Foreign Body Aspiration (FBA) in Children

Supervised by Dr. Amir Naghshzan (AmirNaghshzan@gmail.com)

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1. Definition

Foreign body aspiration (FBA) is the inhalation of a solid or liquid object into the tracheobronchial tree, causing partial or complete airway obstruction.

- Peak age: **1–3 years**
- Common objects: **Nuts (especially peanuts), seeds, popcorn, small toys, coins, beads**
- FBA is a **medical emergency** when airway obstruction is severe.

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2. Clinical Presentation

Key History

Always ask:

- Sudden choking episode
- Witnessed aspiration
- Sudden onset cough while eating or playing
- Persistent cough after choking
- Unilateral wheeze not responding to bronchodilator
- Recurrent pneumonia in the same lobe
- Persistent fever despite antibiotics

Remember:
A choking episode followed by symptom improvement **does NOT exclude aspiration.**

Symptoms

Acute presentation

- Choking
- Violently coughing
- Gagging
- Stridor
- Wheezing
- Respiratory distress
- Cyanosis (late)

Delayed presentation

- Chronic cough
- Persistent wheeze
- Localized decreased breath sounds
- Recurrent pneumonia
- Hemoptysis (rare)

Physical Examination

Findings depend on location.

Larynx

- Hoarseness
- Inspiratory stridor
- Severe airway obstruction

Trachea

- Biphasic stridor
- Audible slap or click

Bronchus (most common)

- Unilateral wheeze
- Reduced breath sounds
- Hyperinflated hemithorax
- Localized crackles

Normal examination does NOT rule out FBA.

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3. Diagnostic Approach

Step 1: Is the child choking now?

Complete airway obstruction

Unable to:

- Speak
- Cry
- Cough

Immediate management:

- Infants (<1 year):
  - 5 back blows
  - 5 chest thrusts
- Children (>1 year):
  - Abdominal thrusts (Heimlich maneuver)

Start CPR if unconscious.

Partial obstruction

Child can:

- Cough
- Speak
- Cry

Management:

- Encourage coughing
- Give oxygen
- Do NOT perform blind finger sweep
- Arrange urgent bronchoscopy if aspiration suspected

Step 2: Stable child

Assess:

History

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Physical examination

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Chest X-ray

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High suspicion?

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Rigid bronchoscopy

Clinical suspicion is more important than imaging.

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4. Differential Diagnosis

Condition	Distinguishing features
Asthma	Bilateral wheeze, recurrent episodes
Viral bronchiolitis	Age <2 years, URI symptoms
Croup	Barking cough, stridor
Epiglottitis	Fever, drooling, toxic appearance
Pneumonia	Fever, infiltrate on CXR
Anaphylaxis	Rash, hypotension
Tracheomalacia	Chronic noisy breathing
Vocal cord dysfunction	Inspiratory symptoms

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5. Investigations

Chest X-ray (First investigation)

May show:

- Normal (up to 30–50%)
- Air trapping

- Hyperinflation
- Atelectasis
- Mediastinal shift
- Pneumonia
- Visible radiopaque foreign body (uncommon)

Inspiratory/Expiratory Films

Useful if child cooperative.

Find:

- Unilateral air trapping

Lateral Decubitus Film

Useful in young children.

Affected side remains inflated.

CT Chest

Not routinely required.

May help when diagnosis is uncertain and bronchoscopy availability is limited.

Bronchoscopy

Gold standard

Indications:

- High clinical suspicion
- Persistent unilateral findings
- Witnessed aspiration
- Persistent symptoms despite normal imaging

Rigid bronchoscopy is preferred because it is both **diagnostic and therapeutic**.

Flexible bronchoscopy may be used diagnostically in selected stable patients.

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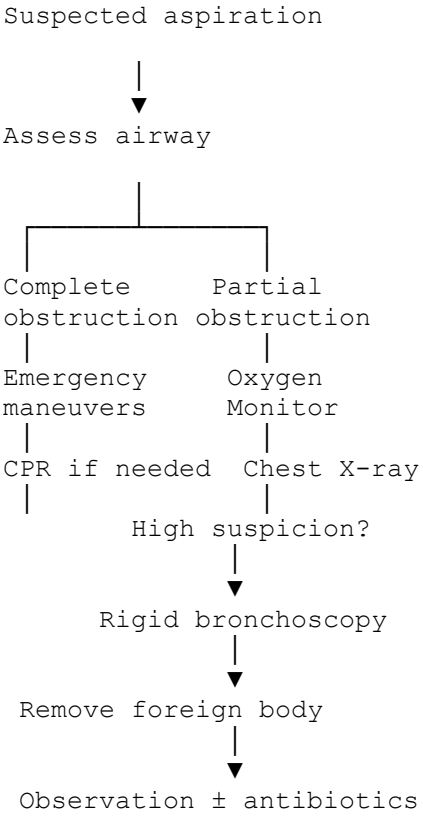
6. Management Algorithm



Initial Management

ABC assessment

- Airway
- Breathing
- Circulation

Provide:

- Oxygen if hypoxemic
- Continuous pulse oximetry
- Avoid agitation

Keep patient NPO before bronchoscopy.

Definitive Treatment

Rigid bronchoscopy

Treatment of choice.

Performed under general anesthesia.

Success rate >95%.

Antibiotics

Not routinely indicated.

Only if:

- Pneumonia
- Lung abscess
- Secondary bacterial infection

Corticosteroids

Routine use **not recommended**.

May be considered after difficult extraction with significant airway edema (specialist decision).

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7. Drug Summary Table

Medication	Indication	Pediatric Dose
Oxygen	Hypoxemia	Titrate to maintain SpO_2 ≥94%
Nebulized epinephrine	Severe post-procedure airway edema or stridor	0.5 mL/kg of 1 mg/mL solution (maximum 5 mL), nebulized
Dexamethasone	Significant airway edema after bronchoscopy	0.15–0.6 mg/kg IV/PO (maximum 10 mg)
Amoxicillin-clavulanate*	Secondary bacterial pneumonia	45–90 mg/kg/day (amoxicillin component) in divided doses

*Only if bacterial infection is present.

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8. Admission Criteria

Admit if:

- Respiratory distress
- Persistent hypoxemia
- Bronchoscopy required
- Airway edema
- Post-procedure complications
- Pneumonia
- Significant comorbidities
- Inadequate home observation

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9. Referral Criteria

Urgent referral to pediatric surgery, pediatric pulmonology, or ENT if:

- Suspected FBA
- Witnessed aspiration
- Persistent unilateral wheeze
- Abnormal chest X-ray
- Recurrent localized pneumonia
- Failed foreign body removal
- Airway compromise

Emergency referral if:

- Cyanosis
- Severe respiratory distress
- Complete obstruction

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10. Follow-up

After bronchoscopy:

- Ensure symptom resolution
- Re-examine lungs
- Repeat chest X-ray only if clinically indicated
- Review pathology if complications occurred

Parents should return immediately if:

- Fever
- Persistent cough
- Dyspnea
- Wheezing
- Chest pain

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11. Clinical Pearls

- A **sudden choking episode** is the most important historical clue.
- Normal chest X-ray **does not exclude** FBA.
- Persistent unilateral wheeze is FBA until proven otherwise.
- Bronchodilators usually do **not** improve symptoms caused by an aspirated foreign body.
- Right main bronchus is the most common site, but objects can lodge anywhere in the airway.
- Organic materials (e.g., peanuts) cause marked inflammation and should be removed promptly.
- **Rigid bronchoscopy is both the diagnostic and therapeutic gold standard.**
- Never delay bronchoscopy when clinical suspicion is high, even if imaging is normal.

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12. Common Mistakes in Exams and Practice

❌ Diagnosing asthma without considering sudden onset after choking.

❌ Reassurance based on a normal chest X-ray.

❌ Delaying bronchoscopy because symptoms temporarily improved.

❌ Blind finger sweep in a conscious child.

❌ Giving repeated bronchodilators despite persistent unilateral wheeze.

❌ Performing CT instead of arranging timely bronchoscopy when clinical suspicion is high.

❌ Prescribing antibiotics routinely without evidence of bacterial infection.

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13. Key Take-Home Messages

1. Foreign body aspiration is most common in children aged **1–3 years**.
2. A witnessed choking episode is the strongest diagnostic clue.
3. Normal examination or chest X-ray does **not** exclude aspiration.
4. Persistent unilateral wheeze or recurrent pneumonia should always prompt consideration of FBA.
5. Complete airway obstruction requires immediate age-appropriate airway maneuvers and CPR if the child becomes unresponsive.
6. Chest X-ray is the initial investigation, but imaging may be normal.
7. **Rigid bronchoscopy is the gold standard** for diagnosis and treatment.
8. Do not delay bronchoscopy when clinical suspicion is high.
9. Antibiotics are indicated only for secondary bacterial infection.
10. Early recognition and prompt removal reduce the risk of chronic lung complications.

High-Yield Exam Checklist

Question	High-Yield Answer
Most common age	1–3 years
Most common aspirated object	Peanuts/nuts
Strongest diagnostic clue	Sudden choking episode
Most common examination finding	Unilateral decreased breath sounds or wheeze
Initial investigation	Chest X-ray
Gold standard for diagnosis	Rigid bronchoscopy
Gold standard for treatment	Rigid bronchoscopy
Normal chest X-ray excludes FBA?	**No**
Routine antibiotics?	**No**
Most dangerous complication	Complete airway obstruction