

Paediatric aerodigestive foreign bodies: remember the nasopharynx

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Abstract

Introduction: Nasopharyngeal foreign bodies are relatively uncommon, compared with other aerodigestive sites. They may mimic a lower airway location, or may be coughed up into the nasopharynx prior to endoscopic evaluation.

Objective: To describe our experience with nasopharyngeal foreign bodies mimicking a more distal airway location.

Method: Case series from a tertiary referral children's hospital.

Results: We present a series of four children who were initially thought to have a lower aerodigestive tract foreign body (three respiratory, one oesophageal), but who were finally diagnosed with nasopharyngeal foreign body. The concept of panendoscopy at all foreign body removals is suggested as a means to avoid a missed nasopharyngeal foreign body.

Conclusion: Although nasopharyngeal foreign bodies are uncommon, their rare ability to mimic distal sites mandates a thorough endoscopic approach to ensure that all sites (i.e. larynx, lungs, oesophagus and nasopharynx) are evaluated endoscopically.

Key words: Foreign Body; Nasopharynx; Inhalation

Introduction

The standard management for a suspected aerodigestive tract foreign body includes bronchoscopy, laryngoscopy and oesophagoscopy, together with physical examination and Radiological investigation (inspiratory and expiratory chest films). Once a foreign body has been removed, it is common practice to rule out the presence of a second foreign body. Similarly, a vanishing foreign body should prompt investigation of other areas.

Nasal cavity foreign bodies commonly present with unilateral nasal obstruction and purulent discharge or epistaxis. Foreign bodies in the nasopharynx are rare, and may go undetected for many years.^{1–7} They are more difficult to diagnose, and carry the risk of dislodgement resulting in aspiration.

In this article, we describe four cases (Table I) of children who presented with signs and symptoms of a lower aerodigestive tract foreign body, who on examination were found to have a nasopharyngeal foreign body.

Case reports

Patient one

A four-year-old boy was found by his mother outside in his backyard 'choking' and in respiratory distress, including a cyanotic episode.

In the emergency department, he was found to have decreased air entry into the right lung, and a chest X-ray showed some mild hyperinflation on the left. He was in

mild respiratory distress when evaluated by the paediatric otolaryngology service, and a probable diagnosis of an airway foreign body was made.

Anaesthesia was induced without incident; in particular, no coughing was noted. Bronchoscopy and oesophagoscopy were normal. However, nasopharyngoscopy using a Boyle–Davis mouthgag and a mirror revealed a fair-sized twig impacted in the adenoid bed. The twig was removed uneventfully.

Follow-up X-rays were normal, and the patient was discharged home.

Patient two

A three-year-old girl suffered a witnessed choking event while playing with some small toys and other material on her living room floor. She was cyanotic and briefly apnoeic, according to her family. Her condition improved over minutes, with only a persistent cough remaining. She was brought to the emergency department by her family.

On examination, she was found to have decreased air entry to the left lung fields, with a normal chest X-ray.

Due to the strong history, persistent cough and clinical findings, the patient was taken to the operating theatre for endoscopy. At induction, she gave a few brief coughs but was stable. Bronchoscopy and oesophagoscopy were normal. However, a piece of clear, brittle plastic was found in the patient's nasopharynx, using a telescope trans-nasally, and was removed.

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TABLE I

DEMOGRAPHIC DATA ON FOUR PAEDIATRIC CASES OF NASOPHARYNGEAL FOREIGN BODY MIMICKING LOWER AERODIGESTIVE TRACT FOREIGN BODY

Pt no	Age	Gender	Symptoms	Signs	Chest X-ray	B'scope & O'scope	Nasopharyngeal FB
1	4 y	Male	Choking Cyanotic episode	Decreased air entry R lung	Hyperinflation L lung	Normal	Twig
2	3 y	Female	Choking Cyanotic episode Persistent cough	Decreased air entry L lung	Normal	Normal	Clear plastic
3	3 y	Female	Cough Vomiting	Stridor Desaturations	Normal	Normal	Tree bark
4	11 m	Female	Choking Apnoeic episode	Droping	Normal	Normal	Cedar twigs

Pt no = patient number; b'scope = bronchoscopy; o'scope = oesophagoscopy; FB = foreign body; y = years; m = months; R = right; L = left

After removal, the patient was stable and was discharged home.

Patient three

A three-year-old girl was in her backyard when she abruptly started coughing and became distressed. There was no obvious cyanosis but the child had severe coughing bouts, to the point of vomiting, over a period of almost 30 minutes.

She was brought to the emergency department of a peripheral hospital, and was found to have mild inspiratory stridor and a persistent cough. A chest X-ray was reported as normal, and she was transferred to our institution for review.

On examination in the emergency department, she was found to have mild inspiratory stridor, coarse sounds in both lungs, and occasional desaturations (to percentages in the high 80s).

Based on the clinical history, the patient was taken to the operating theatre. At induction, the anaesthetist had some difficulty in maintaining oxygen saturation, and the bronchoscope was urgently inserted. No abnormality was found in the larynx, trachea or bronchi. The patient's oxygenation stabilised, the bronchoscope was removed and oesophagoscopy was performed. A narrow nasal endoscope was then inserted to examine the nasopharynx. A piece of tree bark was found in the nasopharynx. The patient was then intubated, a Boyle–Davis mouthgag inserted and the foreign body removed without incident.

The patient was discharged, stable, that evening.

Patient four

An 11-month-old girl was found playing on the floor near a cedar twig. She had a coughing and gagging episode which was followed by a 5-second apnoeic spell. Her mother attempted to withdraw the object by inserting her finger into the child's mouth. The mother was noted to have felt a twig in the back of the child's mouth, but was unable to extract it.

On presentation to the emergency department, the child was reported to have vomited four times, and to have been drooling since the initial episode, but no other respiratory symptoms had occurred since the initial episode.

Chest X-ray and lateral neck X-ray were normal.

Based on the clinical history and the suspicion of a foreign body in the oesophagus and possible cedar needles in the airway, it was decided to proceed to surgery. Induction of anaesthesia was unremarkable. Laryngoscopy and bronchoscopy were performed, with no evidence of a foreign body. The patient was intubated and oesophagoscopy was undertaken. There was no evidence of a foreign body in the oesophagus. As examination of the nasopharynx commenced, a cedar twig was noted

underneath the soft palate. A Boyle–Davis mouthgag was inserted and the twig was removed. A second twig was also identified abutting the right eustachian tube orifice. The second twig was also removed and the child was discharged home in stable condition later that day.

Discussion

The anatomical boundaries of the nasopharynx extend from the base of the skull to the soft palate. Foreign bodies in the nasopharynx are rare, with only a handful of reported cases.^{1–7} Objects that have been reported in the nasopharynx include teeth, coins, rings, leeches and fish.^{1,3,8–10} While nasopharyngeal foreign bodies are believed to be more common in patients with palatal defects and after penetrating trauma,^{7,11–13} they have also been reported in patients presenting with symptoms and signs of lower aerodigestive foreign bodies.^{9,14,15}

Our case series highlights the importance of examining the nasopharynx when a child presents with an apparent lower aerodigestive tract foreign body that cannot be found. All four of our cases presented with symptoms or signs of lower aerodigestive tract foreign bodies. Three of our cases mimicked airway foreign bodies and one case mimicked an oesophageal foreign body. On review of the literature, nasopharyngeal foreign bodies present more commonly in a delayed fashion after a reported choking episode, with symptoms of nasopharyngeal obstruction, or as an incidental finding.^{9,14,15} None of our cases involved a delayed presentation, perhaps because all had a convincing history, physical signs and/or radiographic findings suggestive of a lower aerodigestive tract foreign body. A lateral neck X-ray was only performed in one of our reported cases, and was normal.

The mechanism by which foreign bodies are introduced into the nasopharynx is largely unknown. It has been suggested that attempted removal by a concerned parent or bystander may cause the object to become forcefully lodged in the nasopharynx. Coughing or emesis may eject an aerodigestive tract foreign body into the nasopharynx (as highlighted in our second patient); this event may occur during the initial aspiration or later during induction of anaesthesia. Parker *et al.* reported two cases of swallowed coins that were later found in the nasopharynx following forceful coughing episodes.³ One of these children (aged six years) underwent attempted retrieval of the foreign body by digital extraction, by his father.³ Both of these children presented without signs or symptoms of aerodigestive foreign body.³ A traumatic or iatrogenic event can cause a foreign body to lodge in the nasopharynx.^{16,17} Finkelstein *et al.* reported the case of a sponge left in the nasopharynx following pharyngeal flap surgery.¹⁷

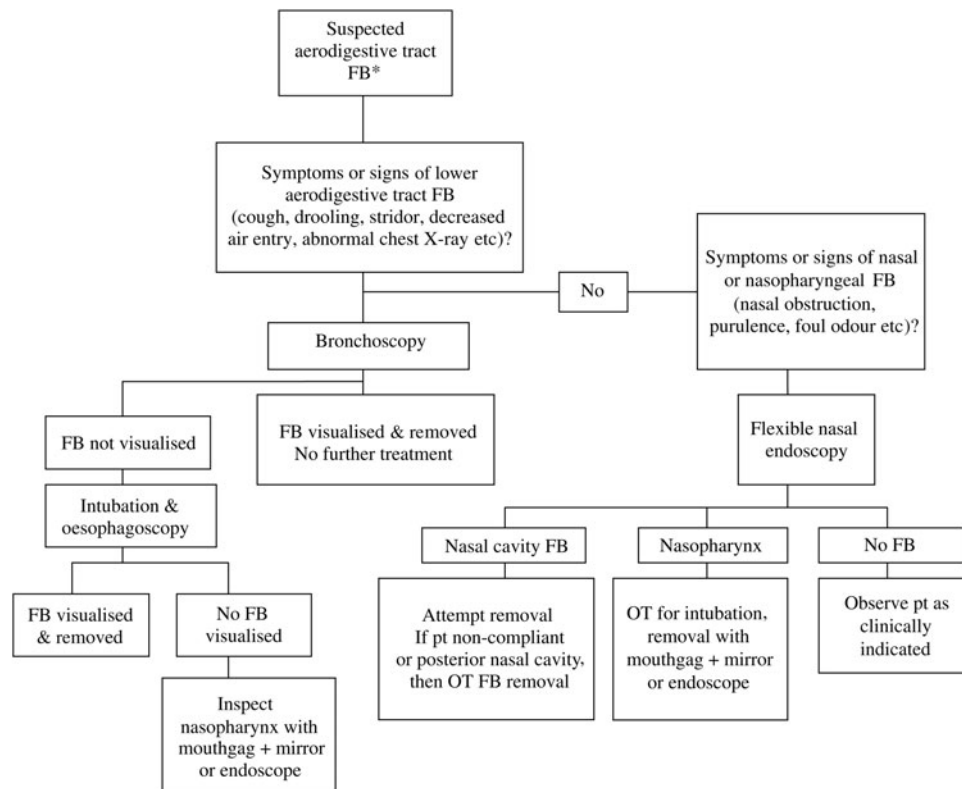


FIG. 1

Algorithm for management of paediatric aerodigestive tract foreign body (FB). *Clinicians should always be aware that two FBs may be present. Pt = patient; OT = operating theatre

Bullets have also been found in the nasopharynx secondary to penetrating trauma.¹⁶ It has been suggested that ingested foreign bodies may be propelled superiorly by the gag reflex, and become lodged in the nasopharynx in children.⁹

- Foreign bodies in the nasopharynx are uncommon
- This paper describes four cases of nasopharyngeal foreign body mimicking the signs and symptoms of lower aerodigestive tract foreign body
- A patient with a suspected aerodigestive foreign body should undergo thorough history-taking, physical examination and radiological investigation (including inspiratory and expiratory chest films), as well as flexible nasal endoscopy which usually views the nasopharynx
- A patient with suspected aerodigestive foreign body in whom no foreign body can be found on bronchoscopy, oesophagoscopy or laryngoscopy should undergo nasopharyngeal examination
- Nasopharyngeal foreign bodies can safely be removed, after oral endotracheal intubation, via a transoral approach

Our four patients all had signs or symptoms of a lower aerodigestive tract foreign body. It seems likely therefore that the foreign body was initially in the lower aerodigestive tract and then became lodged in the nasopharynx, either through coughing, induction of anaesthesia or attempted retrieval by a bystander (as in patient four).

Treatment of suspected lower aerodigestive tract foreign body involves bronchoscopy, oesophagoscopy and laryngoscopy. If the foreign body is not found, or is suspected on

history-taking or physical examination to be in the nasopharynx, the airway should be secured and removal of the foreign body from the nasopharynx attempted via a transoral approach. The greatest risk of retrieval of a nasopharynx foreign body without securing the airway is aspiration and possible death, which has been reported in one case.⁴ To avoid the potential for aspiration, the airway should be secured with an endotracheal tube prior to attempted removal. As highlighted in our cases, a Boyle–Davis mouthgag and a mirror are useful in facilitating removal. A rigid endoscope and forceps can also be used for removal of a nasopharyngeal foreign body once the airway has been secured. We propose an algorithm for the management of paediatric aerodigestive tract foreign bodies (Figure 1), in order to avoid missing a nasopharyngeal foreign body.

Retained foreign bodies in the nasopharynx may cause symptoms similar to adenoid hypertrophy and (with at least one reported case) obstructive sleep apnoea.¹⁸ Additionally, long-standing nasopharyngeal foreign bodies can present as otitis media, epistaxis, recurrent rhinosinusitis, halitosis, mouth-breathing and purulent nasal discharge.^{1,14} The longest reported duration for a retained nasopharyngeal foreign body is 20 years.¹⁹ In such cases, dislodgement and possible aspiration is always a risk, as the foreign body may descend and potentially cause airway obstruction.

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