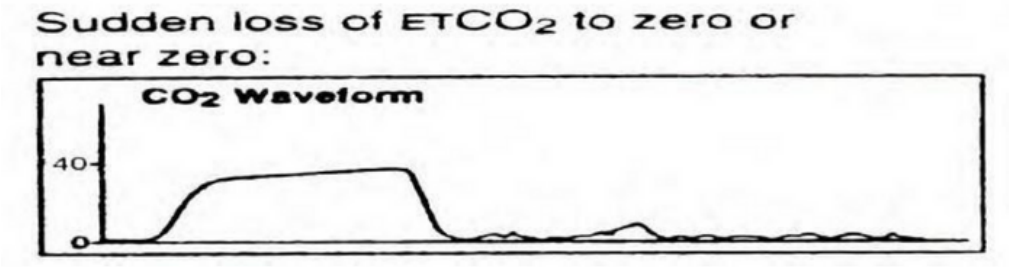
RETURN TO TABLE OF CONTENTS

Pearls/Pitfalls/Conclusion

- Interpreting Waveform Capnography
  - The figure below shows a normal capnography waveform display. There are 4 phases of the waveform that require analysis:
    - **The flat A – B baseline segment (Respiratory Baseline)** represents the beginning of exhalation of CO2. Free gas that is contained in dead space from the conduction airways (trachea, bronchi). This value normally is zero.
    - **The B – C segment (Expiratory Upstroke),** a sharp rise, represents exhalation of a mixture of dead space gases and alveolar gases.
    - **The C – D segment** represents the alveolar plateau, characterized by exhalation of mostly alveolar gas.
    - **Point D is the end-tidal (EtCO2) value** that is recorded and displayed by the monitor, (peak concentration of CO2 occurring at the end of expiration).
    - **The D – E segment (Inspiratory Downstroke)**, a sharp fall, reflects the inhalation of gases that are CO2. Free (room air or supplemental oxygen).



  - Normal range for EtCO2 is **35 – 45 mmHg**
  - Alterations of the normal capnography or EtCO2 values are the result of changes in metabolism, circulation, ventilation, or equipment function.
  - Sudden loss of EtCO2 to zero or near zero must be addressed immediately, as it may represent:
    - Endotracheal tube in esophagus
    - Incorrect placement of supraglottic device
    - Airway device not connected to capnography detector
    - Total obstruction/mucus plugging
    - Capnography malfunction



Airway Management Protocol (Under 13 years old)

RETURN TO TABLE OF CONTENTS

Audience
- EMT-Basic
- Paramedic

Purpose
Provide guidelines for airway management in patients who need assistance with ventilation and oxygenation.

Indications
- 12 years old and under
- Respiratory distress
- Respiratory failure
- Apnea

Contraindications
- 13 years old and over

Procedure
1. Assess patient's oxygenation and ventilation status
2. Place on continuous SpO2 and EtCO2 monitoring
3. Initiate supplemental oxygen via nasal cannula or non-rebreather mask
4. Consider initiating Continuous Positive Airway Pressure (CPAP) in patients with shortness of breath likely secondary to asthma, COPD, pulmonary edema, or CHF - Refer to **CPAP Protocol**
5. If patient is unable to maintain appropriate ventilation, assist ventilations via BVM
    a. Consider usage of airway adjuncts (e.g. OPA, NPA) as tolerated by patient
6. **[Paramedic only]** In patients who cannot be oxygenated/ventilated with all other methods of airway management interventions and require a definitive airway, perform cricothyroidotomy - refer to **Cricothyroidotomy Protocol**

Pearls/Pitfalls/Conclusion
- Currently, there is no clinically proven survival or neurological benefit from prehospital pediatric endotracheal intubation in patients under 13 years old when compared to BVM ventilations. Future-looking, there is an ongoing national study, the Pediatric Prehospital Airway Resuscitation Trial (Pedi-PART), that seeks to determine which airway strategy is the best to restore or maintain breathing in children: BVM, supraglottic, or endotracheal intubation.

Automatic Transport Ventilator (ATV) Protocol (1/2)

RETURN TO TABLE OF CONTENTS

Audience
- Paramedic

Purpose
Provide guidelines for the use of an automatic transport ventilator

Standard Guidance
Paramedics shall use automatic transport ventilators (ATV) according to the following procedures and guidelines.
1. Approval of Tucson Medical Center Base Hospital Medical Director.
2. Personnel must be properly trained in the use of the ventilator as outlined in the AzDHS guidelines and according to the provider agency, manufacturer, and this and other appropriate policies.
3. The ATV will be familiar to the paramedic and must be thoroughly trained and regularly retrained in the device's use. Such training shall occur annually and shall be documented.
4. Treatment provided and transferring physicians orders are within the paramedic's scope of practice.
5. The ATV is approved for use on patients weighing more than 16 Kg (35 lbs.)
6. The Paramedic is responsible for all airway management and must frequently reassess endotracheal tube placement. Bilateral breath sounds are to be checked after each patient movement.
7. If the ATV failure occurs and cannot be corrected, or patient's condition deteriorates due to respiratory compromise, the paramedic is to discontinue use of the ATV and initiate ventilation by bag valve mask or bag valve mask ETT and notify the Medical Direction Authority Hospital or Administrative Base Hospital of situation.
8. A non-invasive BP monitor device shall be utilized. Vital signs will be monitored and documented every 15 minutes and immediately if there is any change in patient status or adjustment of the ATV setting. Vital signs shall also include pulse oximetry, $EtCO_2$ (capnography or waveform capnography are preferred) and cardiac monitoring which shall be maintained throughout transport.

Indications
- Requiring ventilatory assistance in conjunction with advanced airway adjuncts.
- Requiring ventilatory assistance in conjunction with basic airway adjuncts.
- Requiring ventilatory assistance in conjunction with manual airway maintenance.

Contraindications
- Blunt or penetrating chest trauma that have had a needle thoracotomy, unless the patient has a chest tube in place on the affected side.
- Patients weighing less than 16 Kg. (35 lbs.)
- Pneumothorax - tension pneumothorax
- Pulmonary over-pressurization syndrome (e.g. blast injury, water ascent injury, etc.)

Automatic Transport Ventilator (ATV) Protocol (2/2)

RETURN TO TABLE OF CONTENTS

Procedure

1. Secure patient's airway using appropriate airway management techniques and according to the Airway Management Protocol.
2. Ensure the patient's airway is clear of obstructions and suction as needed.
3. Ensure that the ventilator is connected to an oxygen source, such as a portable oxygen cylinder or main ambulance oxygen source. FIO2 should be set at 100%.
4. Set appropriate ventilator setting which may include:
    i. Mode
    ii. FiO2
    iii. Tidal volume (TV)
    iv. Respiratory rate (RR)
    v. Positive end-expiratory pressure (PEEP)
5. Determine the proper ideal volume setting. This is done by determining patient's ideal body weight and multiplying it by 6-8 ml/kg. Begin with the lowest TV limit.
6. Set respiratory rate to achieve ventilation goals to avoid hyperventilation.
    a. Age ≥ 14 yrs=10
    b. Age 2-14 yrs=20
    c. Age ≤ 2 years= 25
7. Set initial PEEP at 5 cm H2O (if available)
8. Assess ventilations. Listen for bilateral lung sounds and observe for proper chest rise and fall which should appear normal and symmetrical.
9. Assess and manage airway as you would for any patient with controlled ventilation.
10. May be used with Suprglottic Airway or Endotracheal Tube.
11. If applicable, consider sedation with Midazolam for the patient following the **Medication Facilitated Intubation Protocol** dosing.
12. For Interfacility Transport Use: Follow **Sedation Interfacility Protocol**.
13. If spontaneous breathing occurs, it may be desirable to reduce the respiratory rate (RR) as long as the patient's spontaneous rate is sufficient for their age and condition and they are maintain adequate tidal volume.
14. Check O2 cylinder pressure level frequently, as this will quickly deplete a "D" cylinder.

Pearls/Pitfalls/Conclusion

- Chest rise may not appear full in patients with COPD. Do not increase TV past the upper TV limit.
- If lung sounds are absent or on one side only, remove the patient from the ATV and manually assist ventilations which ruling out airway obstructions, improper tube placement, or pneumothorax. Check all ATV settings and verify the device is operating properly.
- If chest expansion is not adequate, the rescuer should slowly increase tidal volume until chest expansion is adequate or the uppermost limit (for the patient's ideal body weight) is reached.
- If chest appears to over-expand, decrease tidal volume.
- Frequent evaluation of the patient's mental status and/or degree of agitation should be performed throughout the transport and adequate sedation should be administered per medical direction authority.

Medical Provider Maintenance Requirements

Agencies using this equipment must be certain to follow the manufacturer's instructions regarding use, maintenance, cleaning and regular testing of this device.

1. The unit must be inspected and tested after every patient use.
2. The unit must be disinfected after use unless a disposable unit is used.
3. The unit shall undergo preventative testing and maintenance by qualified personnel annually.
4. Agencies shall arrange for (at least) annual inspection and testing of the equipment by a manufactures representative (or designee). Documentation of this service shall be maintained in a service log. This record shall be kept by each agency using ATV's.

CPAP Protocol (1/2)

RETURN TO TABLE OF CONTENTS

Audience
- EMT-Basic
- Paramedic

Purpose
Provide guidelines for use of Continuous Positive Airway Pressure (CPAP) to improve ventilation and oxygenation in an attempt to avoid intubation.

Indications
- Respiratory distress or failure from suspected respiratory disease (e.g. asthma, COPD)
- Respiratory distress or failure from fluid overload (e.g. CHF)
- Near-drowning

Contraindications
- Cardiopulmonary arrest
- Depressed level of consciousness
- Inability to protect the airway
- Inability to assume an upright position
- Respiratory arrest or agonal respirations
- Signs and symptoms of pneumothorax
- Persistent nausea/vomiting
- Inability to establish a proper mask seal
- Major trauma, especially head injury with concern for increased ICP or significant chest trauma
- Facial anomalies or trauma (e.g. burns, fractures)
- Penetrating chest trauma
- Active upper GI bleed or recent history of gastric surgery
- Systolic BP below 90 mmHg, not due to heart failure, and unresponsive to fluid bolus or vasopressors
- Shock associated with cardiac insufficiency

Procedure
1. If switching patient from hospital machine, ensure you are utilizing the proper mask type for your equipment (closed vs open vented mask).
2. Ensure that you have adequate oxygen supply, considering the oxygen concentration required for the patient (O2 consumption calculation).
    a. Check O2 cylinder pressure level frequently
3. Implement treatment protocols/standing orders for underlying condition as appropriate. Administration of bronchodilators should take priority over use of CPAP in asthmatic patients; if the CPAP device allows inline bronchodilator therapy both should be initiated if indicated.
4. Position the patient in a sitting or comfortable position.
5. Apply monitors (EKG, SpO2, NIBP) and continue to assess every 5 minutes for patient deterioration and/or complications.
    a. Consider contacting medical control if the blood pressure remains below 90 mmHg and is unresponsive to fluid therapy or vasopressors before initiating CPAP
    b. Assess lung sounds before and after applying CPAP, and as feasible during transport.
6. Explain the procedure to the patient, anticipate and alleviate anxiety through verbal coaching.
7. Assemble and initiate CPAP at 5 cmH2O.
    a. Securely apply the mask, check for air leaks, and consider having the patient hold the mask before applying head straps to reduce anxiety.
    b. Gradually increase pressure by 1-2 cm H2O increments as tolerated by the patient to achieve desired oxygenation
        i. Maximum CPAP pressure is 10 cmH2O
        ii. Continuously coach the patient

CPAP Protocol (2/2)

RETURN TO TABLE OF CONTENTS

Monitoring the Patient

Most patients respond to treatment within 5-10 minutes; if there is no improvement within this timeframe, reassess for other clinical causes or issues. Re-evaluate mask seal and settings. Removal of CPAP/Bi-PAP should only occur if the patient cannot tolerate the mask, requires suction or airway intervention, experiences continued or worsening respiratory failure, or if pneumothorax is suspected. Consider intermittent positive pressure ventilation (BVM), placing a supraglottic airway, or intubation if the patient is removed from CPAP therapy.

Pearls/Pitfalls/Conclusion

- Watch for complications from CPAP, which include:
  - Hypotension
  - Pneumothorax
  - Corneal Drying
- Pulse oximetry must be used to continuously monitor patient's oxygen saturation.
- Correct CPAP pressure must be delivered at all times. The flow from the generator should always be in excess of the patients demand. Check to make sure that you feel excess flow coming out from the exhaust port of the CPAP valve at all times.
  - The CPAP valve should remain slightly open during the entire respiratory cycle.
  - The anti-asphyxia valve on the mask should not open during normal operation.
  - You should be able to feel some gas escaping from the exhalation port of the CPAP valve even during inspiration.
- Do not remove CPAP until hospital therapy is ready to be placed on patient. Watch patient for gastric distention, which can result in vomiting.
- Continuous Positive Airway Pressure has been shown to rapidly improve vital signs, gas exchange, reduce the work of breathing, decrease the sense of dyspnea, and decrease the need for endotracheal intubation in patients who suffer from shortness of breath from asthma, COPD, pulmonary edema, CHF, and pneumonia. In patients with CHF, CPAP improves hemodynamics by reducing left ventricular preload and afterload.
- **Contact Medical Direction Authority for assistance with troubleshooting as needed.**

Cricothyroidotomy Protocol (1/2)

RETURN TO TABLE OF CONTENTS

Audience
- Paramedic

Purpose
Provide guidelines for performing a cricothyroidotomy for a patient who cannot be oxygenated/ventilated with all other methods of airway management interventions and requires a definitive airway.

Indications
- Cannot intubate cannot ventilate scenarios, failure of non-surgical airway adjuncts, partial upper airway obstruction
- Surgical Cricothyroidotomy: 12 years of age and above
- Needle Cricothyroidotomy: < 12 years of age

Contraindications
- Absolute
  - Patients who can be intubated
  - Complete upper airway obstruction
  - Complete or partial tracheal transection
- Relative contraindications
  - Anterior neck trauma
  - Landmark obscuration

Procedure - Surgical Cricothyroidotomy
1. Place patient in supine position with neck in extension. You may use towel rolls under the shoulder to achieve positioning.
2. With non-dominant hand, identify cricothyroid membrane (CTM). Hold larynx in position with your thumb and middle finger on each side.
3. Clean the neck
4. Using a scalpel, make a vertical incision over the CTM, cutting through the skin and subcutaneous tissue
5. Once the CTM is identified, make a horizontal incision through the CTM
6. Carefully remove scalpel and place your index finger through the CTM to hold its place
7. Remove your finger and advance a bougie through the CTM directed towards the patient's feet
8. Pass an Endotracheal Tube (6-0) or Tracheostomy Tube (4-0 preferred) over the bougie until the balloon on the cuffed tube is no longer visible.
9. Inflate the cuffed balloon
10. Hold tube in place while removing bougie
11. Connect to BVM and ventilate at age-appropriate range
12. Confirm placement with EtCO2 device.

Procedure - Needle Cricothyroidotomy
1. Place patient in supine position with neck in extension. You may use towel rolls under the shoulder to achieve positioning.
2. With non-dominant hand, identify cricothyroid membrane (CTM)
3. Clean the neck
4. Using a 3-5 cc syringe with 1cc of sterile saline attached to a 12G to 16G catheter-over-needle, insert the needle directed toward the patient's feet at a 45 degree angle
5. Aspirate and advance needle inferiorly until loss of resistance and return of air bubbles
6. Advance the catheter over the needle until it is flush with the skin.
7. Remove needle and syringe.
8. Secure catheter in place with tape and dressing
9. Attach air delivery system

Cricothyroidotomy Protocol (2/2)

RETURN TO TABLE OF CONTENTS

Pearls/Pitfalls/Conclusion

- Watch for complications:
  - Hemorrhage
  - Subcutaneous emphysema
  - Pneumomediastinum
  - Pneumothorax
- This is a tactile procedure that must be able to be performed without visual cues due to bleeding

Medication Facilitated Intubation (MFI) Protocol (1/2)

RETURN TO TABLE OF CONTENTS

Audience
- Paramedic

Purpose
Provide guidelines for using medications to facilitate placement of invasive airway in patients who will not accept nasal or conventional oral intubation.

Indications
- Inability to tolerate laryngoscopy (e.g. gag reflex), or failure of other airway means:
  - Supraglottic airway
  - Hypoxia (Sp02 < 90 %) with failed interventions to improve oxygenation
  - Respiratory arrest that cannot be intubated due to non-flaccid state
  - Head injury with GCS ≤8 with need for definitive airway and mechanical ventilation
  - Unconsciousness or altered mental status with airway compromise of risk pulmonary aspiration
  - Potential for airway compromise due to trauma to larynx, asthma, respiratory illnesses
  - Uncontrolled seizure activity requiring airway control
  - Patients unable to protect airway

Contraindications
- Under no circumstances should MFI be used to restrain a violent or combative patient
- SBP < 90
- Age < 13 years old

Procedure
1. Take into considerations the indications, risks and alternatives to intubation.
2. Assess for difficult airway characteristics prior to intubation attempt(s)
3. Perform a brief neurological status and GCS Score. This MUST precede the administration of sedatives agents.
4. Prepare all equipment including suction, capnography, and rescue airway.
5. Place on continuous cardiac monitoring
   - **If hemodynamically unstable, call Medical Direction Authority before proceeding**
6. Pre-oxygenate with 100% FiO_2 for 5 minutes by BVM or NRB + Nasal Cannula at 15L
   - If unable to wait 5 minutes, give 4 vital capacity breaths with BVM.
7. Administer **Ketamine 1.5 mg/kg (max dose 150mg) IV/IO**
8. Perform intubation - refer to **Airway Management (13 years and older) SO**
   - If NOT successful in 15 seconds, perform BVM ventilation and reattempt. Maximum 2 attempts.
   - If unable to intubate, place OPA or supraglottic airway (SGA) and ventilate via BVM - refer to **Supraglottic Protocol SO**
   - Perform cricothyroidotomy if unable to intubate or oxygenate/ventilate via OPA/SGA and BVM despite troubleshooting.
9. Confirm placement with EtCO2 waveform capnography (Gold Standard) + 2 other methods:
   - Observe chest rise and fall
   - Auscultate for lung sounds and no epigastric sounds
10. Ventilate at age appropriate rate. **Goal EtCO2 = 35-45**
11. Consider Post Intubation Sedation with **Midazolam 0.1 mg/kg (max initial dose 5mg) IV/IO**, may repeat after 10 minutes up to max TOTAL dose of 10 mg.
    - Do NOT give if patient is hypotensive, as Midazolam can cause hypotension
    - **If more sedation is needed, you must call Medical Direction Authority.**
12. Reassess the patient every 5 minutes: BP, HR, RR, O2, EtCO2
13. Check tube placement after each patient move.

Medication Facilitated Intubation (MFI) Protocol (2/2)

RETURN TO TABLE OF CONTENTS

Documentation

Documentation will be completed on the Prehospital Patient Care Report (PCR)/ (EPCR). The PCR or the patient's incident number must be forwarded to your agency's EMS Coordinator and Base Hospital Medical Direction **within 24 hours**.

- In addition to complete documentation of patient assessment and care, specific areas to be addressed on the PCR/ePCR will include but not be limited to:
  - MFI indications
  - Description of airway condition (clear, vomitus, blood, etc.)
  - Documentation of pre-oxygenation with the oxygen saturations
  - All drugs used, including doses and times administered
  - Document reasons for repeat doses of medications
  - Vital signs every five (5) minutes post medication administration
  - Number of intubation attempts (pre and post use of sedation)
  - Tube size, depth of endotracheal tube insertion and method used for securing the endotracheal tube
  - Oxygen saturation levels during procedure
  - Three (3) methods used for tube verification.
  - Documentation of reverification of tube placement during transport and methods used
  - Documentation of ECG monitor strip before and after intubation
  - Documentation of key events as noted on continuous monitoring during transport
  - Status of ETT at turnover at receiving facility or air medical and after each patient movement
  - Name of Provider patient was transferred to

Supraglottic Protocol (1/2)

RETURN TO TABLE OF CONTENTS

Audience
- EMT-Basic (STR)
- Paramedic

Purpose
Provide guidelines for the use of supraglottic airway device for airway management. The TMC Base Hospital Program recommends the use of the i-gel® supraglottic airway device. Use of other supraglottic devices will require direct approval from Medical Director.

Indications
- Respiratory distress
- Respiratory failure
- Apnea

Contraindications
- Responsive patients with intact gag reflex
- Known esophageal disease
- Known or suspected ingestion of caustic substances

Procedure
1. Select the correct i-gel size, based on patient weight
2. Open the i-gel package, and on a flat surface take out the protective cradle containing the device.
3. Remove the i-gel and transfer it to the palm of the same hand that is holding the protective cradle, supporting the device between the thumb and index finger.
4. Place a small bolus of a water-based lubricant, such as K-Y Jelly, onto the middle of the smooth surface of the protective cradle in preparation for lubrication.
5. Grasp the i-gel with the opposite (free) hand along the integral bite block and lubricate the back, sides and front of the cuff with a thin layer of lubricant.
6. Place the i-gel back into the protective cradle in preparation for insertion.
7. Remove the i-gel from the protective cradle. Grasp the lubricated i-gel firmly along the integral bite block. Position the device so that the i-gel cuff outlet is facing towards the chin of the patient. The patient should be in the 'sniffing' position with head extended and neck flexed. This can be achieved with assistance of towel rolls. The chin should be gently pressed inferiorly before proceeding. Introduce the leading soft tip into the mouth of the patient in a direction towards the hard palate.
8. Glide the device downwards and backwards along the hard palate with a continuous but gentle push until a definitive resistance is felt.
    i. The tip of the airway should be located into the upper esophageal opening and the cuff should be located against the laryngeal framework.
    ii. The incisors should be resting on the integral bite-block.
9. Confirm placement with EtCO2 waveform capnography (Gold Standard)
10. i-gel should be taped down from 'maxilla to maxilla' or secured with approved securing device.
11. If required, an appropriate size nasogastric tube may be passed down the gastric channel.

i-gel size	Patient Size	Patient weight guidance (kg)
1	Neonate	2-5kg
1.5	Infant	5-12kg
2	Small paediatric	10-25kg
2.5	Large paediatric	25-35kg
3	Small adult	30-60kg
4	Medium adult	50-90kg
5	Large adult	90+kg

i-gel size	Maximum size of Nasogastric Tube (FG)
1	N/A
1.5	10
2	12
2.5	12
3	12
4	12
5	14

Supraglottic Protocol (2/2)

RETURN TO TABLE OF CONTENTS

Pearls/Pitfalls/Conclusion

- THE AIRWAY IS CONSIDERED UNSECURE
  - Intubation of the trachea cannot be ruled out as a potential. The i-gel does not protect the airway from the effects of regurgitation and aspiration. High airway pressures may divert gas either to the stomach or to the atmosphere.
  - Intubation of the trachea cannot be ruled out as a potential complication of the insertion of the i-gel.
- After placement, perform standard checks for breath sounds and utilize an appropriate carbon dioxide monitor as required by protocol.
- i-gel must be lubricated according to the instructions for use. Avoid blockage of the ventilation apertures with lubricant or aspiration of the lubricant.
- i-gel is not intended for reuse.
- Excessive air leak during manual ventilation is primarily due to sub-optimal depth of i-gel insertion.
- As with all supraglottic airways, it is important to ensure the correct size of device is used, lubrication is optimal, the device is inserted and positioned correctly and regularly checked intraoperatively in order to reduce the potential for nerve damage, tongue numbness, cyanosis and other potential complications.
- Sometimes a feel of 'give-way' is felt before the end point resistance is met. This is due to the passage of the bowl of the i-gel through the faucial pillars (pharyngo-epiglottic folds).
- Once resistance is met and the teeth are located on the integral bite block, do not repeatedly push i-gel down or apply excessive force during insertion.
- No more than three attempts in one patient.
- Use a bougie if an exchange from SGA to ETT is needed.
- A horizontal line (Adult sizes 3,4 and 5 only) at the middle of the integral biteblock represents the correct position of the teeth. If the teeth are located lower than the distal tip of the bite block, then it is likely the device has been incompletely inserted. In this instance, remove the i-gel and reinsert with a gentle jaw thrust applied by an assistant. If that does not resolve the problem, use one size smaller i-gel.
- Do not use the gastric channel if:
  - There is an excessive air leak through the gastric channel.
  - There are esophageal varices or evidence of upper gastro-intestinal bleed.
  - In cases of esophageal trauma.
  - There is a history of upper gastro-intestinal surgery.
  - The patient has bleeding/clotting abnormalities.
- Things to include in Documentation:
  - Evidence of respiratory distress without gag reflex.
  - Successful insertion of i-gel.
  - Size used.
  - Note patient respiratory status post- insertion.

Tracheostomy Protocol

RETURN TO TABLE OF CONTENTS

Audience
- EMT-Basic
- Paramedic

Purpose
Provide guidelines for the care of tracheostomy tube and patients with respiratory distress. Tracheostomies may be present due to birth defect, surgical complications, trauma, or other medical condition (e.g. failure to thrive, bronchial or pulmonary dysplasia, muscular weakness/dystrophy). Signs of distress may include nasal flaring, accessory muscle usage, attempts to cough, copious secretions, decreased or abnormal lung sounds, AMS, or cyanosis.

Indications
- Respiratory distress
- Respiratory failure
- Apnea

Contraindications
- Reinsertion: ≤ 7 days since stoma creation

Procedure
1. Assess ABCs
2. Place on continuous cardiac monitoring, including SpO2 and EtCO2 monitoring.
3. Assess tracheostomy tube and look for reversible causes of distress
    a. Think “DOPE”
        i. D = Dislodged/displaced/disconnected
        ii. O = Obstruction
        iii. P = Pneumothorax
        iv. E = Equipment failure (e.g. ventilator, O2 supply)
4. Initiate high-flow O2 via NRB or blow-by over tracheostomy
5. Assist ventilations via BVM as needed
6. Suction if unable to ventilate
    a. If tube has a cannula, remove the cannula prior to suctioning
7. Upgrade to ALS treatment:
    a. **[Paramedic only]** Remove tracheostomy tube and attempt to ventilate via BVM
    b. **[Paramedic only]** If it has been > 7 days since time of initial stoma creation, intubate through the stoma towards the feet with either another tracheostomy tube (if available from caregivers) or an appropriately sized Endotracheal Tube
        i. Consider using a Bougie to assist with exchange
        ii. Allow no longer than 30 seconds for the procedure
8. Confirm placement with EtCO2 monitoring. Assess for subcutaneous emphysema.

Pearls/Pitfalls/Conclusion
- Always talk to family/caregivers as they have specific knowledge and skills
- Use patients equipment if available and functioning properly
- Estimate suction catheter size by doubling the inner tracheostomy tube diameter and rounding down
- Suction depth: Ask family/caregiver. No more than 3-6 cm typically.
- Do not suction more than 10 seconds each attempt and pre-oxygenate before and between attempts.
- DO NOT force suction catheter. If unable to pass, then tracheostomy tube should be changed.
- **Only safe to reinsert tracheostomy tube if >7 days since initial stoma creation**