

**THE SMILE TRAIN**  
**ANESTHESIA GUIDELINES**  
*March 14, 2005*

These guidelines are designed to promote the safety of children undergoing general anesthesia for cleft lip and palate procedures. They may be modified based on the patient's underlying medical condition and the anesthetic equipment, drugs, and facilities available.

The anesthesiologist or anesthesiologist participating in these cases should be familiar with the care and monitoring of small infants and young children. He or she should be adept in pediatric airway management, venous access, and resuscitation. He or she should be administering pediatric anesthesia on a weekly and preferably daily basis. A specialized team of personnel consisting of trained surgical nurses, technicians, surgeons, and anesthesiologists dedicated to these cases is highly desirable.

➤ **Preoperative evaluation**

- History and physical exam completed by a pediatrician detailing family history of adverse reactions to anesthesia, medical and birth history including congenital abnormalities, other medical conditions, previous operations, current upper respiratory tract infection, allergies, current medications, height and weight.
- Laboratory work including CBC, platelets, PT/PTT (for cleft palate repair)
- CXR is not necessary if the history and heart/lung exam is negative
- ECG is not necessary if the history and heart exam is negative
- Consider having bank blood available for large cleft palate repairs
- The patient should be afebrile and in optimal cardiorespiratory condition , i.e., URIs resolved as much as possible
- Informed consent for the surgical procedure obtained by surgeon and discussion of general anesthesia, including potential risks and complications, by the anesthesiologist with patient's parents
- Schedule youngest and smallest patients early in the day. Schedule cleft palates, revisions, and other difficult cases early rather than later

➤ **NPO status for elective cases**

- 2 hours clear liquids (water, apple juice) for all ages
- 4 hours for solids and milk/formula up to 6 mo old
- 6 hours for solids, non-clear liquids for all children 6 mo or older

➤ **Premedication**

- Oral midazolam 0.25-0.5 mg/kg 1/2 hour prior to induction if >8 kg; otherwise, no premedication. Recognize that premedication may cause the patient to be drowsy postoperatively if the procedure is of short duration.

➤ **Preparation of Anesthetic Equipment**

- Full vaporizer
- Functioning suction machine and catheters
- Full oxygen tanks
- ECG and pulse oximetry
- Capnography (end-tidal co<sub>2</sub>) if available
- Temperature-monitoring capability
- Appropriate circuit to give positive pressure ventilation (circle or Jackson-Rees)
- Appropriate sizes of blood pressure cuffs, ETT's, laryngoscope blades, masks, oral and nasal airways
- Calculation of endotracheal tube size based on age (age/4 + 4) or one can look at patient's 5th finger as approximation. Rae tube preferred if available, but not required
- Lactated Ringers or normal saline IV solutions for early morning cases, dextrose 5% - containing solutions for pm cases (small or malnourished children may be unable to mobilize glucose stores if fasted for prolonged periods)
- #22 and #20 g iv catheters and appropriate 60 drop/cc iv tubing or buretrol drip chamber
- Warm blankets
- Anesthetic record with continuous recording of vital signs (every 5 minutes or less) and medications administered

➤ **Intraoperative Medications**

- Inhalational agent – sevoflurane, halothane, or isoflurane
- Muscle relaxants – succinyl choline, short acting non-depolarizing agent (vecuronium, atracurium, or rocuronium)
- IV induction agent – propofol, thiopental, ketamine
- Anti-sialogogue, vagolytic – atropine, glycopyrolate
- Antibiotic
- Reversal agents – edrophonium or neostigmine, naloxone
- Rectal acetaminophen
- Steroids – to reduce swelling postoperatively (1 or 2 doses only)
- Narcotic – fentanyl or morphine
- Resuscitation medications – epinephrine, atropine, calcium, bicarbonate, glucose
- Bronchodilators – aminophylline, terbutaline, or albuterol inhaler
- Consider blood banking for repair of large palate defect, reoperation, or patient with borderline anemic preop

➤ **Induction of General Anesthesia**

- Application of full monitoring including continuous ECG, BP, and pulse oximetry
- In healthy patients, inhalational mask induction with spontaneous ventilation and IV, start right after loss of consciousness. IV induction if IV access is easy or child is older. Alternatively, IM induction in the OR (with all monitors applied) with ketamine 3-5 mg/kg, atropine 0.02 mg/kg and succinylcholine 4 mg/kg if intubation appears straightforward
- In patients with suspected difficult airway, inhalation induction with IV in place.
- O<sub>2</sub>/N<sub>2</sub>O/inhalational agent
- Assure ability to ventilate by mask without muscle relaxants
- Intubation with patient on 100% O<sub>2</sub>, reasonably deep, to avoid bronchospasm and laryngospasm, with or without muscle relaxants--ETT size should allow airleak at 15-30 cm H<sub>2</sub>O pressure
- Observe and auscultate equal bilateral chest movement and presence of end-tidal CO<sub>2</sub> if available
- Rectal acetaminophen 30-45 mg/kg, if available

➤ **Intraoperative Maintenance**

- Antibiotics and steroids given per preference of surgeon (e.g., cefazolin 25 mg/kg every 8 hrs if not allergic for wound prophylaxis, dexamethasone 0.25-0.5 mg/kg IV up to 10 mg for airway edema)
- Beware of ETT movement as patient's head is being positioned during surgery and as retractors are being placed. Beware of tube occlusion if mouth retractor is opened completely.
- Beware of throat pack placement and assure removal before extubation – recommend intraoperative suture tag placement on side of patient's cheek and sign in prominent place in OR to remind personnel of throat pack placement/removal
- Prefer maintenance of spontaneous ventilation during the procedure --guide to depth of anesthesia without risk of muscle-relaxant or narcotic overdose
- Prefer inhalational agent and O<sub>2</sub>/N<sub>2</sub>O or O<sub>2</sub>/air for maintenance--minimize narcotic administration as surgeon will infiltrate with local anesthetic/epinephrine solution which provides post operative pain relief and aids in hemostasis
- Record vital signs (BP, HR, RR, O<sub>2</sub> sat, Temp, and ET CO<sub>2</sub> if avail.) every 5 minutes on written record
- Carefully monitor intraoperative blood loss and fluid administration

➤ **Pediatric Intravenous Fluid Administration Guidelines**

- Maintenance Fluids  
4 cc/kg/hr for 0-10kg  
plus 2cc/kg/hr for next 10 kg  
plus 1cc/kg/hr for additional kgs
- May use a dextrose-containing solution for maintenance fluids. Use balanced salt solution (eg., LR, plasmalyte) for deficit, third space and blood loss replacement
- Deficit: calculate from above then x hours NPO, replace 1/2 first hour, 1/4th second hour, 1/4th third hour
- Third Space Losses  
2-4 cc/kg/hr minor procedure (lip scar revision)  
4-6 cc/kg/hr moderate procedure (bilateral lip repair)  
8-10cc/kg/hr major procedure (large cleft palate repair)
- Blood Loss  
Replace 3x blood loss with balanced salt solution  
10cc/kg/hr PRBCs raises HCT 5%

Estimated Blood Volume

Infant	80 ml/kg
1-3 years	75 ml/kg
3-6 years	70 ml/kg
>6 years	65 ml/kg

- In most cases, where climate is hot and IV has a chance of falling out, be generous with fluid administration--a well-hydrated patient will have less post operative nausea and vomiting

➤ **Emergence from General Anesthesia/Extubation in OR**

- Ensure throat pack is removed
- Placement of tongue suture by surgeon post-palate/pharyngoplasty procedures. Allows forward retraction on tongue to relieve potential post op airway obstruction
- Strong suction available
- Patient should be breathing 100% O<sub>2</sub> spontaneously, with no residual narcotization and oxygen saturation >97% or better
- Surgeon is present and immediately available in OR and instrument table remains set up
- Tracheostomy instrument tray available, not open
- Gently suction nares, oropharynx and stomach if possible—but beware suture lines and wounds
- Patient should be awake, eyes opening, with spontaneous purposeful movement, and able to open mouth and/or cough
- Retain ability to give 100% O<sub>2</sub> by positive pressure mask

- Consider extubating with patient head-up or in lateral position

➤ **Transport to PACU**

- Transport patient who is awake and breathing spontaneously with portable oxygen tank and mask if available
- Routinely administer supplemental oxygen to maintain O<sub>2</sub> sat > 96%
- PACU should be located immediately adjacent to or inside the OR suite and staffed with a 1:1 patient:nurse ratio. PACU nurses should be specially trained in airway management and recognizing/treating signs of airway obstruction
- Suction, continuous BP, pulse oximetry and temperature monitoring should be available
- Continuous ECG if available
- Ability to warm or cool patient.
- Full oxygen tanks and ability to give positive pressure mask ventilation with 100% O<sub>2</sub>
- Availability of resuscitation drugs and equipment as described for the OR setting above
- Awake patient should be monitored for at least one-two hours in PACU setting for bleeding and nausea/vomiting
- Most young patients will be comfortable with acetaminophen, 15 mg/kg orally every 4 h, if local anesthesia/intraorbital nerve blocks have been administered in the operating room. Morphine should be used cautiously and the patient monitored carefully in the postoperative period.

➤ **Post op Observation**

- Patient should be transferred to ward bed if the vital signs are stable and there is no evidence of bleeding. Vital signs and wound checked for bleeding at least every hour or more frequently for the first twelve hours. Clear liquids PO should be offered initially, then oral intake advanced as tolerated. Intravenous fluids should be continued until the patient is taking liquids well orally.
- Recommend high visibility bed with at least 3:1 patient:nurse ratio or better
- Emergency protocol established and in place to monitor and treat problems as they arise--chain of communication and command clearly delineated, ability to access anesthesiologist and surgeon for airway management post operatively if needed
- Surgeon immediately available to answer and address questions regarding postoperative wound care and drainage
- Family of patient to be fully informed of all events occurring during and after operative procedure, including success or failure of procedure performed.

*These Guidelines have been approved by the Smile Train Medical Advisory Board*