

# JOINT TRAUMA SYSTEM CLINICAL PRACTICE GUIDELINE (JTS CPG)



## Airway Management of Traumatic Injuries

To optimize the airway management for patients with traumatic injury in the operational medical treatment facility environment.

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**01 Sep 2023 Update: DEVICE data regarding video laryngoscope.**

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## BACKGROUND

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Airway obstruction was the second most common cause of potentially survivable death in all US combat casualties from October 2001 to June 2011. Thus, airway management is often a critical early step in the resuscitation of the severely injured trauma patient. Identifying harbingers of a potentially difficult airway, having knowledge of a difficult airway algorithm, and understanding the proper utilization of alternative airway devices will allow for a pre-planned strategy for successful airway management.

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## SIGNIFICANT CHANGES

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Refer to in [Appendix A](#) for Trauma Airway Assessment guidance and [Appendix B](#) for Difficult Airway Management.

1. Ketamine is the first line agent for Rapid Sequence Intubation (RSI).
2. Apply principles of Apneic Oxygenation.
3. Utilize device name rather than brand-name wherever possible.
4. Eliminate blind nasal intubation. Anticipate fiber optic guidance if available.
5. Use waveform or digital capnography as primary tool to verify tube placement if available.
6. Remove recommendation for use of an intubating Laryngeal Mask Airway.
7. Offer surgical cricothyroidotomy or tracheostomy as surgical airway options.
8. Optimize RSI and Intubation Pathway for all patients. Separate Traumatic Brain Injury (TBI) algorithm not required.
9. Include specific pediatric recommendations.
10. Trauma airway management should be rehearsed with your trauma team on a regular basis to include role assignments and familiarization with difficult airway management and surgical airway equipment.

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## PERFORMANCE IMPROVEMENT (PI) MONITORING

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### POPULATION OF INTEREST

- All patients who received ETT/cricothyroidotomy/supraglottic airway/NPA
- All patients with compromised airway (initial GCS < 8 or AIS head and neck ≥ 3 or AIS face ≥ 3, arrival/transport or initial ED SpO<sub>2</sub> < 90%, arrival/transport or initial ED ETCO<sub>2</sub> > 50).

### INTENT (EXPECTED OUTCOMES)

- All injured patients who present with obtundation (GCS<8), apnea, respiratory distress or insufficiency, airway obstruction, or impending airway loss will have a secure and definitive airway established expeditiously upon arrival to a Role 2 or Role 3.
- SpO<sub>2</sub> is maintained between ≥ 90% and 96%. SpO<sub>2</sub> >96% is not necessary.

## PERFORMANCE/ADHERENCE METRICS

1. Number and percentage of patients in the population of interest who had a secure and definitive airway (endotracheal tube, cricothyroidotomy, tracheostomy) established or verified on arrival to Role 2 or 3, or documentation of appropriate intervention.
2. Number and percentage of patients in the population of interest with initial ED SpO<sub>2</sub> < 90%, < 80%, <70%, <60%.
3. Number and percentage of patients who had definitive airway (endotracheal tube, cricothyroidotomy, tracheostomy) with ETCO<sub>2</sub> documented at the same role of care where the procedure is done.

## DATA SOURCE

- Patient Record
- Department of Defense Trauma Registry (DoDTR)

## SYSTEM REPORTING & FREQUENCY

The above constitutes the minimum criteria for PI monitoring of this CPG. System reporting will be performed annually; additional performance improvement monitoring and system reporting may be performed as needed.

The system review and data analysis will be performed by JTS Chief and the JTS PI Branch.

## RESPONSIBILITY

It is the trauma team leader's responsibility to ensure familiarity, appropriate compliance and PI monitoring at the local level with this CPG.

### All Health Care Providers

1. Will be familiar with the guidelines for performance of trauma airway management.
2. Will be familiar with the guidelines for performance of rapid sequence intubation.
3. Will be familiar with alternative airway devices mentioned in guidelines for trauma airway management.
4. Will provide feedback and suggested CPG changes to the JTS Chief and/or Program Manager.

### The Chief, Emergency/Anesthesia/Surgery

At each Level III facility, the chief will coordinate with the JTS Chief on the appropriateness of the guidelines being used and provide input for updates on an as needed basis.

### The JTS Chief

1. Will be the subject matter expert on the trauma airway management CPG to be used in the US Central Command Area of Responsibility.
2. Will review annually and update the CPG as needed.

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## REFERENCES

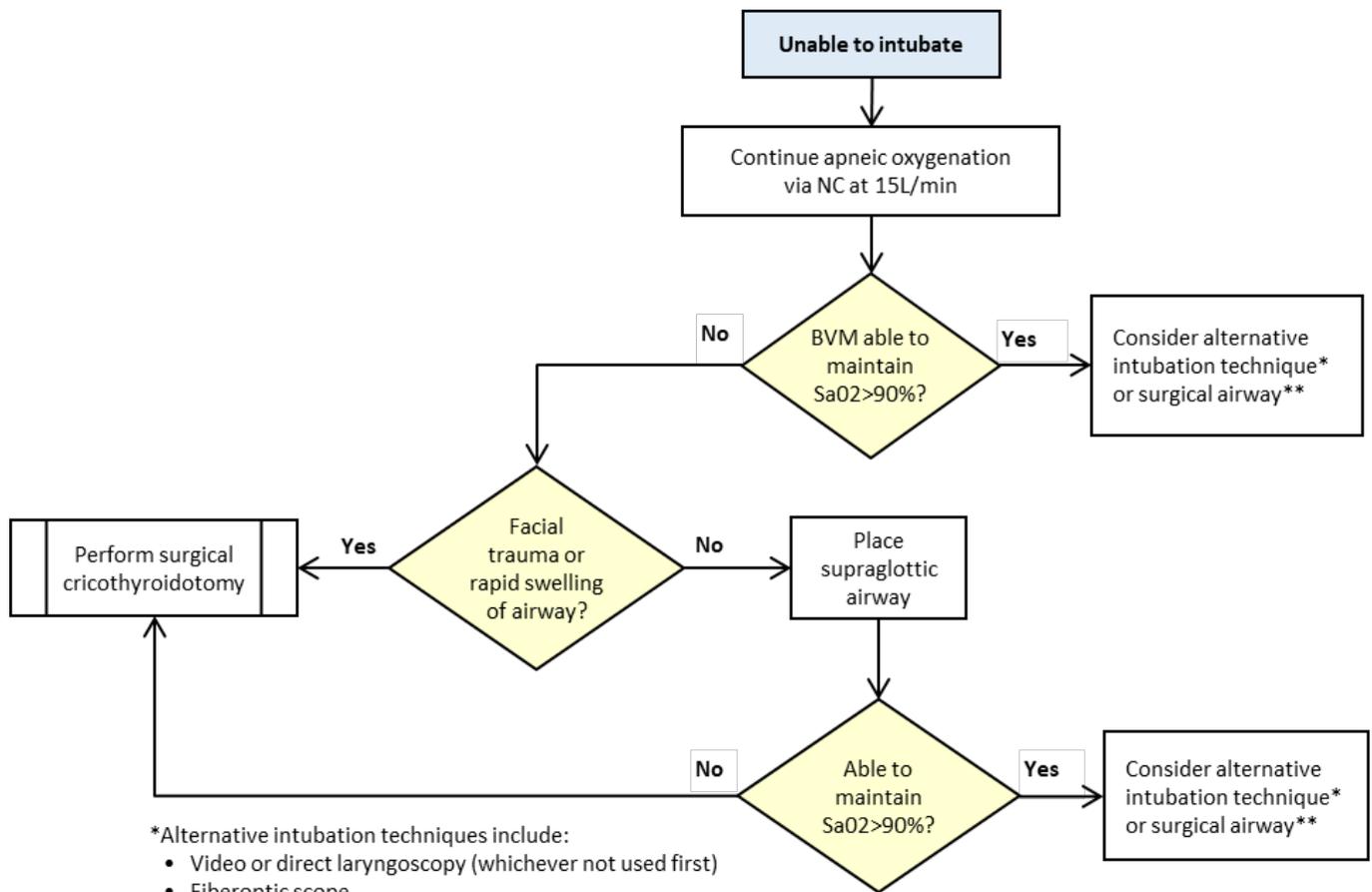
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## APPENDIX A : TRAUMA AIRWAY ASSESSMENT

Trauma Airway Management		
Airway Assessment		
<ul style="list-style-type: none"> <li>All trauma airways are potentially high-risk. Anticipate a difficult airway.</li> <li>Identify critical team members and verbalize role assignments.</li> <li>Initiate pre-oxygenation (1,2).</li> <li>Consider Ketamine (0.5-1.0 mg/kg IV/IO) for delayed sequence intubation if combative or otherwise uncooperative patient (3,4,5).</li> <li>Recall that the neutral position ("C-spine stabilization") degrades the laryngoscopic view.</li> </ul>		
Rapid Sequence Induction (RSI) and Intubation Pathway		
<p><b>1. Confirm equipment availability and function.</b> IV/IO, suction, self-inflating bag and mask, oxygen source, laryngoscope- video (preferred) or direct (if video not available) (5, 20), ETT with stylet and/or gum elastic bougie, oral &amp; nasal airways, surgical airway kit, drugs, CO2 detector, monitors, other rescue equipment</p> <p><b>2. Pre-Oxygenate (Denitrogenate) the lungs (1,2,6)</b></p> <ul style="list-style-type: none"> <li>Prolongs tolerance of apneic period</li> <li>Goal is ≈ 3 minutes of tidal volume breathing at 90% FIO<sub>2</sub>.</li> <li>With standard reservoir facemask set flow rate of oxygen as high as possible</li> <li>Recommend augmenting with nasal cannula at 15L/min oxygen in preparation for apneic oxygenation, leave in situ throughout procedure (2,8)</li> <li>Elevate head of bed if not contraindicated.</li> </ul> <p><b>3. Maintain cervical spine stabilization.</b></p> <p><b>4. Remove front of cervical collar</b></p> <p><b>5. Consider cricoid pressure simultaneous w/ medication administration (9,10)</b></p> <p><b>6. Administer medications :</b> Initiate RSI</p> <p><b>Sedative/hypnotic</b></p> <ul style="list-style-type: none"> <li>Ketamine (1<sup>st</sup> Line): 2 mg/kg IV/IO</li> <li>Etomidate (2<sup>nd</sup> Line): 0.3 mg/kg IV/IO</li> </ul> <p>Unstable patients require reduced dosage of induction agent.</p>	<p><b>Neuromuscular Blockade</b></p> <ul style="list-style-type: none"> <li>Rocuronium: 1.2 mg/kg IV/IO or</li> <li>Vecuronium: 0.1 mg/kg IV/IO or</li> <li>Succinylcholine: 1.5 mg/kg IV/IO</li> </ul> <p><b>7. Perform laryngoscopic tracheal intubation.</b></p> <ul style="list-style-type: none"> <li>Following onset of neuromuscular blockade</li> <li>Recommend gum elastic bougie as primary ETT stylet.</li> </ul> <p><b>8. If laryngoscopic view is poor:</b></p> <ul style="list-style-type: none"> <li>Apply external laryngeal manipulation technique(s)</li> <li>Consider alternative visualization method or Supraglottic airway device.</li> </ul> <p><b>9. Confirm tracheal intubation.</b></p> <ul style="list-style-type: none"> <li>Visualize tube passing between the vocal cords (First Line)</li> <li>Wave form or digital capnography when available (Second Line)</li> <li>Easy chest rise, equal axillary breath sounds/absence of gastric insufflation, CO<sub>2</sub> Calorimeter, and "fog" in ETT</li> <li>Esophageal detector bulb or fiber optic confirmation during cardiac arrest</li> </ul> <p><b>10. Provide continuing care IAW Anesthesia CPG</b></p>	
Recommendations for Pediatric Patients		
		<ol style="list-style-type: none"> <li>Train to expect pediatric patients. Have a dedicated pediatric airway cart, including Broselow tape or equivalent.</li> <li>Pre-dose with atropine IV/IO (0.02mg/kg, minimum dose 0.1mg, maximum dose 0.5mg) in all &lt;1 years old, those &lt;5 who are receiving succinylcholine, and in all who receive a 2nd dose of succinylcholine.</li> <li>Induction - <ul style="list-style-type: none"> <li>Ketamine (first line) 2mg/kg IV/IO</li> <li>Etomidate (second line) 0.3mg/kg IV/IO</li> </ul> </li> <li>Neuromuscular blockade - <ul style="list-style-type: none"> <li>Succinylcholine 1.5mg/kg IV/IO (2mg/kg &lt;5 years old) or</li> <li>Rocuronium 1mg/kg IV/IO</li> </ul> </li> <li>Avoid surgical airway in &lt;12 years old - use needle cricothyroidotomy (12-14 gauge), tracheostomy preferred over surgical cricothyroidotomy</li> </ol>
Unable to Intubate: Can You Mask Ventilate?		
<p><b>Mask Ventilation Pearls</b></p> <ul style="list-style-type: none"> <li>Skilled operator</li> <li>Good seal</li> <li>Jaw thrust</li> <li>Oral airway</li> <li>Nasal airway(s)</li> <li>Two operator mask ventilation</li> </ul>	<p><b>YES</b></p>	<ul style="list-style-type: none"> <li>Improve position, change blade/operator, laryngeal manipulation technique, gum elastic bougie.</li> <li>Attempt alternate technique: Fiber optic, video laryngoscope, tracheal trans illumination device.</li> <li>More than ≈ 3 attempts at intubation may abolish your ability to mask ventilate due to edema caused by laryngoscopy.</li> <li>Surgical airway (Cricothyroidotomy or tracheostomy)</li> </ul>
	<p><b>NO</b></p>	<ul style="list-style-type: none"> <li>Emergency pathway...seconds matter.</li> <li>Supraglottic airway or</li> <li>Surgical cricothyroidotomy</li> </ul>

**APPENDIX B: DIFFICULT AIRWAY MANAGEMENT ALGORITHM**



\*Alternative intubation techniques include:

- Video or direct laryngoscopy (whichever not used first)
- Fiberoptic scope
- Transtracheal illumination device
- Retrograde wire with Magill forceps
- Changing providers

\*\*Surgical airway includes both tracheostomy and surgical cricothyroidotomy will be performed.

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**APPENDIX C: ADDITIONAL INFORMATION REGARDING OFF-LABEL USES IN CPGS**

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**PURPOSE**

The purpose of this Appendix is to ensure an understanding of DoD policy and practice regarding inclusion in CPGs of “off-label” uses of U.S. Food and Drug Administration (FDA)–approved products. This applies to off-label uses with patients who are armed forces members.

**BACKGROUND**

Unapproved (i.e., “off-label”) uses of FDA-approved products are extremely common in American medicine and are usually not subject to any special regulations. However, under Federal law, in some circumstances, unapproved uses of approved drugs are subject to FDA regulations governing “investigational new drugs.” These circumstances include such uses as part of clinical trials, and in the military context, command required, unapproved uses. Some command requested unapproved uses may also be subject to special regulations.

**ADDITIONAL INFORMATION REGARDING OFF-LABEL USES IN CPGS**

The inclusion in CPGs of off-label uses is not a clinical trial, nor is it a command request or requirement. Further, it does not imply that the Military Health System requires that use by DoD health care practitioners or considers it to be the “standard of care.” Rather, the inclusion in CPGs of off-label uses is to inform the clinical judgment of the responsible health care practitioner by providing information regarding potential risks and benefits of treatment alternatives. The decision is for the clinical judgment of the responsible health care practitioner within the practitioner-patient relationship.

**ADDITIONAL PROCEDURES****Balanced Discussion**

Consistent with this purpose, CPG discussions of off-label uses specifically state that they are uses not approved by the FDA. Further, such discussions are balanced in the presentation of appropriate clinical study data, including any such data that suggest caution in the use of the product and specifically including any FDA-issued warnings.

**Quality Assurance Monitoring**

With respect to such off-label uses, DoD procedure is to maintain a regular system of quality assurance monitoring of outcomes and known potential adverse events. For this reason, the importance of accurate clinical records is underscored.

**Information to Patients**

Good clinical practice includes the provision of appropriate information to patients. Each CPG discussing an unusual off-label use will address the issue of information to patients. When practicable, consideration will be given to including in an appendix an appropriate information sheet for distribution to patients, whether before or after use of the product. Information to patients should address in plain language: a) that the use is not approved by the FDA; b) the reasons why a DoD health care practitioner would decide to use the product for this purpose; and c) the potential risks associated with such use.