Section: Otorhinolaryngology

Case Series

DEEP NECK SPACE INFECTION SECONDARY TO FOREIGN BODY IN AERO DIGESTIVE TRACT

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ABSTRACT

Deep neck space infections (DNSI) caused by foreign bodies in the aerodigestive tract are challenging to diagnose and manage. This series examined the clinical profiles, diagnostics, microbiology, management, and outcomes of seven patients with DNSI from ingested sharp objects. Odynophagia was the most common presentation, with a mean age of 51.3 years. Comorbidities, especially diabetes mellitus, increase disease severity. Management involves surgical drainage, foreign body removal, and broad-spectrum antibiotics. One patient with uncontrolled diabetes developed diabetic ketoacidosis and died despite intervention. The microbiological results showed polymicrobial infections, with one patient positive for Pseudomonas aeruginosa. Foreign body-induced DNSI require longer hospitalisation and are associated with more complications than odontogenic DNSI. Early intervention is crucial, as mortality is higher in foreign body cases with delayed diagnosis. This series highlights the importance of prompt recognition and management of DNSI caused by ingested foreign bodies to prevent life-threatening complications.

Keywords: Deep neck space infection, Aerodigestive Tract, Odynophagia, Foreign body.

INTRODUCTION

Deep neck space infections (DNSI) occur within the fascial planes and deep connective tissue compartments. These spaces are organised into superficial (investing), middle (pretracheal), and deep (prevertebral) fascial layers, which act as barriers to infection. Once pathogens breach these boundaries, they spread along planes into adjacent spaces and vital structures of the host.[1] While DNSI commonly arise from odontogenic sources, pharyngitis, or tonsillitis, some cases result from ingested foreign bodies penetrating the aerodigestive tract.[2]

Sharp objects, such as fish or chicken bones, pose a risk by perforating the mucosa and facilitating bacterial inoculation into deep spaces. Migration may be occult, with negative endoscopic findings despite the infection. Case reports have shown that ingestion of fish bones can lead to abscess formation, mediastinitis, or fatal sepsis when treatment is delayed.[3,4] Sharp foreign bodies in the hypopharynx or oesophagus can penetrate the prestyloid and parapharyngeal spaces, causing abscesses and complications such as airway compromise, jugular vein thrombosis, and septic shock.[5,6]

Diabetes mellitus (DM) and immunocompromise increase morbidity and mortality rates. Patients present with odynophagia, dysphagia, neck pain, swelling, trismus, and signs of infection. Foreign body sensation with severe odynophagia and submandibular pain suggests that the object is embedded.[3,7] CT with contrast remains the diagnostic standard, showing the extent of the abscess and the location of the foreign body.[2,6] Management requires airway assessment, broad-spectrum antibiotics, and surgical intervention. Incision and drainage with foreign body removal are essential procedures.[5,8] Failure to extract the object can lead to persistent infections.

Despite medical advances, these infections remain a challenge. Sharp objects and deep penetrations contribute to high morbidity. Mortality remains significant when treatment is delayed.[3] This case

series examined the clinical profiles, diagnostics, microbiology, management, and outcomes of DNSI caused by aerodigestive foreign bodies.

CASE PRESENTATION

Case 1:

A 37-year-old female with no pre-existing illnesses presented on the third day of odynophagia. Radiological evaluation revealed a retropharyngeal abscess at the C5–C6 level. No organisms were isolated from culture. A chicken bone was identified as the underlying cause. The patient underwent incision and drainage (I&D) with removal of the foreign body and recovered without complications.

Case 2:

A 47-year-old male with known coronary artery disease and diabetes mellitus presented on day 3 of odynophagia. Imaging identified a parapharyngeal abscess, secondary to an impacted fish bone. Culture was sterile. The patient underwent I&D and extraction of the foreign body, with satisfactory clinical outcome.

Case 3:

A 67-year-old female without comorbidities reported odynophagia of two days' duration. Computed tomography demonstrated a retropharyngeal abscess from C4 to C6 vertebral levels. A retained fish bone fragment was noted intraoperatively. Culture was negative. The patient was treated with I&D and foreign body retrieval and showed complete recovery.

Case 4:

A 55-year-old male with no prior medical history presented on day 5 of odynophagia. Imaging revealed a retropharyngeal abscess between C2 and C4 levels. A fish bone fragment was identified as the source. Microbiological culture yielded no growth. The patient underwent surgical drainage and foreign body removal, resulting in clinical improvement.

Case 5:

A 68-year-old male, previously healthy, presented on the fourth day with odynophagia. Radiological findings demonstrated an abscess extending from C1 to C6, involving both retropharyngeal and parapharyngeal spaces. A fish bone was found to be the causative agent. Culture was negative. The patient was managed with I&D and foreign body extraction and recovered uneventfully.

Case 6:

A 50-year-old female presented with odynophagia of four days' duration. She had no underlying comorbidities. Imaging revealed a retropharyngeal abscess extending from C2 to C8 levels. Intraoperative findings included multiple chicken bone fragments. No organisms were isolated from culture. Following I&D and foreign body removal, the patient had an uneventful postoperative course.

Case 7:

A 35-year-old female with diabetes mellitus, pulmonary tuberculosis, and features of airway obstruction presented on day 6 with odynophagia and cervical swelling. Laboratory work-up confirmed diabetic ketoacidosis. Imaging revealed a retropharyngeal abscess from C4 to C7 levels. Culture grew Pseudomonas aeruginosa. The patient underwent I&D, foreign body removal, and tracheostomy. Despite intervention, she developed complications and succumbed to illness.

Figure 1: Lateral neck X-ray showing foreign body in the cervical oesophagus

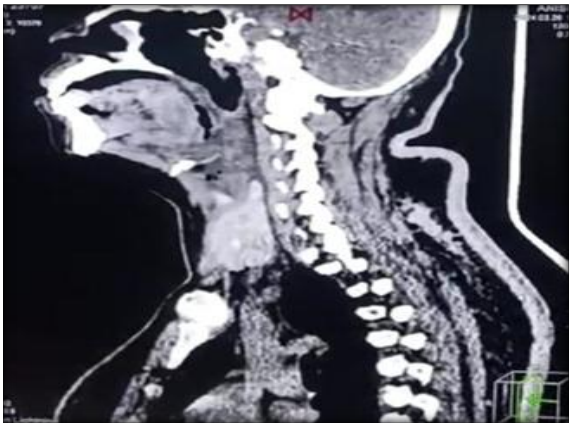

Figure 2: Sagittal CT scan of neck showing DNSIs

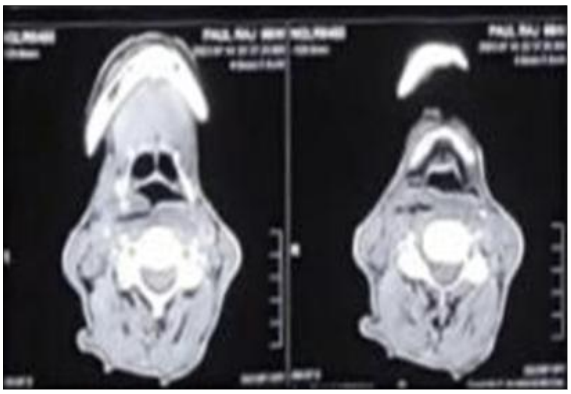

Figure 3: Axial CT images of the neck showing DNSIs

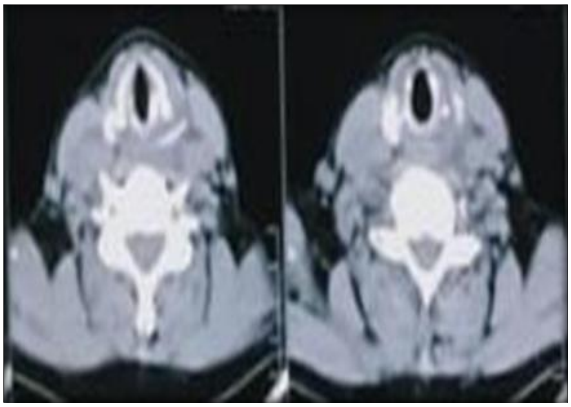

Figure 4: Axial CT sections of the neck showing a retropharyngeal abscess

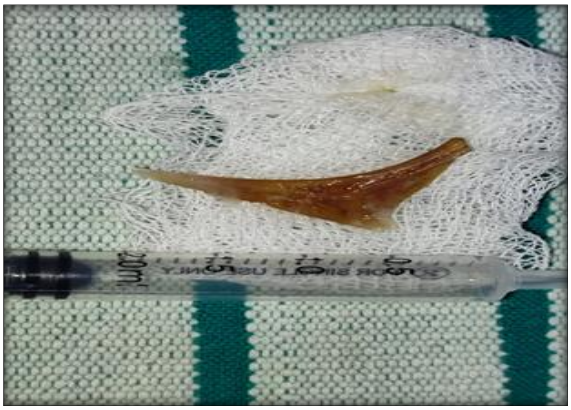

Figure 5: Extracted fish bone foreign body following surgical removal

DISCUSSION

DNSI are life-threatening conditions with evolving epidemiology influenced by aetiology and advances. Foreign body infections present challenges and require comparison with odontogenic, tonsillar, or nodal infections. In our series, odynophagia was the most commonly reported clinical presentation, followed by odynophagia with neck swelling. DNSI commonly result from odontogenic infections and peritonsillar sources, with a higher incidence in males and adults, and diabetes increases disease severity.[9] This was similar to our findings, where 50% of the reported comorbidities were diabetes mellitus, followed by CAD. Despite timely intervention, one patient with uncontrolled diabetes developed diabetic ketoacidosis (DKA), with a higher incidence in females (57.14%) than in males (42.86%). A study has shown that odontogenic sources account for 70% of cases, primarily in the submandibular and parapharyngeal spaces.[10]

Foreign body-induced DNSI show a bimodal distribution in children (accidental ingestion) and adults (elderly or predisposed to ingestion).[11,12] This was supported by our series, which reported a mean patient age of 51.3 years. In this case series of seven patients, five presented with retropharyngeal abscess, one with a parapharyngeal abscess, and one with combined retropharyngeal and parapharyngeal abscess. Retropharyngeal abscess is the most common deep neck space infection secondary to foreign body in the aerodigestive tract. Common objects include sharp bones or metals that migrate into deep fascial layers. These patients present later due to occult migration of the stones.[11] Odontogenic DNSI progress to Ludwig's angina, whereas foreign body cases have higher suppurative complications.[13] Contrast-enhanced CT is essential for abscess delineation and object localisation in radiotherapy planning. Objects may require repeated imaging.[12]

DNSI are polymicrobial, with Streptococcus, Staphylococcus, and anaerobic bacteria predominating in their composition. In our series, only one patient had positive culture results. Klebsiella occurs more in diabetic patients, while gram-negative bacteria are common with foreign bodies.[9] Treatment requires surgical drainage and antibiotics. Foreign body cases require object retrieval, and all our patients underwent foreign body removal via rigid esophagoscopy with broad-spectrum antibiotics, with one undergoing tracheostomy.[12] Foreign body-induced DNSI require longer hospitalisation and are associated with higher complications. Early intervention in odontogenic DNSI leads to better outcomes. DNI mortality remains higher in foreign body cases with delayed diagnosis. Complex DNSI with mediastinitis have a 26% mortality rate, whereas uncomplicated odontogenic DNSI have a mortality rate of < 5%.[9,14]

CONCLUSION

DNSI from aerodigestive foreign bodies are severe and life-threatening conditions that require high clinical suspicion and prompt intervention. In this series, the majority of patients presented with retropharyngeal abscess, followed by parapharyngeal and combined space involvement. Patients presented with odynophagia, mainly due to fish and chicken bones. Most patients recovered after surgical drainage, foreign body removal, and broad-spectrum antibiotics, although one patient with uncontrolled diabetes had a fatal outcome, highlighting the risks in immunocompromised individuals. While microbiological results were often negative, polymicrobial infections were noted, with one case being positive for Pseudomonas aeruginosa. Early diagnosis using contrast-enhanced CT and aggressive management led to favourable outcomes in this case. Delays in diagnosis, particularly in patients with diabetes, increase morbidity and mortality. Urgent recognition and management are critical for preventing complications.

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