An Unusual Foreign Body in a Child's Airway - a Metallic Spark Wheel of a Gas Lighter

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Abstract

Foreign body aspiration (FBA) is a common pediatric emergency, particularly in children under 5 years. While organic materials such as nuts and seeds are most frequently aspirated, metallic foreign bodies are comparatively less common and can present distinctive therapeutic challenges. We report a 4-year-old boy who presented with persistent cough and respiratory distress following an unwitnessed aspiration. Chest radiography revealed a radio-opaque well-defined object near the carina. Flexible bronchoscopy identified a metallic spark wheel from a gas lighter lodged just above the carina, slightly deviated toward the right main bronchus. Retrieval was technically challenging due to its large size and smooth central projection but was successfully performed using rat-tooth forceps via flexible bronchoscope. The child recovered without complications. Metallic foreign bodies, though uncommon, are frequently reported in children. However, to our knowledge, this is the first case of a gas lighter spark wheel aspiration. Its unique design posed specific technical challenges during retrieval, highlighting the importance of pre-procedural planning, tool selection, and operator expertise. Flexible bronchoscopy proved to be an effective and safe method for managing this unusual foreign body.

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Background

Foreign body aspiration (FBA) represents a common and potentially life-threatening emergency in the pediatric population. The highest incidence occurs in children under five years of age, a period marked by exploratory behaviors, mouthing of objects, incomplete dentition (absence of molars), and immature protective airway reflexes.[1–3] In this age group, aspiration often occurs during play or feeding, and the absence of a witnessed event remains a major barrier to early diagnosis.[4]

Organic materials such as peanuts, seeds, and food particles account for the majority of aspirated objects worldwide.[5,6] In contrast, inorganic foreign bodies, including metallic items, plastic parts, pins, and toy fragments, are less frequently reported but are clinically important due to their variable shapes and potential to cause airway injury.[7,8] The case we are going to report that aspiration of a spark wheel of a gas lighter represents a particularly unusual metallic foreign body. Metallic objects are usually radiopaque and therefore detectable on plain chest radiographs, unlike most organic items which are radiolucent.[9] Nevertheless, the clinical presentation of inorganic FBA may remain non-specific, and misdiagnosis as asthma, pneumonia, or bronchitis is common.[4,10] Bronchoscopy remains the gold standard for both diagnosis and management of airway foreign body, and rigid bronchoscopy is widely used as the procedure of choice in pediatric patients offering secure airway control and versatile instruments.[2]

Case Details

A 4-year-old boy presented with persistent cough and mild respiratory distress for 4 days. Cough was non-productive, continued in nature without any diurnal variation. He was presumed as pneumonia and had been treated with injectable antibiotics for 2 days at a local private clinic, but his symptoms worsened, leading to referral to Bangladesh Shishu Hospital and Institute, department of Pediatric Respiratory Medicine for further evaluation and better management. On query, mother stated that, the illness began abruptly, with no history of prior similar episodes. There was no family history of asthma or atopy. The incident of aspiration was unwitnessed, and the child did not disclose any history of aspiration at the date of admission. On physical examination, the boy was afebrile, dyspneic (R/R- 52/min) tachypneic (pulse- 140/min),

BP-90/60mm of Hg, SpO2-91% in room air. Chest auscultation revealed slightly reduced breath sounds with mild ronchi and crepitation over the right lung, 1st and 2nd heart sounds were audible without any murmur. There was no organomegaly, and other systemic examinations revealed normal.

Fig.1: X-ray Chest revealing radio-opaque object located just above the carina

Chest radiograph demonstrated a well-defined, radio-opaque object located just above the carina, slightly deviated toward the right main bronchus (fig.1). Based on the suspicion of airway foreign body, the child was planned for bronchoscopic evaluation.

Under general anesthesia, flexible bronchoscopy was performed and laryngeal mask ventilation (LMA) was used during the whole procedure. A metallic spark wheel measuring approximately 1.2 cm in diameter, with a smooth central projection (fig. 3) was visualized lodged just above the carina and slightly angled toward the right main bronchus (fig.2A). The foreign body was carefully grasped with rat-tooth forceps via the flexible bronchoscope (fig.2B) and successfully removed without mucosal injury (fig.2C). Post-procedure inspection confirmed complete removal. The child had an uneventful recovery and remained asymptomatic at one-week follow-up.

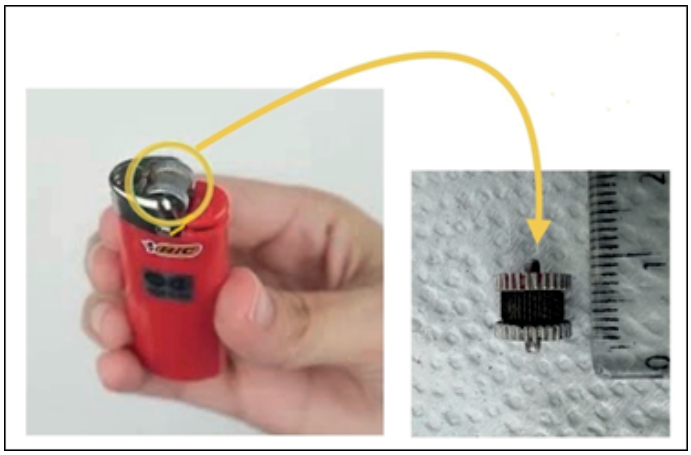

Fig.3: Removed Foreign body (Metallic spark wheel of a gas lighter)

Patient Consent

Written informed consent was obtained from the child's parents for publication of this case report and any accompanying images.

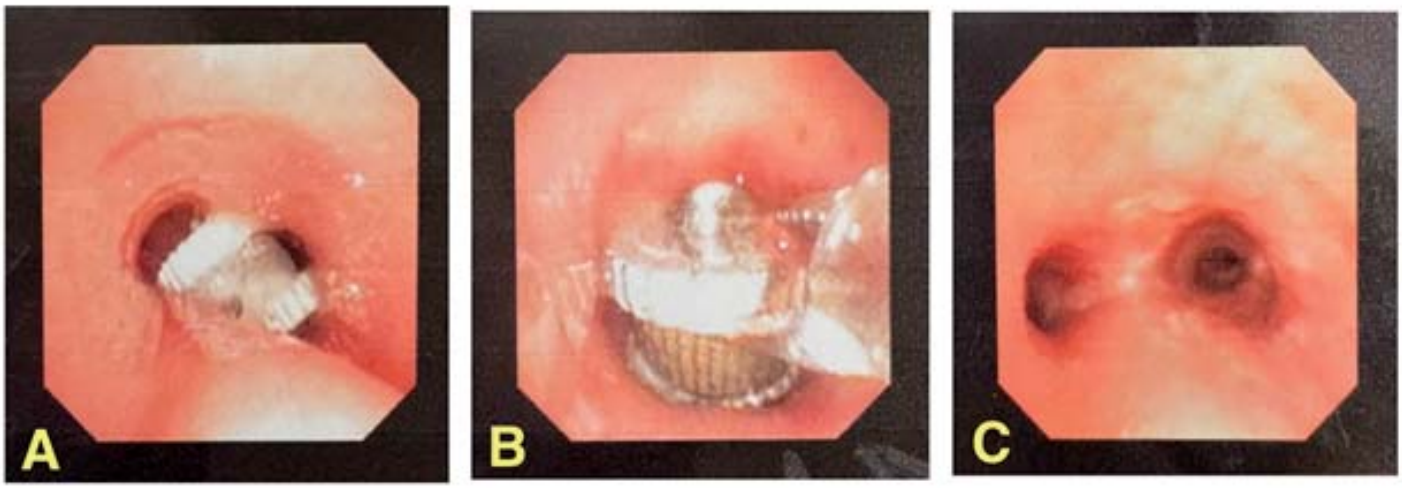

Fig.2: Bronchoscopic view of airway (A- Metallic spark wheel just above the carina, B- spark wheel while removing, grasping with rat-tooth forceps, C- Site of impaction after removal of spark wheel)

Discussion

Foreign body aspiration is a significant cause of morbidity and mortality in children. The clinical spectrum of FBA ranges from acute choking with cyanosis to subacute or chronic symptoms such as persistent cough, wheezing, or recurrent pneumonia.[4]

The unwitnessed event and subtle early symptoms led to delayed suspicion and initial antibiotic treatment, reflecting common diagnostic pitfalls.[11] In fact, up to one-third of children present without a witnessed aspiration event.[7] This was also the case in our patient, who initially received antibiotic therapy for presumed pneumonia without improvement, a diagnostic pitfall widely documented in the literature.[11]

Radiological evaluation is often crucial. While radiopaque objects provide a straightforward diagnosis, many aspirated foreign bodies are radiolucent and manifest only with indirect signs such as unilateral hyperinflation, atelectasis, or mediastinal shift.[12] Computed tomography (CT) has been increasingly used when plain radiographs are inconclusive, with high sensitivity for both radiolucent and radiopaque objects.[13] In our case, the foreign body was metallic and clearly visualized on chest X-ray, enabling prompt planning of bronchoscopic retrieval.

Bronchoscopy is the gold standard for both diagnosis and management. Rigid bronchoscopy still remains the procedure of choice in children, offering secure airway control, and the use of a wide range of retrieval instruments.[10] However, in recent years, flexible bronchoscopy has gained recognition as a safe and effective tool for foreign body removal in selected cases, particularly when supported by suitable retrieval accessories and operator expertise.[14,15]

Several recent studies have highlighted the effectiveness of flexible bronchoscopy in children. A large Tunisian series reported successful removal in 94.3% of 105 children, with only minor complications such as mild laryngeal edema.[13] Similarly, a Belarusian single-center study demonstrated 100% success in 24 children, with no conversions to rigid bronchoscopy and no major complications.[16] A recent meta-analysis found no significant difference in overall success rates between flexible and rigid bronchoscopy, though flexible procedures were associated with a lower risk of desaturation.[16]

Flexible bronchoscopy has also been successfully applied to retrieve metallic and other inorganic objects. Kim et al. reported successful removal of metallic screws, springs, and Lego pieces in children using flexible bronchoscopy with retrieval baskets, with a 90% success rate and minimal complications.[1] Other series from Turkey also reported safe and effective removal of inorganic objects such as metal pins and toy parts.[4]

In our case, flexible bronchoscopy under general anesthesia with LMA ventilation permitted safe removal of the metallic spark wheel using rat-tooth forceps without airway trauma. To the best of our knowledge, however, this is the first reported case of aspiration of a metallic spark wheel from a gas lighter. Its unique circular design and smooth central projection made grasping difficult and raised the risk of impaction at the subglottic area during retrieval. This case demonstrates that flexible bronchoscopy, in skilled hands and with appropriate instrumentation, can provide a safe and effective alternative to rigid bronchoscopy for even unusual metallic foreign bodies.

Conclusion

Our case highlights the importance of maintaining high suspicion, even in the absence of a witnessed event. Flexible bronchoscopy can be an effective and safe alternative to rigid bronchoscopy in experienced hands. Early recognition and timely bronchoscopic removal are essential to prevent potentially life-threatening complications.

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