Case Report

Flexible Endoscopic Management of Tracheo-oesophageal Magnet Foreign Bodies with Acquired Fistula in a Toddler

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Abstract

Aerodigestive foreign bodies (FBs) aspiration is a common problem in children; however, simultaneous aerodigestive localisation is rare. Ingestion of multiple magnetic FBs can lead to serious complications, especially tracheo-oesophageal fistula and recurrent chest infections. These depend on the duration of foreign-body ingestion/aspiration, prompt intervention and adequate technique for foreign-body retrieval. A 1.8-year-old female child was found to have two magnetic FBs lodged simultaneously in the oesophagus and trachea. The magnetic FBs in the aerodigestive tract in children were removed in the same session using flexible endoscopes.

Keywords: Aspiration, child, foreign body, ingestion, magnet, over-the-scope clip

Introduction

Aerodigestive foreign bodies (FBs) in children are frequently encountered clinical problems with their potential for life-threatening complications. FB aspiration into the tracheobronchial tree or ingestion with oesophageal retention requires prompt surgical diagnosis and management. The identification of a foreign object lodged in the trachea or oesophagus can be difficult owing to a delay in presentation and non-specific symptoms.[1,2] Most ingested FBs pass spontaneously through the gastrointestinal tract without causing problems. This depends on the type and size of the foreign body ingested. For instance, round objects, small-sized coins and meat impaction can pass spontaneously but artificial teeth/denture rarely pass spontaneously, same with large fish bone impaction.

However, multiple magnetic FBs can cause serious complications.[2-4]

This is a report of a unique rare case of a toddler who was diagnosed to have two magnetic FBs lodged simultaneously in both oesophagus and trachea with acquired tracheo-oesophageal fistula.

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Case Report

A 1.8-year-old female presented to the paediatric pulmonology clinic complaining of a 3-day history of repeated cough and symptoms of respiratory infection. The mother reported the ingestion of multiple FBs (five magnetic-coloured balls) by her child a month ago and reported also that the girl passed three magnetic balls in stool 2 days after the incident, but still two balls, the mother did no see.

On examination, the child had a mild fever (37.7°C), repeated cough, adventitious sounds in the form of sonorous rhonchi and occasional coarse crepitations. She was not in respiratory distress and her oxygen saturation was 97% on room air. The abdomen was soft, lax and non-tender.

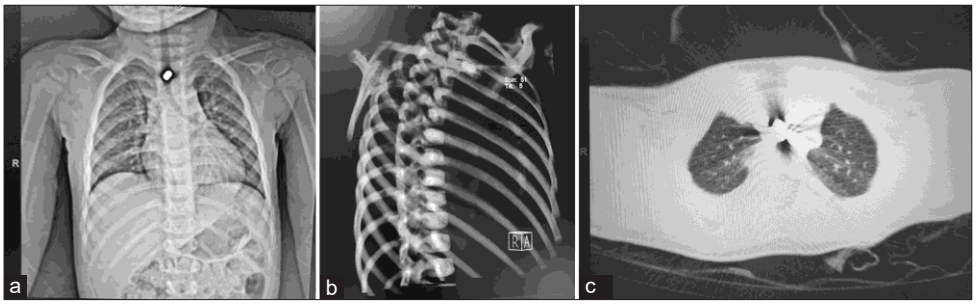
Imaging, plain chest radiograph showed a transverse radiopaque shadow in the posterior upper part of the chest at the level of the third thoracic vertebra, suggestive of two FBs [Figure 1], computed tomography chest was done showed one ball in the upper oesophagus and the other one in the trachea.

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Figures 1: Plain and chest radiograph (a) and computed tomography scan chest reconstruction (b) showed a transverse radiopaque shadow in the posterior upper part of the chest at the level of the third thoracic vertebra, suggestive of two foreign bodies (c) lung view

Multidisciplinary team

A team from paediatric pulmonology consultant, paediatric gastroenterology consultant, paediatric surgery consultant and anaesthesia consultant were rapidly gathered to endoscopically manage the case using fibre-optic flexible endoscopies, with flexible endoscopy accessory tools.

Operating theatre, the child received a pre-oxygenation and intravenous (IV) sedation using fentanyl 1 µg/kg and propofol 0.75 mg/kg. Then, lidocaine 2% was given to spray the oral cavity and the laryngeal inlet. A proper laryngeal mask was inserted with a Y-shaped connection. An initial examination using a flexible fibre-optic bronchoscope was done to explore the trachea and bronchial tree through the laryngeal mask. This initial exploration revealed a small round metallic magnetic foreign body embedded in the posterior lateral wall of the trachea [Figure 2], which was then removed carefully using a helical stone extractor basket passed through a working channel of a flexible bronchoscope. This metallic object was found to have a magnetic force pulling in the other foreign magnetic ball in the oesophageal wall with an underlying acquired tracheo-oesophageal fistula measuring about 3–4 mm [Figure 3].

The child was then intubated with a 4fr endotracheal tube to secure the airways, and a flexible oesophagoscopy was done to remove the oesophageal side embedded second magnetic ball [Figure 4] through Dornier-type stone retrieval basket. Moreover, an over-the-scope clip (OTSC) (Ovesco Endoscopy GmbH, Tuebingen, Germany) has been used to close the acquired tracheo-oesophageal fistula shown in [Figure 5]. The 'OTSC' is a clip made of shape-memory nitinol alloy which returns to its initial closed shape when released from the applicator, ending closure of the two jaws of the clip. 'OTSC' is chosen and loaded onto the scope depending on the size and appearance of the lesion, in the current case, blunt 'OTSC' (type 'a') was used as a fresh perforation. The clip was mounted onto a silicone cap placed onto the tip of oesophagoscope and applied by stretching a wire by means of a handwheel installed on the entrance of the scope working channel. When the clip was released from the applicator, it closed because of 'shape-memory' effect and high elasticity of the nitinol alloy. In addition, there is a twin grasper that has two independently movable jaws that are used to approximate the tissue margins before the 'OTSC' clip was released.

The patient was shifted to the surgical ward after extubating for complete recovery. A final chest, abdomen and gastrografin swallow radiographs were done to confirm the clearance of the trachea and the digestive tract and showed no leak of the fistula. Feeding was resumed the next day. The chest infection was treated with IV antibiotics for 3 days with oral relay for 5 days. She was discharged from the hospital after 2 days. She was tolerating full oral feeding and symptom free.

Discussion

Aspiration and ingestion of FBs in children continue to increase and represent a common health problem in the paediatric population.[1,2] More than 50% of FB injuries in the aerodigestive tract affect children younger than 4 years.[1] This can be attributed to the fact that chewing and swallowing become more coordinated around the age of 5 years. Ingestion of a single magnet does not represent a problem as the vast majority of FBs reaching the stomach pass through the gastrointestinal tract spontaneously. While if ingested in multiples, magnets become harmful and may cause complications requiring surgical intervention.[3,4]

Tracheal and oesophageal FBs are typically retrieved through rigid endoscopy. A rigid oesophagoscope is routinely used as an effective tool to remove foreign body.[2] Today the methods available for extraction are diverse, including flexible fibre-optic endoscopy and other non-endoscopic approaches.[5] Removal of FBs using a Foley catheter was reported in 1966.[6] It has been used for the extraction of large radiopaque FBs but is of no use in the majority of instances. The flexible fibre-optic instrument was developed during the 1970s and 1980s. Most diagnostic oesophagoscopy is now performed with flexible instruments which they are vastly superior.[7]

The case we report in this article is a unique case described of simultaneous magnet FBs in the trachea and the oesophagus of a toddler, and the use of flexible endoscopies to remove them and to close the acquired tracheo-osophageal fistula. A systematic review of the literature through PubMed/Google Scholar did not find any similar management.

Foreign-body management differs according to localisation. Magnets localised in the oesophagus, stomach or respiratory



Figure 2: Round metallic magnetic foreign body embedded in the posterior lateral wall of the trachea

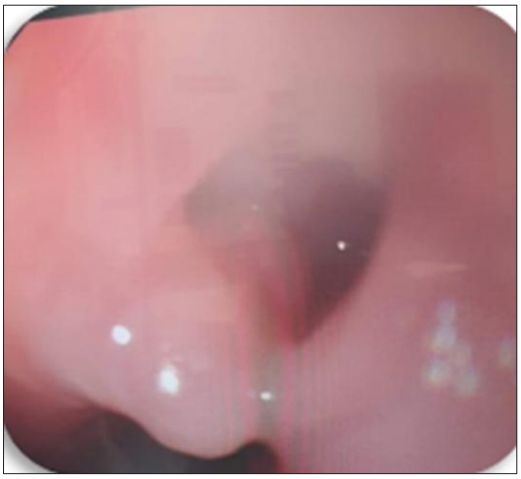


Figure 3: Acquired tracheo-oesophageal fistula (trachea view)

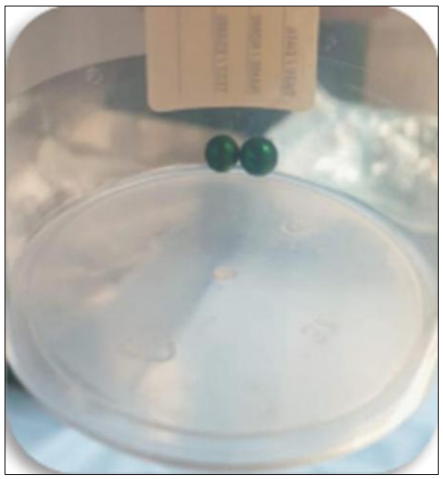


Figure 4: Removed two magnetic balls



Figure 5: Over-the-scope clip closed acquired tracheo-oesophageal fistula (oesophagus view)

tract are usually removed endoscopically.[5,6] This endoscopic intervention should be early, as soon as possible, if ingestion or aspiration of more than one magnet is suspected.[3,4] In fact, there are no reports where more than one magnet was passed spontaneously.[4] On the other hand, a delay in intervention would lead to serious complications. The attracted magnets may result in pressure necrosis, between two loops of the intestine or between the trachea and the oesophagus (as per our reported case) and end by perforation or fistula.[3,4] In our case, the delay in management because of the delay mother's reporting had led to erosion of the mucosa, perforation or formation of a tracheo-oesophageal fistula with all its complications. In the case of a suspected double localisation of magnet FBs, we recommend starting by exploring the respiratory tract to secure the airways. Most authors consider rigid endoscopy to be the standard technique for extraction of FBs in the aerodigestive tract of children, and the success rate is >97%.[1,2] However, in our case, we think that a fibre-optic flexible bronchoscope is a fast and less traumatic tool to deal with FBs in the respiratory tract.

Conclusion

Ingestion of magnet FBs is still rare, but its incidence is increasing. Simultaneous ingestion and aspiration of magnets have never been described before. Our report shows that this is a possible event and should alert caregivers. Multiple magnet ingestion is a serious accident and needs to be managed as early as possible. Delay in treatment can result in serious problems, possibly leading to perforation and the formation of a tracheo-oesophageal fistula. The 'OTSC' device provides a possible safe and effective endoscopic alternative to manage tracheo-oesophageal fistulae.

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Conflicts of interest

There are no conflicts of interest.

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