Respiratory - Airway: AIRWAY OBSTRUCTION - PEDIATRIC Practice Guideline

**Patient Care Goals:**
1. Provide effective oxygenation and ventilation
2. Recognize and alleviate airway obstruction and respiratory distress
3. Identify a potentially difficult airway in a timely fashion

**Patient Presentation:**

**Inclusion Criteria**
1. Signs of severe respiratory distress/obstruction
2. Signs of hypoxemia or hypoventilation
3. Stridor
4. Stridor from presumed foreign body airway obstruction in child less than one year of age

**Exclusion criteria**
- Chronically ventilated patients
- Newborn patients (see Newborn care protocol)

**Back Blows/Chest Thrusts/Abdominal Thrusts**
Continue until airway is cleared or patient loses consciousness.

**Quality Improvement:**
Key Documentation Elements
1. Interventions, number of attempts
2. Scene time if load and go scenario

**Patient Safety Considerations**
Ongoing assessment is critical
If unable to clear airway obstruction, unable to oxygenate, unable to ventilate, transport immediately to the nearest ED.

**NOTES:**
- Abdominal thrusts are no longer indicated in unconscious patients.
- If unable to clear patient's airway, continue attempts to remove/ventilate and begin immediate transport to the closest most appropriate ED.
- King LT-D insertion is not indicated in respiratory distress secondary to airway obstruction.
Caregiver reports any signs/symptoms of ALTE:
- skin color change (pale, cyanotic, blue)
- Decreased muscle tone (floppy)
- Any episode of apnea regardless of duration
- Baby required vigorous stimulation to arouse
- Bystander administered CPR

Patient is < 90 days old?
- No
  - Patient symptomatic OR with abnormal age appropriate vital signs?
    - No
      - Provide age appropriate care
      - Transport
    - Yes
      - Confirm MED unit has been dispatched

Patient is < 90 days old?
- Yes

Determine blood sugar level
- Patient is < 90 days old?
  - Yes
    - Provide age appropriate care
    - Transport
  - No
    - Monitor ECG
    - Monitor pulse ox
    - Contact medical control as necessary
    - Provide age appropriate care
    - Transport

NOTES:
- Consider:
  - Respiratory infection
  - GI reflux
  - Seizure
  - Premature birth
  - Drug exposure
  - Shaken baby syndrome (child abuse)
  - Cardiac arrhythmia
Patient Care Goals:
1. Maintain adequate perfusion
2. Restore regular sinus rhythm, correct rhythm disturbance if unstable
3. Search for underlying cause (hypoxia, shock, second or third degree AV block, toxin exposure)

Patient Presentation:
May present with symptoms such as diaphoresis, dyspnea, chest pain, syncope/faint, hypotension, altered mental status

Inclusion Criteria:
Heart rate <60

Exclusion Criteria:
No specific recommendations

Epinephrine:
0.01 mg/kg IV/IO q 3-5 min. Repeat as symptoms persist or decompensate
Atropine 0.02 mg/kg (min of 0.1 mg single dose max of 0.5 mg single dose)

Transcutaneous pacing (TCP):
Place pads AP position.
Set pacer to fixed mode, Rate 70, output 50mA
Determine electrical capture and mechanical capture (right sided pulses), increase rate by 5 and/or output by 10mA to ensure/maintain capture

Quality Improvement:
Key Documentation Elements:
1. Heart rate and rhythm changes
2. Interventions
3. Mental status and signs of instability

Patient Safety Considerations:
If pacing is performed, consider sedation/pain control
Routine use of lights and sirens is not recommended during transport unless hemodynamically unstable

Assess appropriateness for clinical condition
Heart rate typically <60/min if bradycardia

Identify and treat underlying cause
IV/IO access
ECG to identify rhythm

Persistent bradycardia causing hypotension?
Acuteely altered mental status?
Signs of shock or poor perfusion?
No to all
Monitor and observe

Yes to any
Oxygenation and BVM Ventilation
PRN for 30 seconds
Symptoms improve

Symptoms continue
CPR if Heart Rate remains < 60/min
30 seconds

Bradycardia persists?
Yes

CPR
Epinephrine

Still no response or if pulseless arrest develops, go to pediatric cardiac arrest algorithm

OUMC
Consider Atropine for AV block or TCP if bradycardic pulse still present
Respiratory - Airway: BRONCHIOLITIS: Medical Protocol

Patient Care Goals:
1. To alleviate respiratory distress
2. To promptly identify respiratory distress, failure, and/or arrest, and intervene for patients who require escalation of therapy
3. To deliver appropriate therapy by differentiating other causes of pediatric respiratory distress
4. Score - Suction Score...

Patient Presentation:
Inclusion Criteria
- Child < age 2 with wheezing or diffuse rhonchi usually in setting of respiratory infection; usually first time wheezing illness

Exclusion Criteria
- Anaphylaxis
- Croup
- Esophagitis
- Foreign body aspiration
- Submersion/drowning

Use of nebulized epinephrine:
- Bronchiolitis Severity Score (BSS) ≥ 10

Nebulized Epinephrine:
- 2.5 mL of epinephrine 1:10000 nebulized over 15 minutes

Quality Improvement:
- Key Documentation Elements
  1. Respiratory rate
  2. Oxygen saturation
  3. Use of accessory muscles
  4. Breath sounds
  5. Air entry
  6. Mental status
  7. Color
  8. Bronchiolitis Severity Score

Patient Safety Considerations:
- Routine use of lights and sirens is not recommended during transport unless severe or refractory to EMS interventions

Inclusion Criteria: Paramedic Judgement

- Likely Bronchiolitis
  - Apply Bronchiolitis Severity Score
  - Supplement oxygen to keep saturation > 93%
  - Frequent and aggressive suction especially nasal bulb syringe
  - Re-assess Bronchiolitis Severity Score
  - Frequent and aggressive suction especially nasal bulb syringe
  - Severe only
  - Nebulized Epinephrine ONLY if severe BSS ≥ 10
  - BVM 100% oxygen if respiratory failure

IV/IO normal saline bolus 20 mL/kg if poor perfusion
Repeat x 1 if no improvement
**Respiratory - Airway: BRONCHIOLITIS: Medical Protocol**

**Modified Bronchiolitis Severity Score (≥10 is considered severe)**

<table>
<thead>
<tr>
<th></th>
<th>Normal (0)</th>
<th>Mild (1)</th>
<th>Moderate (2)</th>
<th>Severe (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory Rate</strong></td>
<td>&lt;40</td>
<td>40-50</td>
<td>50-60</td>
<td>&gt;60</td>
</tr>
<tr>
<td><strong>SaO2 % RA</strong></td>
<td>≥97%</td>
<td>96-94%</td>
<td>93-90%</td>
<td>&lt;90%</td>
</tr>
<tr>
<td><strong>General Appearance</strong></td>
<td>Calm</td>
<td>+ Irritable</td>
<td>++Irritable</td>
<td>+++ Irritable</td>
</tr>
<tr>
<td><strong>Calm/Console</strong></td>
<td></td>
<td>Easy to console</td>
<td>Difficult to console</td>
<td>Unable to console</td>
</tr>
<tr>
<td><strong>Retractions (SS, IC, SC)</strong></td>
<td>None</td>
<td>Subcostal</td>
<td>Intercostal</td>
<td>Supraclavicular, Suprasternal, or Paradoxical</td>
</tr>
<tr>
<td><strong>Nasal Flaring (NF)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Auscultation</strong></td>
<td>Clear</td>
<td>Scattered end expiratory wheeze or crackles</td>
<td>Diffuse expiratory wheeze or crackles</td>
<td>Insp/Exp wheeze or crackles; poor air movement; grunting</td>
</tr>
</tbody>
</table>
Patient Care Goals:
1. Return of Spontaneous Circulation (ROSC)
2. Preservation of neurologic function

Patient Presentation:
Inclusion Criteria:
Pediatric patient without palpable pulses

Exclusion Criteria:
Patients with valid DNR/POLST order
Obvious death as defined as: decapitation, rigor mortis, dependent lividity, decomposition, full thickness burns >90% of body, hypothermia with rigid airway or ice formation in airway

Obvious traumatic etiology (see Traumatic Cardiac Arrest practice guideline)

Defibrillation:
Anterolateral pad placement, biphasic dose 2 J/kg first shock; 4 J/kg subsequent shocks to maximum single shock dose of 200 Joules
Resume compressions immediately after shock

Refactory Vfib/Vtach (defined as persistent rhythm not responding to loading dose of amiodarone, and 3 defibrillation attempts from any device):
Limit Epinephrine to 3 doses while refractory.
Apply second pad in the anterior/posterior orientation and deliver remaining shocks in this orientation.

Medications:
Epinephrine 1:10,000, 0.01 mg/kg (max of 1 mg per dose) q3-5 min IV/IO
Amiodarone IV/IO, 5 mg/kg bolus; may repeat same bolus dose after 8-10 min.
NS bolus 20 mL/kg pressure bag over 5 mins; repeat X 1 if no ROSC.

Advanced Airway:
King airway

Quality Improvement:
Push hard (> 1/3 AP diameter of chest) and fast (100-120/min).
Minimize interruptions in compressions.
Rotate compressors every 2 minutes.
Avoid excessive ventilation (1 breath every 6 seconds).
Capnography.

Key Documentation elements:
Times of resuscitation and all interventions
Witnessed? Bystander CPR?
Initial rhythm shockable/first monitored rhythm?
Any ROSC?

TOR/10-99 criteria with OLMC
OLMC should be involved with TOR decision; factors likely to favor TOR include:
- Cardiac arrest not witnessed by EMS Provider
- Continuous asystole throughout resuscitation attempt
- Not believed related to environmental hypothermia
- Patent airway
- High quality CPR
- 15 minute resuscitation effort EtCO2 10 mmHg or less
- Clinical death exam positive

Safety Considerations:
Transport of patients with ongoing resuscitation may arise in certain circumstances such as submersion, thoracic penetrating trauma arrest, or refractory Vfib/Vtach; a mechanical CPR device is encouraged.

Pediatric Medical Cardiac Arrest
Universal Care

Valid DNR/POLST order or obvious death?
Yes
No

1 Start CPR
Attach monitor/Defibrillator
Oxygen: BVM/OPA/NPA

2 Shockable rhythm?
Yes
No

3 Shock

4 CPR 2 min
IV/IO access

5 Shockable rhythm?
Yes
No

6 Shock

7 CPR 2 min
Epinephrine q 3-5 min
Advanced airway
Capnography

8 Shockable rhythm?
Yes
No

9 CPR 2 min
IV/IO access
Epinephrine q 3-5 min
Advanced airway
Capnography

10 Shockable rhythm?
Yes
No

11 CPR 2 min
Treat reversible causes

If no signs of ROSC, go to 10 or 11
TOR/10-99 with OLMC only
If ROSC, go to Post Cardiac Arrest Care

Call early OLMC immediately if unclear DNR/POLST or if patient pregnant >20 weeks.
Contact OLMC after beginning aggressive resuscitation. Do not delay initial resuscitation.
**Croup Severity Score on next page**
**Modified Croup Severity Score (4 is moderate croup severity)**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Level of Consciousness</strong></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>0</td>
</tr>
<tr>
<td>Disoriented</td>
<td>5</td>
</tr>
<tr>
<td><strong>Cyanosis</strong></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>With Agitation</td>
<td>4</td>
</tr>
<tr>
<td>At Rest</td>
<td>5</td>
</tr>
<tr>
<td><strong>Stridor</strong></td>
<td></td>
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<tr>
<td>None</td>
<td>0</td>
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<tr>
<td>With Agitation</td>
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</tr>
<tr>
<td>At Rest</td>
<td>2</td>
</tr>
<tr>
<td><strong>Air Entry</strong></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>0</td>
</tr>
<tr>
<td>Decreased</td>
<td>1</td>
</tr>
<tr>
<td>Markedly Decreased</td>
<td>2</td>
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<tr>
<td><strong>Retractions</strong></td>
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</tr>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Mild</td>
<td>1</td>
</tr>
<tr>
<td>Moderate</td>
<td>2</td>
</tr>
<tr>
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<td>3</td>
</tr>
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</table>
**Patient Care Goals:**
1. Provide routine care to the newborn infant
2. Perform a neonatal assessment
3. Rapidly identify newborn infants requiring resuscitative efforts
4. Provide appropriate interventions to minimize distress in the newborn infant
5. Recognize the need for additional resources based on patient condition and/or environmental factors

**Patient Presentations:**
- Inclusion Criteria
- Exclusion Criteria
  - Documented gestational age <20 weeks (if any doubt about accuracy of gestational age, initiate resuscitation)

**Oxygen administration:**
- Provide blow-by oxygen as needed
- BVM with room air at 40-60 breaths/min
- Primary indicator of effective ventilations is HR
- If no improvement after 90 seconds on room air, increase oxygen to 100% FiO2 until HR normalizes

**Chest Compressions:**
- Two-thumb-indicating hands technique is preferred
- Coordinate compressions and BVM (3:1 ratio; 90 compressions and 30 breaths per minute)

**Target Productual (Ft. hand) O2 saturation after birth:**
- 1 min: 60-90%
- 5 min: 80-85%
- 10 min: 85-90%

**Epinephrine:**
- 0.01 mg/kg max of 1mg; may repeat q3 to 5 mins PRN

**Quality Improvement:**
- Key Documentation Elements
  - Date and time of birth
  - History (present, birth/delivery complications)
  - Estimated gestational age
  - HR (precordium, brachial, or umbilical stump)
  - Muscle tone, appearance, color, APGAR
  - Interventions

**Patient Safety Considerations:**
- Hypothermia is common, ensure heat retention at all times by drying thoroughly, wrapping in dry cloth if stable and not impeding care, skin to skin warming
- Routine use of lights and shiners is not recommended during transport unless hemodynamically unstable

- **Term Gestation? Good tone? Breathing or crying?**
  - Yes
  - Warm and maintain normal temperature, position airway, clear secretions if needed, dry, stimulate by heel taps or back rub

- **Apnea or grunting? HR below 100/min?**
  - No
  - Warm and maintain normal temperature, position airway, clear secretions
  - Dry patient
  - Ongoing evaluation
  - Transport

- **Yes**
  - BVM
  - Pulse ox right hand, monitor
  - Consider ECG monitor

- **HR below 100/min?**
  - No
  - Assess chest movement
  - Ventilation corrective steps if needed

- **HR below 60/min?**
  - Yes
  - Advanced Airway and BVM with 100% O2
  - Start CPR
  - ECG monitor
  - Consider I/D access

- **HR still below 60/min?**
  - No
  - Epinephrine
  - OLMC

- **Yes**
  - Warm and maintain normal temperature, position airway, clear secretions
  - Dry patient
  - Ongoing evaluation

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**Reviewed/Revised:** 01/2017
**Revision:** 6

**Approved:** M. Riccardo Colella, DO, MPH, FACEP
**Approved:** Program Director Sternig, RN

**Pg. 1 of 1**
Patient Care Goals:
1. Maintain adequate oxygenation, ventilation, and perfusion
2. Restore regular sinus rhythm, correct rhythm disturbance if unstable
3. Search for underlying cause (medications, drugs, CHF, history of dysrhythmia)

Patient Presentation:
May present with symptoms such as palpitations, dyspnea, chest pain, syncope/near syncope, hemodynamic instability, altered mental status

Inclusion Criteria:
Heart rate > 220/min (infant) or > 180/min (child)

Exclusion Criteria:
Sinus tachycardia

Adenosine:
0.1 mg/kg (max single dose of 6 mg) IV followed immediately by rapid 10 ml flush of NS. May repeat one additional dose at 0.2 mg/kg (max single dose of 12 mg) if no improvement within 5 minutes.

Amiodarone:
5 mg/kg IV infusion over 30 minutes (max dose of 150 mg).

Synchronized Cardioverson:
AP Padd Placement
1 J/kg initially; 2 J/kg for subsequent doses

Sedation/Analgesia PRN stability:
Midazolam 0.1 mg/kg max of 2 mg.
Fentanyl 0.5 to 1 mcg/kg max of 100 mcg.

Quality Improvement:
Key Documentation Elements
1. Heart rate and rhythm changes
2. Interventions
3. Mental status or signs of instability

Patient Safety Considerations:
Routine use of lights and sirens is not recommended during transport unless hemodynamically unstable

Assess appropriateness for clinical condition if:
- > 220/min (infant)
- > 180/min (child)

IV/O access and 12-lead ECG

Persistent tachyarrhythmia causing:
- Hypotension?
- Acutely altered mental status?
- Signs of shock?
- Acute heart failure?

Yes to any...

Synchronized cardioversion
Consider sedation/analgesia prior but do not delay cardioversion

If no improvement

OLMC

Wide QRS

Yes

If VTACH most likely

OLMC if patient does not improve to above therapy
Consider amiodarone with OLMC

If SVT with QRS abnormality:
Adenosine if regular and monomorphic

If SVT likely:
Vagal maneuvers (not carotid)
Adenosine if regular and monomorphic

If sinus tachycardia likely:
Monitor and Observe

PRN