This is an Accepted Manuscript for *The Journal of Laryngology & Otology*
DOI: 10.1017/S0022215124000690

Lost and Found: Surgical Adventures in Migratory Foreign Body Cases

Author 1: Dr. Divya G M

Qualifications: MBBS, MS (ENT), MCh (Head & Neck Oncosurgery)

Associate Professor, Department of ENT, Head and Neck surgery (CAP), Pariyaram

Medical College, Kannur, Kerala

Email : omdgm4177@gmail.com

Author 2: Dr Sanu P Moideen*

Qualifications: MBBS, MS (ENT), DNB (ENT), FHNOS

Consultant ENT, Head & Neck Oncosurgeon, ACE - Centre for Advanced Care in ENT, Head and Neck Oncosurgery, Muvattupuzha, Kerala, India

Email : drsanu85@gmail.com

Author 3: Dr. Razal M Sheriff

Qualifications: MBBS, MS (ENT)

Consultant ENT Surgeon, ACE - Centre for Advanced Care in ENT, Head and Neck Oncosurgery, Muvattupuzha, Kerala, India

Email : dr.razal@yahoo.com

Author 4: Dr. Amjad Khan

Qualifications: MBBS, MS (ENT)

Consultant ENT Surgeon, AIG Hospitals, Hyderabad, India

Email : sarahamjadkhan@gmail.com

***Corresponding author**

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

Abstract

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

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

Results: 15 patients presented with varied symptoms, and fish and chicken bones, along with metal wires, were common foreign bodies. CT 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, though rare, pose significant challenges for otolaryngologists. Early recognition, thorough diagnosis, and meticulous neck exploration are 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.

Keywords: Dysphagia, Endoscopy, Swallowing, Computerised tomography

Lost and Found: Surgical Adventures in Migratory Foreign Body Cases

1. INTRODUCTION

The presence of foreign bodies in the upper aerodigestive tract is a frequent occurrence in otolaryngologic 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 esophagus. Typically, outpatient procedures such as laryngoscopy, hypopharyngoscopy, or esophagoscopy under general anesthesia can successfully remove these foreign bodies [3].

However, a small percentage of these 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. Despite an extensive search, which included databases such as NCBI, MEDLINE, MESH, PubMed, ScienceDirect-Elsevier, HERDIN, and PJO-HNS, they only identified 67 cases of ingested foreign bodies that had migrated extraluminally [4]. Most of them were case reports, including one or few patients. To address this research gap, this observational study was carried out with the following objectives:

- To analyze the clinical presentation, assessment, and treatment of migrated foreign bodies.
- To investigate factors predisposing extraluminal migration of foreign bodies.

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

2. MATERIALS & METHODS

This study was a prospective, descriptive, multicentric investigation conducted at the

- Department of ENT, Head and Neck Surgery, Government Medical College Hospital in Calicut, Kerala, India, spanning from December 2012 to August 2015.
- Department of ENT, Head and Neck Surgery, Government Medical College Hospital in Calicut, Kerala, India, spanning from October 2019 to November 2023.
- Department of ENT, Head and Neck Surgery at MCS Hospital in Muvattupuzha was involved from January 2021 to August 2023, and the
- Department of ENT, Head and Neck Surgery at Smita Memorial Hospital in Thodupuzha 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, as well as radiological and intra-operative findings.

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

3. 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 these medical centers. Among them, there were 6 male and 9 female patients.

Time of presentation: Four patients sought medical attention within twenty-four hours of ingesting the foreign body. Five patients presented on the first week, three presented between eighth to fourteenth day, one on the twentieth day, one two months later, and the final patient reported a history of foreign body ingestion five years prior.

Patient symptoms: Out of the 15 patients, 8 experienced neck pain, 3 had neck swelling, and 3 complained of difficulty swallowing (dysphagia), and one had on and off pricking sensation in the throat as their primary concern. Only two patients, who were elderly and had multiple comorbidities, presented with frank retropharyngeal abscess. All others experienced localized 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 laryngo-pharyngoscopy and attempted removal.

Unfortunately, one patient with a foreign body in the thyroid gland was conservatively managed by her primary care physician for a duration of five years, being diagnosed as thyroiditis. It was only in the fifth year, during a CT scan, that the foreign body was visualized and subsequently retrieved. It turned out to be a bone from a Pearl Spot fish.

One patient with a metallic wire as foreign body in the base of tongue, was managed as laryngopharyngeal reflux disease for a period of two months. She gave no history of foreign body ingestion, her only symptom was on and off pricking sensation in the throat. She underwent flexible nasopharyngolaryngoscopy multiple times before and since the foreign body was

extraluminal inside the base of tongue tissue, it was not picked during the scopies and she was managed conservatively. In view of persistent symptoms, she underwent a screening computed tomogram of the neck, which showed the foreign body.

Evaluation: All patients underwent a plain computed tomogram (CT) scan of the neck, which confirmed the extraluminal migration of the foreign body. This imaging technique provided precise information regarding the size, type, orientation, and relationship of the foreign body 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: retropharyngeal space (4 patients), thyroid gland (3 patients), parapharyngeal space (3 patients), base of tongue (1 patient), submandibular gland (1 patient), duct of parotid gland (1 patient), prevertebral muscle (1 patient), and sternocleidomastoid muscle (1 patient).

Types of foreign bodies: Nine patients had fish bones as foreign bodies; specifically, 6 of them were bones from *Arius sona* (known locally as Etta), 2 were bones from *Etroplus suratensis* (Pearl spot fish, known locally as Karimeen), and another 1 was from *Sardinella longiceps* fish. Among the remaining three patients, 4 had chicken bones, and 2 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, we were able to retrieve after doing 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.

4. DISCUSSION

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

When foreign bodies possess sharp edges, there is a potential for them to breach the pharyngeal mucosa and move extraluminal into the neck spaces. This condition, known as "migratory foreign bodies," requires surgical intervention for extraction. In such instances, identification and retrieval through procedures like hypo pharyngo-laryngoscopy or esophagoscopy 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 esophagus. This clarifies why increased rates of penetration are observed in the hypopharynx and cervical esophagus. 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 [6]. Consistent with Remson's findings, our study observed that, akin to Chee and Sethi's inference, all migrated foreign bodies were characterized 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 pediatric population, two of our patients were under the age of 16. The remaining patients in our study were 28 years of age or older.

In contrast to conventional beliefs and teachings, only four out of fifteen 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 upon 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 can be deceptive. It can be odynophagia, dysphagia, globus sensation, drooling, and vomiting to respiratory distress symptoms such as shortness of breath, coughing, choking, and stridor. [7]

While infrequent, these migrating foreign bodies can lead to severe complications, like suppurative parapharyngeal or retropharyngeal abscess (due to introduction of bacteria into visceral space), which can cause severe and life-threatening mediastinitis. Additionally, these foreign bodies may penetrate adjacent visceral structures, including the thyroid gland etc causing thyroid abscess [5]. Moreover, there is a risk of these objects penetrating major blood vessels in the neck, leading to vascular complications such as aorto-esophageal and innominate-esophageal 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-esophagoscopy

and the presence of a foreign body either inside or outside the upper digestive tract, as identified through computed tomography (CT). A CT scan of the neck, utilizing extra fine cuts of 1 mm, is the investigative method of choice as it can identify thin, small, and minimally calcified foreign bodies, which is difficult to identify by plain X-ray radiographs. Additionally, the scan acts as a 'road map,' for the surgeon providing precise information about the size, type, 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 Scan 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 extraluminal, 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 due to the extension given for the neck positioning and due to 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 localize 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 [6], hence meticulous surgical dissection should be performed for identification and retrieval of them.

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

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

5. CONCLUSION

Although migratory foreign bodies are not highly prevalent, they are not implausible in otolaryngology practice. Recognizing a migrating foreign body requires a high index of suspicion. The combination of a thorough history, physical examination, and imaging studies is crucial for establishing a diagnosis, emphasizing the importance of early intervention to prevent complications. A meticulous and systematic approach is essential during neck exploration, and intraoperative 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.

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

6. REFERENCES

1. Murthy PS, Bipin TV, Ranjit R, Murty KD, George V, Mathew KJ. Extraluminal migration of swallowed foreign body into the neck. Am J Otolaryngol. 1995;16:213–215
2. Remsen K, Lawson W, Biller HF, Som ML. Unusual presentation of penetrating foreign bodies of upper aerodigestive tract. Ann Otol Rhino Laryngol Suppl 1983;105:32-44
3. Osinubi O, Osiname A, Pal A, Lonsdale R, Butcher C. Foreign body in the throat migrating through the common carotid artery. J Laryngol Otol. 1996;110:793–795
4. Salting AO. Not just another sore throat: Extraluminal migration of foreign body from the hypopharynx—a case report. SAGE Open Medical Case Reports. 2018 Oct;6
5. Ho NH, Chang FC, Wang YF. Clinical approaches to migrating ingested foreign bodies in the neck. Ear, Nose & Throat Journal. 2022 Mar;101:181-5
6. Chee LWJ, Sethi DS. Diagnostic and therapeutic approach to migrating foreign bodies. Ann Otol Rhinol Laryngol 1999; 108: 177–180
7. Jayachandra S, Eslick GD. A systematic review of paediatric foreign body ingestion: presentation, complications, and management. Int J Pediatr Otorhinolaryngol 2013; 77; 311–317
8. Tang P, Singh S, Shoba N, Rahmat O, Shivalingam S, Gopala KG, et al. Migrating foreign body into the common carotid artery and internal jugular vein–A rare case. Auris Nasus Larynx. 2009 Jun 1;36(3):380-2
9. Jamal S, Irfan M, Nazim N. Spontaneous extrusion of migrated fish bone in the neck after 48 hours of ingestion. Bangladesh J Med Sci 2011 Apr;10:129-32
10. Sethi DS, Stanley R. Migrating foreign bodies in the upper digestive tract. Annals Acad Med Singapore 1992;21:3

11. Kavitha AK, Pinto GO, Moras K, Lasrado S. An unusual migrated foreign body. J Clin Diagn Res 2010;4:2903-06

7. COMPLIANCE WITH ETHICAL STANDARDS

Funding Statement

The study has not received funding from any organization or institution.

Ethical Approval

The procedures used in this study are adhere to the tenets of the Declaration of Helsinki (2017/20).

Conflict of interest

The authors declare that they have no potential conflict of interest (financial and nonfinancial)

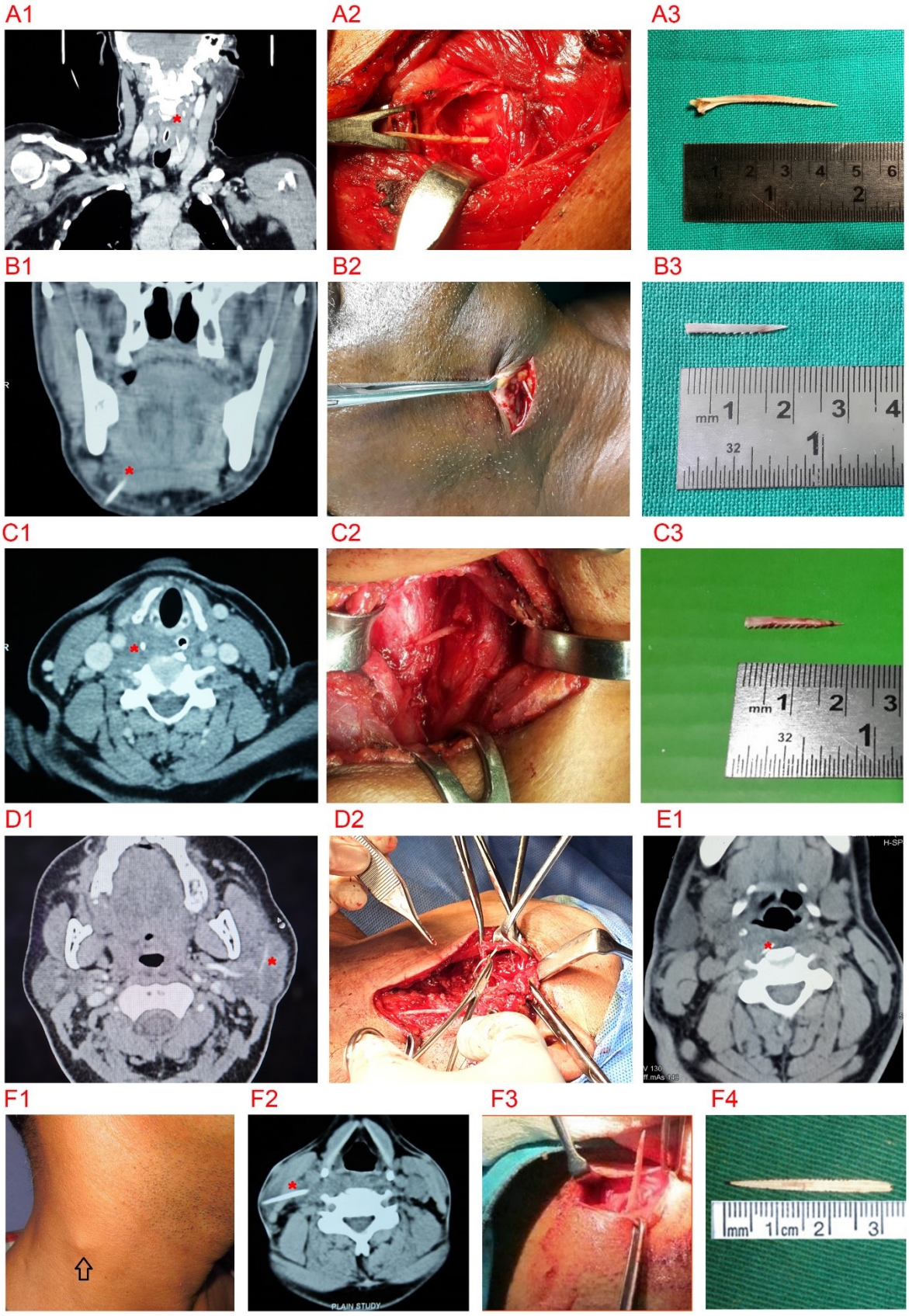
Informed Consent

Informed consent was obtained from all individual participants included in the study.

Summary:

- Migratory foreign bodies in the upper aerodigestive tract are uncommon but can lead to serious complications, necessitating surgical intervention.
- Patients may present with various symptoms, including neck pain, dysphagia, and abscesses, making early recognition challenging.
- Precise diagnosis relies on imaging techniques, particularly CT scans, which provide detailed information about the size, type, and orientation of the foreign body in relation to vital neck structures.
- Fish and chicken bones, along with metal wires, were common migratory foreign bodies, emphasizing the diverse nature of ingested objects that can lead to extraluminal migration.
- Migratory foreign bodies can lead to severe complications such as abscess formation, vascular complications, and even life-threatening mediastinitis, highlighting the importance of prompt intervention.
- Neck exploration for foreign body retrieval can be challenging due to imprecise localization, emphasizing the need for meticulous surgical dissection and intraoperative radiography for guidance.
- To the best of our knowledge, this is the largest case series on extraluminal migratory foreign bodies in otolaryngology practice.

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



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