

PCCL Session: Summary Report and Resources

PCCL session topic: "You Must Be Choking – A Case of Foreign Body Obstruction"

Date: June 20, 2025

Learning objectives:

- 1. To develop an approach to managing a patient presenting with a suspected foreign body inhalation
- 2. To provide options for airway management in a pediatric patient with partial airway obstruction from foreign body inhalation
- 3. To discuss optimal ventilation strategies in an intubated child with foreign body in the airway
- 4. To review diagnosis and management of complications resulting from mechanical ventilation in a pediatric patient with foreign body (FB) aspiration.

Case:

- 21-month female. Past medical history: T Last Meal: 6 hours ago-Breast milk, bread.
- <u>Presentation</u>: Reports of choking on a nut while in her car seat. Bystander back blows were delivered on scene, but child still had partially obstructed airway. EMS report: Stridor and Difficulty breathing. Vitals: HR 180, RR 28, SaO2 95% R/A, O2 by non-rebreather at 15L, Salbutamol 2.5 mg neb.
 - Triage Nursing assessment: Child with stridor. Notes: "Was lethargic, now perked up". Vitals: HR 156, SaO2 99%, BP 138/85, RR 30, 10kg. CTAS 2 direct to trauma bay, full cardiac monitors, trauma team activation
 - Physician assessment (significant findings): CNS- "Awake, alert, crying but intermittently somnolent". Resp: WOB- "subcostal and suprasternal indrawing and stridor, this progressed to a large component of expiratory wheeze in both fields within an hour." Airway: "clear-poor view", no facial swelling, no erythema, no rash. CVS: no signs of hypoperfusion. No edema. Differential Diagnosis: FB aspiration. R/O anaphylaxis.
- <u>Initial Management</u>: IV access established x2. Epinephrine 150 mcg IM, Nebulized epinephrine, IV Dexamethasone 2mg. High-flow NP (HFNP) O2-FiO2 80%, 10L/min. RSI drugs, airway cart. No significant change. Tenuously stable condition.



- <u>Transport Plan</u>: Transfer child to our OR for ongoing monitoring and preparation for airway management. ERP-RTVS Support: CHARLIE, RUDI initially, then BCCH PICU/ENT/Anesthesiology confirmed plan to avoid intubation if possible. Consultation with equidistant pediatric hospital in home province. PTN to arrange transfer to BCCH.
- <u>Progression</u>: Patient's condition worsening: HR 180-190, RR 40, BP 140/60, SaO2 98% (Airvo 10L, 80%). CNS: Progressively more obtunded. Resp: Tracheal tug, subcostal indrawing, sternal retractions, prominent expiratory wheeze, no stridor. PICU video consultation with PICU and anesthesia
- <u>Airway Management Considerations</u>: Unknown location of partially obstructing foreign body and risks with changes. Effects of sedation/muscle relaxation on muscle tone? Effects of transition from Negative to Positive inspiratory pressure? Effects of placing an endotracheal tube (ETT)? Potential ball valve effect? Fasting status-aspiration risk. Despite limited examination no clear predictors of difficult laryngoscopy. Local team with comfort in managing elective pediatric airways.
 - Intubation Difficult Inhalational induction secondary to low tidal volumes. Gentle pressure support ventilation (PSV) to achieve deep anesthesia with dropping heart rate and slowing respirations (ET sevo ~6%). Video laryngoscopy Mac 2 blade-grade 1 view. No periglottic FB visible. ETT gently passed between cords without resistance between breaths to 14cm. (Subsequently withdrawn to 12cm). oral-gastric tube.
 - Ventilator settings PSV 0/4, RR-34, FiO2 0.5, tidal volume-Roughly 80mL (8 mL/kg), SaO2 98-100%, Sevoflurane ET 2.8%, ETCO2 Initial 79 decreased to 45. Increased PIP to 5 and PEEP to 5 and Vt to 10mls/kg.
- <u>Transfer</u>: Patient transferred via HART to nearby adult ICU until they can be transferred the next day to BCCH due to weather delays.

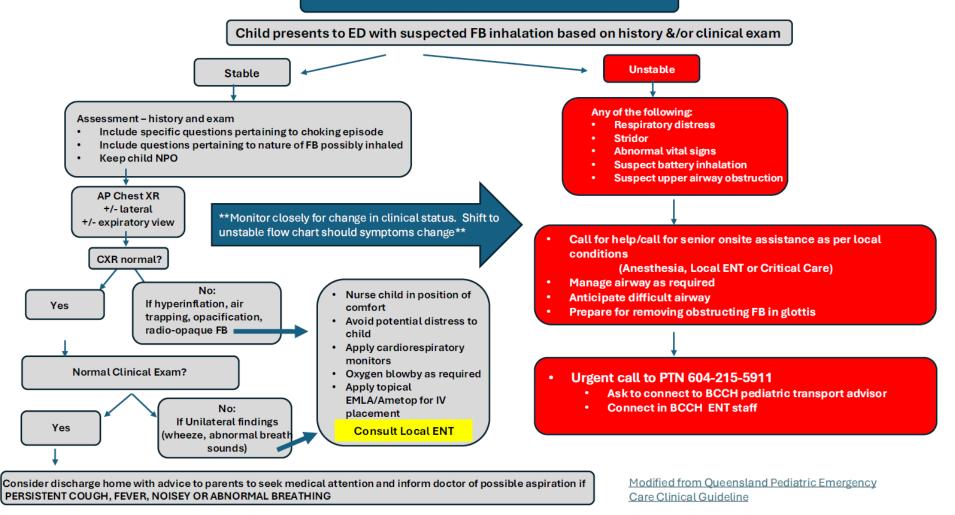
Learnings:

Inhaled Foreign Body Emergency Management in Children

Follow the flow chart below, modified from the <u>Queensland Pediatric Emergency Care Clinical Guidelines</u> with BCCH ENT:



Inhaled Foreign Body – Emergency Management





Pediatric Intubation (foreign body)

Intubating a child with suspected foreign body aspiration requires careful, individualized planning to avoid worsening the obstruction and to ensure safe airway management. Every child and situation is different; providers are encouraged to consult and utilize BC Children's Hospital via the <u>Patient Transfer Network</u> (PTN) as a provincial support resource when managing these complex cases.

As indicated in the flow chart, the **key decision point is the work of breathing**. **The other critical consideration** is the availability locally of clinicians with airway expertise. If the patient presents to a remote community with lack of anesthesia or ENT support, the goal is to expedite transfer to a centre for removal by an ENT specialist using rigid bronchoscopy.

Key considerations include:

- **Team readiness:** Airway management should ideally involve a multidisciplinary team, including (if possible) anesthesia and ENT or pediatric surgery. Early consultation improves safety and outcomes. Ensure oximetry and ETCO₂ are available and applied when possible.
- Assess the need for intubation: in complete airway obstruction, if chest thumps and abdominal thrusts have not cleared the airway, intubation is required. Many cases can initially be managed with less invasive measures. If the child is conscious, has minimal work of breathing, and able to oxygenate, avoid unnecessary interventions that may push the object deeper.
- **The application of positive pressure ventilation before removal depends on the clinical situation:** If the child already has significant work of breathing, then application of PPV may be lifesaving. Otherwise, allowing the child to breath spontaneously while awaiting definitive intervention is appropriate.
- Plan for difficult airway: Have all advanced airway equipment readily available, video laryngoscope if available, different laryngoscope blades, various sizes of endotracheal tubes, and adjuncts (e.g., bougie, Magill forceps). Prepare for <u>potential surgical airway</u> (though rare in children) if the FB is stuck in the cords or below the cords but high in the trachea.
- Laryngoscopy and Intubation: in an emergency with complete or almost complete obstruction, perform direct laryngoscopy. If FB can be visualized, attempt removal using Magill forceps. If no FB see on direct laryngoscopy, intubate. If resistance to passage of the ETT, maneuvers can be tried to push the FB further down or if it is food material to break it up using either a bougie or the ETT. Suction the ETT and attempt removal of the obstructing material.

If intubation is indicated, a controlled environment such as the operating room is preferred. The ideal approach, if possible, would be to induce anesthesia with the child breathing spontaneously, using preferably an intravenous propofol/remifentanil induction. Alternatively, an inhalation induction with sevoflurane/oxygen/nitrogen mix can be used but induction times are unpredictable with airway obstruction and environmental contamination is a risk. Consultation with pediatric anesthesia at BCCH is advised before attempting these approaches. They can be accessed by calling the pediatric transport advisor, who can then loop in other specialties as required.



Optimization of Ventilation

If mechanical ventilation becomes necessary in cases of foreign body aspiration (e.g., severe hypoxia, apnea), it is crucial to recognize that every case is unique and requires an individualized approach.

As each clinical case is different, and the clinical course can be very dynamic, a prescription for the mode of ventilation, TV, RR and iTime is not possible. Use FIO2 as required to achieve saturations of > 95%.

Consulting the pediatric transport advisor via PTN at BCCH is advised for support as soon as a FB is suspected. Other specialists can be looped in as required.

Resources:

- <u>Pedmed</u> dosing of pediatric drugs
- Sedation and Analgesia
- Weight based dosing of medications in a hurry section of website
- Continuous infusion guidelines for pediatrics
- Virtual Support Pathways
- Intubation in a hurry section of the website
- EMCRIT podcast Pediatric surgical airway
- Queensland Pediatric Emergency Foreign body Flowchart
- High flow nasal cannula therapy

Here's how to bookmark the <u>Pediatric Critical Care Resources Website</u> as a shortcut on your smartphone home screen, depending on your device and browser:

For iPhone (Safari Browser):

- 1. **Open Safari** and go to the website you want to save.
- 2. Tap the Share icon (square with an arrow pointing up) at the bottom of the screen.
- 3. Scroll down and tap "Add to Home Screen."
- 4. You can edit the name if you like, then tap Add.
- 5. The shortcut will appear on your **Home Screen** like an app icon.



Only Safari supports this on iPhone (not Chrome or Firefox).

For Android (Chrome Browser):

- 1. Open **Google Chrome** and go to the website.
- 2. Tap the **three-dot menu** in the upper-right corner.
- 3. Tap "Add to Home screen."
- 4. Edit the name if desired, then tap Add.
- 5. Confirm by tapping Add automatically or drag it to your preferred location.

Works with most Android devices using Chrome. Firefox has a similar option under its menu.

The resources shared throughout this session are for reference purposes only. Please consult your health authority leaders for guidance on adoption and use of these resources within your local context.

The advice provided during the PCCL sessions is not intended to replace the clinical judgment of the healthcare providers who are with the patient. While PCCL sessions may suggest recommendations, the final decisions regarding a child's care and treatment should always rest with the healthcare professionals involved in their care at both the referring and receiving centres.

If you need additional in the moment support refer to the Provincial Real Time Virtual Support Pathways: If you need additional in the moment support refer to the Provincial Pediatric Virtual Support Pathways: <u>https://childhealthbc.ca/pcc/provincial-pediatric-virtual-support-pathways</u>