The Journal of Laryngology & Otology

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Lost and found: surgical adventures in migratory foreign body cases

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Abstract

Objective. This observational study investigates migratory foreign bodies in the upper aerodigestive tract, emphasising clinical presentation, assessment and factors contributing to extraluminal migration.

Methods. Conducted across multiple medical centres in India, the study included 15 patients aged 11 to 70 years. Detailed observations, demographic information, clinical history, radiological findings and intra-operative outcomes were compiled.

Results. Fifteen patients presented with varied symptoms. Fish and chicken bones, along with metal wires, were common foreign bodies. Computed tomography scans played a crucial role in diagnosis, confirming extraluminal migration. Neck exploration successfully retrieved foreign bodies in most cases, with varied sites of impaction.

Conclusion. Migratory foreign bodies, although rare, pose significant challenges for otolaryngologists. Early recognition, thorough diagnosis and meticulous neck exploration, is crucial for effective management, preventing severe complications. This study adds valuable insights to the understanding of migratory foreign bodies, contributing to the existing literature in otolaryngology practice.

Main Article

Sanu P Moideen takes responsibility for the integrity of the content of the paper

Cite this article: Divya GM, Moideen SP, Sheriff RM, Khan A. Lost and found: surgical adventures in migratory foreign body cases. *J Laryngol Otol* 2024;**138**:1086–1089. https://doi.org/10.1017/S0022215124000690

Received: 18 November 2023
Revised: 6 February 2024
Accepted: 29 February 2024
First published online: 16 May 2024

Keywords:
deglutition disorders; endoscopy; deglutition; foreign bodies; pharynx

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Introduction

The presence of foreign bodies in the upper aerodigestive tract is a frequent occurrence in otolaryngological emergencies.[1,2] When a foreign body is ingested, it may become lodged in various areas, such as the base of the tongue, tonsils, hypopharynx or any section of the cervical oesophagus. Typically, out-patient procedures such as laryngoscopy, hypopharyngoscopy or oesophagoscopy under general anaesthesia can successfully remove these foreign bodies.[3] However, a small percentage of foreign bodies, particularly those with sharp edges, may breach the pharyngeal mucosa and migrate extraluminally into neck spaces, a condition referred to as 'migratory foreign bodies', necessitating surgical intervention for extraction.[3]

In 2018, Salting conducted an extensive literature review encompassing original research articles, review articles and case reports from various reputable sources.[4] Despite an extensive search, which included databases such as the National Center for Biotechnology Information, Medline, medical subject headings, PubMed and ScienceDirect-Elsevier, Salting only identified 67 cases of ingested foreign bodies that had migrated extraluminally.[4] Most of these were case reports including one or few patients. To address this research gap, this observational study was carried out with the following objectives: (1) to analyse the clinical presentation, assessment and treatment of migrated foreign bodies; and (2) to investigate factors predisposing extraluminal migration of foreign bodies.

Materials and methods

This study was an observational, descriptive, multicentric investigation conducted at the Department of ENT, Head and Neck Surgery, Government Medical College Hospital in Calicut, Kerala, India, from December 2011 to August 2019, the Department of ENT, Head and Neck Surgery, Government Medical College Hospital in Kannur, Kerala, India, from October 2022 to November 2023, the Department of ENT, Head and Neck Surgery at MCS Hospital in Muvattupuzha, India, from January 2021 to August 2023, and the Department of ENT, Head and Neck Surgery at Smita Memorial Hospital in Thodupuzha, India, from June 2022 to August 2023.

All patients who received a final diagnosis of extraluminal migration of foreign bodies were included in the study following the acquisition of necessary approvals and informed consents. The variables compiled encompassed demographic information, clinical history, type of foreign body, and radiological and intra-operative findings. The procedures used in this study adhered to the tenets of the Declaration of Helsinki (2017/20).

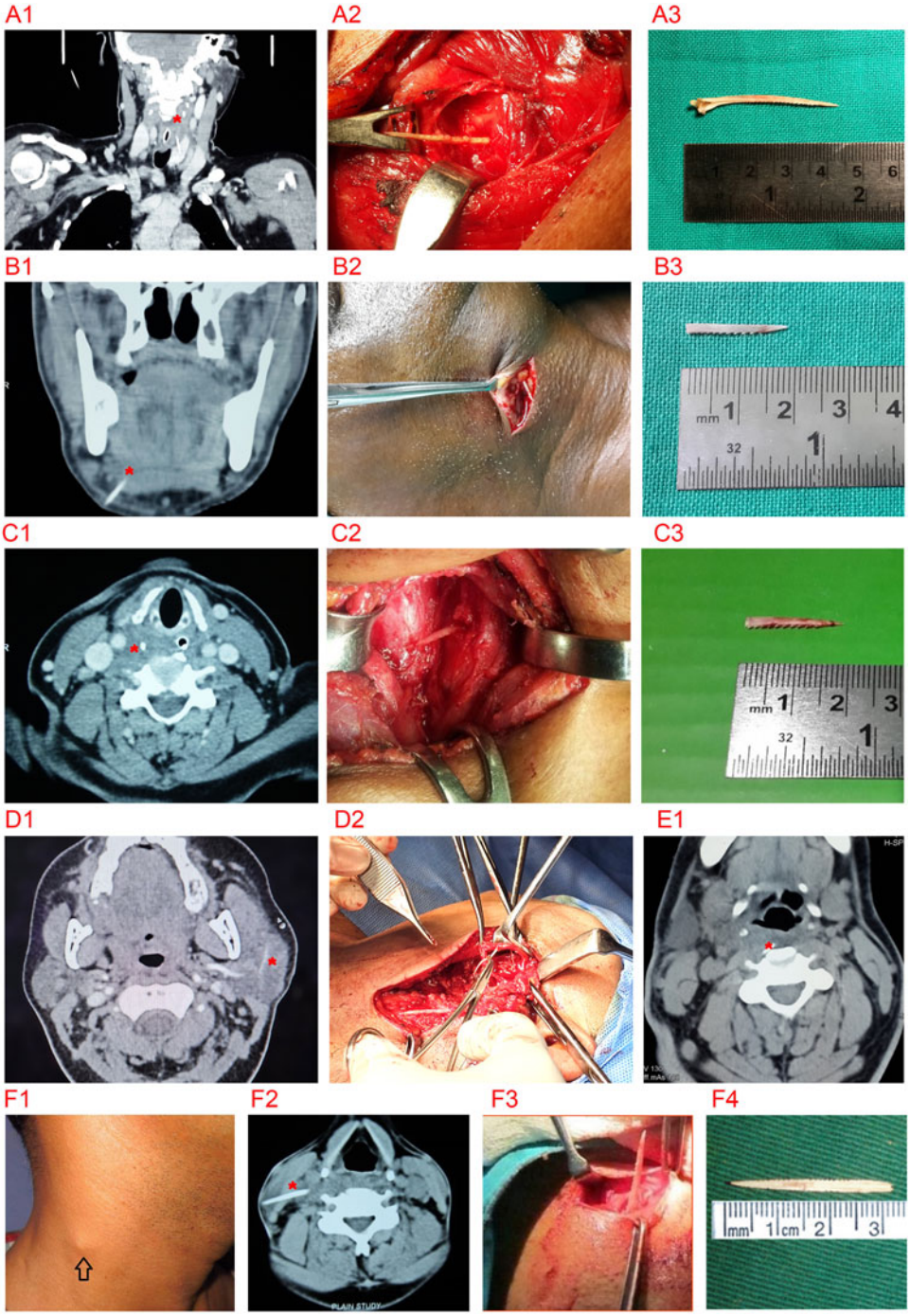

Figure 1. A1: Fish bone impacted in the left lobe of thyroid gland, B1: Fish bone impacted in the submandibular region, C1: Fish bone in the parapharyngeal area, D1: Foreign body in the parotid duct, E1: Foreign body in the prevertebral region, F1: Fish bone piecing right sternocleidomastoid muscle and pointing in the right side neck. F2: Fish bone piecing right sternocleidomastoid muscle and pointing in the right side neck. Asterisk sign (*) in red colour represents the foreign body. A2, B2, C2, D2, F3: Intra operative pictures. A3, B3, C3, F4: Extracted Foreign body.

Observations

During the study period, a total of 15 patients, ranging in age from 11 to 70 years, underwent the removal of migratory foreign bodies at the medical centres. There were six male and nine female patients.

Time of presentation

Four patients sought medical attention within 24 hours of ingesting the foreign body. Five patients presented in the 1st week, 3 presented between the 8th and 14th days, 1 presented on the 20th day, 1 presented 2 months later and the final patient reported a history of foreign body ingestion 5 years prior.

Patient symptoms

Out of the 15 patients, 8 experienced neck pain, 3 had neck swelling, 3 complained of difficulty swallowing (dysphagia) and 1 had an on-and-off pricking sensation in the throat as their primary concern. Only two patients, who were older and had multiple co-morbidities, presented with frank retropharyngeal abscess. All others experienced localised tissue inflammation. One patient with a foreign body in the parotid duct developed parotitis. Before presenting with a migratory foreign body, 13 patients had previously undergone laryngopharyngoscopy and attempted removal.

Unfortunately, one patient with a foreign body in the thyroid gland was conservatively managed by her primary care

https://doi.org/10.1017/S0022215124000690 Published online by Cambridge University Press

physician for a duration of five years, being diagnosed as thyroiditis. It was only in the fifth year, during a computed tomography (CT) scan, that the foreign body was visualised and subsequently retrieved. It turned out to be a bone from a pearl spot fish.

One patient with a metallic wire foreign body in the base of the tongue was managed as laryngopharyngeal reflux disease for a period of two months. She gave no history of foreign body ingestion, and her only symptom was an on-and-off pricking sensation in the throat. She underwent flexible nasopharyngolaryngoscopy multiple times. Because the foreign body was extraluminal inside the base of tongue tissue, it was not identified during the nasopharyngolaryngoscopies and she was managed conservatively. As a result of the persistent symptoms, she underwent screening CT of the neck, which showed the foreign body.

Evaluation

All patients underwent a plain CT scan of the neck, which confirmed the extraluminal migration of the foreign body. This imaging technique provided precise information regarding the size and type of foreign body, its orientation and its relationship to other vital structures in the neck. This information was particularly crucial when planning a neck exploration. Subsequently, all patients underwent neck exploration for the retrieval of the foreign body.

Sites of impaction

Foreign bodies were located in various areas: the retropharyngeal space (four patients), the thyroid gland (three patients), the parapharyngeal space (three patients), the base of the tongue (one patient), the submandibular gland (one patient), the duct of the parotid gland (one patient), the prevertebral muscle (one patient) and the sternocleidomastoid muscle (one patient).

Types of foreign bodies

Nine patients had fish bones as foreign bodies: six were bones from *Arius sona* (known locally as Etta), two were bones from *Etroplus suratensis* (pearl spot fish, known locally as Karimeen) and one bone was from *Sardinella longiceps*. Among the remaining six patients, four had chicken bones and two had metal wires.

Retrieval

In 13 patients, the foreign body was successfully retrieved via neck exploration. For the patient with a base of tongue metallic wire foreign body, this item was retrieved by carrying out a coblation-assisted tongue base reduction. In one patient, the foreign body within the prevertebral muscle could not be retrieved. However, as this patient remains asymptomatic, they are under regular follow up.

Discussion

In otolaryngology clinical practice, the ingestion of upper aerodigestive tract foreign bodies is a common emergency. The typical locations of impaction include the tonsils, the base of the tongue, the pyriform fossa and the cervical oesophagus.

When foreign bodies possess sharp edges, there is a potential for them to breach the pharyngeal mucosa and move extraluminally into the neck spaces. This condition, known as 'migratory foreign bodies', requires surgical intervention for extraction. In such instances, identification and retrieval through procedures such as hypopharyngo-laryngoscopy or oesophagoscopy may prove to be exceedingly challenging or even impossible.

Factors contributing to this migration encompass the object's sharpness, its horizontal orientation, patient manipulation, pharyngeal muscle contractions and tissue responses.[1] Perforation, when it happens, is aided by the robust contraction of the hypopharyngeal and cricoesophageal muscles as they propel a food bolus into the oesophagus. This clarifies why increased rates of penetration are observed in the hypopharynx and cervical oesophagus. The migration mechanism is believed to result from the movement of neck muscles and viscera during voluntary or involuntary motions of the head and neck structures.

In 1983, Remson and colleagues conducted a review encompassing 321 case reports on penetrating foreign bodies, revealing that 43 of them were located extraluminal.[2] The most extensive collection of migratory foreign body cases comes from Chee and Sethi, who documented 24 patients in their retrospective case series.[5] Consistent with Remson's findings, our study observed that, akin to Chee and Sethi's inference, all migrated foreign bodies were characterised by sharp and linear attributes.

There was no notable gender preference observed in our patient group, similar to the findings in Chee's study. However, in contrast to their observation of no extraluminal migration of foreign bodies in the paediatric population, 2 of our patients were under the age of 16 years. The remaining patients in our study were 28 years of age or older.

In contrast to conventional beliefs and teachings, only 4 out of 15 patients sought medical attention within the initial 24 hours of impaction; the remaining patients presented later. A delay in seeking medical help can result in serious consequences, as mentioned earlier.

Among our patients, the prevailing complaints on presentation were predominantly symptoms of ipsilateral neck pain and dysphagia. Some cases presented with no symptoms at all. The initial symptomatology of migratory or migrating foreign body ingestion, for example odynophagia, dysphagia, globus sensation, drooling and vomiting to respiratory distress symptoms such as shortness of breath, coughing, choking and stridor, can be deceptive.[6]

- Migratory foreign bodies in the upper aerodigestive tract are uncommon but can lead to serious complications, such as abscess formation, vascular complications and even life-threatening mediastinitis, highlighting the importance of prompt intervention
- Patients may present with various symptoms, including neck pain, dysphagia and abscesses, making early recognition challenging, and precise diagnosis relies on imaging techniques, particularly computed tomography scans
- Fish and chicken bones, along with metal wires, were common migratory foreign bodies, emphasising the diverse nature of ingested objects that can lead to extraluminal migration
- Neck exploration for foreign body retrieval can be challenging because of imprecise localisation, emphasising the need for meticulous surgical dissection and intra-operative radiography for guidance
- To the best of our knowledge, this is the largest case series on extraluminal migratory foreign bodies in otolaryngology practice

While infrequent, these migrating foreign bodies can lead to severe complications, such as suppurative parapharyngeal or retropharyngeal abscess (due to the introduction of bacteria

https://doi.org/10.1017/S0022215124000690 Published online by Cambridge University Press

into visceral space), which can cause severe and life-threatening mediastinitis. In addition, these foreign bodies may penetrate adjacent visceral structures, including the thyroid gland, causing thyroid abscess.[7] Moreover, there is a risk of these objects penetrating major blood vessels in the neck, leading to vascular complications such as aorto-oesophageal and innominate-oesophageal fistulae, as well as carotid rupture and death.[8]

Although lateral neck radiographs are helpful in confirming the presence of a foreign body, they have limitations in determining whether migration has occurred. Migration is considered to have happened when there is a history of foreign body ingestion, a positive finding on lateral neck radiography, a negative outcome from flexible or rigid laryngo-oesophagoscopy and the presence of a foreign body either inside or outside the upper digestive tract, as identified through CT. A CT scan of the neck, utilising extra-fine cuts of 1 mm, is the investigative method of choice as it can identify thin, small and minimally calcified foreign bodies, which are difficult to identify by plain X-ray radiographs. In addition, the scan acts as a 'road map' for the surgeon, providing precise information about the size, type and orientation of the foreign body, and its relationship to other vital structures in the neck when neck exploration is planned.[9] However, CT scans have their limitations. Determining whether the foreign body is partially or entirely extraluminal can be challenging in some cases. In such cases CT scanning with an oral contrast may provide valuable information. If the foreign body is clearly distinguishable, separate from the contrast in the lumen, it can be inferred to be entirely extraluminal.[10]

Once it has been established that the foreign body is situated extraluminally, it is advisable to conduct neck exploration and removal through an external approach. This approach is recommended to mitigate the risk of life-threatening complications. During neck exploration, because of the extension given for the neck positioning and the mobility of the soft tissues in the neck relative to the bony and cartilaginous structures, the foreign body may not be precisely located as observed in the CT scan. Using the C-arm intra-operatively to localise the foreign body in the neck is recommended in such cases.[11] Searching for a migrated foreign body has been analogously described by some otolaryngologists as akin to finding a needle in a haystack,[5] hence meticulous surgical dissection should be performed for identification and retrieval of it.

To the best of our knowledge, this is the largest case series on extraluminal migratory foreign bodies in otolaryngology practice.

Conclusion

Although migratory foreign bodies are not prevalent, they are not implausible in otolaryngology practice. Recognising a migrating foreign body requires a high index of suspicion. The combination of a thorough history, physical examination and imaging studies is crucial to establish a diagnosis, emphasising the importance of early intervention to prevent complications. A meticulous and systematic approach is essential during neck exploration, and intra-operative radiography can be valuable in locating the foreign body. Effectively diagnosing and extracting these migrating foreign bodies presents a significant challenge for otolaryngologists, necessitating prompt treatment.

Competing interests. None declared

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