Pediatric Procedural Sedation Course

Intra-sedation
Prevention of Wrong Patient, Wrong Procedure, Wrong Site
Oxygen Delivery
Airway Management
Emergency States
Intra-sedation

Prior to administering any sedation medications:

• Follow UNC Healthcare policy: Universal Protocol for Preventing Wrong Patient, Wrong Procedure, Wrong Site Surgery – ADMIN 0141
• Ensure that necessary personnel are available
• Ensure that SOBA/MDI are available and functioning
• Identify location of Code Cart
• Ensure that required documentation is performed using the “Sedation/Analgesia Assessment and Procedure Record”
Prevention of Wrong Patient, Wrong Procedure, Wrong Site Errors

• For all procedures requiring sedation, practitioners are expected to participate in a series of safety checks designed to ensure that the procedure is:
  » the correct procedure
  » being performed on the correct patient
  » being performed on the correct side/level/digit, as appropriate

• The verification process is an on-going process of information gathering and verification, initiated with the decision to do the procedure, continuing through all settings up to and including the “Time Out” just before the procedure
Prevention of Wrong Patient, Wrong Procedure, Wrong Site Errors

• “Time Out” must be a deliberate pause in all activity involving clear communication, including active listening and verbal confirmation among relevant members of the team.

• The “Time Out” immediately before the procedure ensures that:
  » the correct patient, correct procedure, correct side, and correct site have been identified
  » all relevant documents, information, equipment, and other materials are available
Prevention of Wrong Patient, Wrong Procedure, Wrong Site Errors

“Time Out” must include verification of:

- Correct identity using 3 patient identifiers
  - child’s name, medical record number, and date of birth
- Confirmation that correct side and site are marked (if applicable)
- Accurate procedure consent form
- Agreement on procedure to be done
- Correct patient position
- Relevant images and results, appropriately labeled & displayed.
- Equipment required for procedure & sedation is readily available
- Need to administer antibiotics or fluids for irrigation purposes
- Safety precautions based on patient history or medication use
Prevention of Wrong Patient, Wrong Procedure, Wrong Site/Side Errors

• All team members are encouraged to participate in the “Time Out”
• At a minimum the practitioner performing the sedation and the practitioner performing the procedure are required to participate.
• The “Time Out” should be documented on the “Sedation/Analgesia Assessment and Procedure Record”
Oxygen Delivery

- All children, unless medically contraindicated, should receive supplemental oxygen throughout the sedation period regardless of baseline oxygen saturation.
- Methods of oxygen administration include:
  - Nasal Cannula
  - Simple Oxygen Mask
  - Non-rebreather
Oxygen Delivery

Nasal Cannula

- Low flow oxygen delivery device capable of delivering up to approximately 44% FiO₂ at 6L/min
- For children, the flow meter should not be set above 4L/min to prevent irritating the nasopharynx
- Net inspired oxygen depends on the child’s respiratory rate, respiratory effort, size and fit of the nasal cannula
- Secure the cannula if necessary with transparent occlusive dressing on each cheek

If O₂ saturation cannot be consistently maintained above 95%, the nasal cannula should be replaced with a simple face mask after ensuring airway patency
Oxygen Delivery

Simple Oxygen Mask

- Provides up to 60% FiO₂ with a flow rate of 6-10L/min
- Liter flow must be 6 L/min or greater to maintain the intended inspired oxygen concentration and prevent rebreathing of exhaled CO₂
- The mask should extend from the bridge of the nose to the cleft of the chin, covering the nose and mouth but avoiding compression of the eyes

If O₂ saturation cannot be consistently maintained above 95% the simple face mask should be replaced with a non rebreather mask after ensuring airway patency
Non-rebreather Mask

- Provides up to 90% FiO₂ at flow rate of 10-12 L/min
- Oxygen flow rate must be high enough to keep the reservoir bag inflated
- Reservoir bag can be initially inflated by using high flow oxygen while placing your hand over the mask prior to putting on the patient.

A child should not receive further sedation if a non-rebreather mask is required to maintain O₂ saturations above 95%.
Oxygen Delivery

Troubleshooting

• Prior to switching from one delivery device to another always assess the child for apnea, hypoventilation, or obstruction:
  
  » reposition the head to ensure airway patency
  
  » perform head tilt – chin lift and jaw thrust as needed
  
  » place a shoulder roll to maintain adequate positioning ensuring airway patency
  
  » check oxygen delivery and monitoring equipment to ensure it is working properly
Oxygen Delivery

Troubleshooting Checklist:
» Is O2 tubing kinked?
» Are secretions obstructing O2 flow?
» Is the tubing connected to the oxygen source?
» Is the oxygen tank empty?
» Is the nasal cannula or face mask properly positioned on the child?
» Is the pulse oximeter probe on the child?
» Is the child wearing nail polish?
» Is the pulse oximeter probe on the same extremity as the BP cuff?
Airway Management

- Ensuring a patent airway is the first priority when signs of respiratory distress are observed.
- Airway obstruction in children can frequently be relieved by repositioning the head using techniques such as placement of a shoulder roll, head tilt – chin lift, and jaw thrust.
Airway Management

Techniques To Open the Airway:

Head Tilt - Chin Lift

- Place the palm of one hand on the forehead and apply firm backward pressure back.
- Gently lift the chin with the other hand.
- Placement of a neck roll may help maintain positioning.
Airway Management

Techniques To Open the Airway:

Jaw Thrust

- Position 1 or 2 fingers behind the angle of the child’s mandible
- Lift the mandible up and forward without moving the head and neck.
Airway Management

Airway adjuncts may be necessary to maintain a patent airway

Types of Airway Adjuncts:

- Oropharyngeal Airway (OPA)
- Nasopharyngeal Airway (NPA)
- Bag Mask Ventilation
Airway Management

Oropharyngeal Airway (OPA)

- Consist of a flange, a short bite-block segment and a curved body
- Shaped to provide an air channel and suction conduit through the mouth and to the pharynx.
- Fits over the surface of the tongue to hold it and the soft hypopharyngeal structures away from the posterior wall of the pharynx.
- May be used for an **unconscious** child if procedures to open the airway (e.g., head tilt-chin lift or jaw thrust) fail to provide and maintain a clear, unobstructed airway
Airway Management

OPA Placement Technique:

1. Clear the mouth and pharynx of secretions, blood or vomitus using a suction catheter

2. Ensure correct OPA size:
   • place the OPA against the side of the child’s face.
   • the tip of the OPA should extend from the corner of the mouth to the angle of the jaw, resting in proper alignment with the glottic opening.

3. Gently insert the OPA directly into the oropharynx, a tongue blade to depress the tongue may be helpful

4. After insertion of an OPA, keep the head and jaw positioned properly to maintain airway patency

5. Suction the oropharynx as needed
Airway Management

Oropharyngeal Airway (OPA)

• If OPA placement fails to relieve the obstruction, it may be too large or too small

  • an OPA that is too large can obstruct the larynx or cause trauma to the laryngeal structures.

  • an OPA that is too small or inserted improperly may push the base of the tongue posteriorly resulting in airway obstruction

• An OPA should only be used on an unconscious patient due to the risk of stimulating vomiting or gagging in a conscious or semi-conscious patient.

• If obstruction persists despite OPA placement, a Pediatric Rapid Response call may be indicated.
Airway Management

Nasopharyngeal Airways (NPA):

- Provide a conduit for airflow between the nares and the pharynx.
- May be used in conscious or semiconscious children.
- May be useful in children with upper airway obstruction who are neurologically impaired.
- Available in sizes 12F to 36F.
Airway Management

NPA Placement Technique:

1. Clear the nasal passage of secretions using a flexible suction catheter

2. Ensure correct NPA size:
   - compare the outer circumference of the nasopharyngeal airway with the inner aperture of the nares.
   - select an NPA not so large that it causes sustained blanching of the nostrils.
   - NPA length is approximated by the distance from the tip of the nose to the tragus of the ear

3. Lubricate the tip and distal half of the NPA with water-soluble lubricant

4. Insert the NPA through a nostril in a posterior direction perpendicular to the plane of the face and pass it gently along the floor of the nasopharynx.

5. If the airway does not pass readily, withdraw it and attempt insertion in the other nostril.
Airway Management

Hazards of NPA Placement:

• Mucous, blood, vomitus, or the soft tissues of the pharynx can obstruct the NPA
• Frequent suctioning may be necessary to ensure patency

• A NPA that is too long may:
  • cause bradycardia by vagal stimulation
  • injure the epiglottis or vocal cords.
  • stimulate coughing, vomiting, or laryngospasm.
As seen in the image, Airway Management focuses on Bag Mask Ventilation. The key points are:

- Continued signs of respiratory distress or decreased perfusion may necessitate providing ventilatory assistance.
- Use a properly sized bag mask device.
- A bag with an oxygen reservoir can deliver 100% oxygen.
- A flow rate of 10 to 15 liters/minute is required to maintain adequate oxygen volume in the reservoir.
Airway Management

Bag Mask Ventilation

Correctly sized mask:
• Extends from the bridge of the nose to the cleft of the chin
• Covers the nose and mouth but avoids compression of the eyes
• Provide an airtight seal

Correctly sized ventilation bag:
• Large enough to produce chest rise with ventilation and provide adequate tidal volumes
• A bag that is too large may result in over-ventilation and possible pneumothorax.
Airway Management

Bag Mask Ventilation Technique:

1. Open the airway using a head tilt and jaw lift technique
2. As you lift the jaw toward the mask you also seal the mask against the face
3. Use the “E-C” (or Carolina C) clamp technique:
   » position the 3rd, 4th and 5th fingers of one hand along the jaw (forming an “E”) to lift it forward
   » make a seal with the thumb and index finger of the same hand (forming a C) to hold the mask to the face
4. Avoid pressure on the soft tissues underneath the chin – may cause airway obstruction
5. With the other hand, compress the ventilation bag to deliver a tidal volume that produces visible chest rise
Airway Management

Bag Mask Ventilation “E-C” (Carolina C) Technique
Airway Management

Bag Mask Ventilation
Two Person Bag Mask Ventilation

- Two person bag mask ventilation may be more effective and is preferred when possible
- If a two-person technique is utilized one person holds the mask to the face and the second person compresses the bag to ventilate the child.
Airway Management

Bag Mask Ventilation

Effectiveness of oxygenation and ventilation can be assessed by monitoring the following parameters for evidence of clinical improvement or deterioration:

- Visible chest rise with each breath
- Oxygen saturation
- Exhaled Co2
- Heart rate
- Blood pressure
- Distal air entry
- Patient response (appearance, color, agitation)
Emergency States

Any of the following clinical signs may indicate respiratory distress:

- Pallor or cyanosis
- Tachypnea
- Use of accessory breathing muscles
- Retractions
- Nasal flaring
- Tachycardia
- Dysphagia
- Abnormal breath sounds
- Snoring – may indicate partial airway obstruction by secretions or the tongue
- Stridor - high pitched noisy breath sounds
- Altered level of consciousness
Emergency States

Apnea

Characterized by the lack of any air movement through the airway for 20 seconds. Apnea can be classified as obstructive or central.

Obstructive apnea

Respiratory effort exists but all air flow is blocked by anatomical structures or a foreign body

Central apnea

Lack of respiratory effort usually induced by an excess of a sedative medication or a combination of medications that results in severe respiratory depression
Emergency States

The response to respiratory distress or apnea should be immediate

1. Attempt to open the airway using head tilt – chin lift, jaw thrust and/or positioning with a shoulder roll
2. Suction the airway
3. Utilize airway adjuncts such as OPA & NPA to maintain airway patency as needed
4. Assist ventilations if the child will allow
5. If respiratory effort is absent, bag mask ventilation should be instituted immediately
6. **Pediatric Code Blue** should be called if definitive airway management capability is not present at the scene of the sedation
7. Consider reversal medications if sedation has consisted of benzodiazepines and/or opiates
8. If prolonged airway management is necessary, endotracheal intubation may be required
Pediatric Procedural Sedation Course

Congratulations!

You have successfully completed the Intra-sedation: Prevention of Wrong Patient, Wrong Procedure, Wrong Site; Oxygen Delivery; Airway Management and Emergency States module.