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REVIEW

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Fish bone migration: complications, diagnostic challenges, and treatment strategies

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Abstract

Background Fish bone impaction in the pharynx is a common otolaryngological emergency. However, if the fish bone perforates the pharyngeal wall or the gastrointestinal wall and migrates to the neck tissues or organs, entering the lungs, mediastinum, heart, liver, biliary tract, spleen, pancreas, or other structures, or damages major blood vessels in the thoracic or abdominal cavities, it can lead to severe complications. This condition is rare and dangerous, potentially resulting in a series of serious complications, including neck abscess, thyroid abscess, thrombosis or air embolism of the cervical vessels, esophageal perforation, rupture of major mediastinal vessels, mediastinitis, aorto-esophageal fistula, lung abscess, spinal injury, sepsis, splenic abscess, hepatic abscess, anal fistula, and it may even be misdiagnosed as a tumor.

Objective This narrative review synthesizes evidence on fish bone translocation complications to (1) identify high-risk clinical presentations, (2) guide site-specific imaging selection, and (3) inform multidisciplinary management strategies.

Methods Use the keyword "fishbone" to systematically search articles from PubMed、CNKI and Embase databases from 1972 to 2024. Review all original articles and include them in this review where appropriate. This narrative review synthesizes evidence from case reports and observational studies to explore complications and management of fish bone translocation in uncommon sites. Given the predominance of heterogeneous case reports, a formal systematic review with meta-analysis was not feasible; however, we employed systematic search strategies to minimize selection bias.

Conclusion To avoid severe complications, it is crucial to provide comprehensive information on the management of fish bone impaction. When fish bone removal cannot be achieved using laryngoscopy, prompt and decisive surgical intervention is required to extract the foreign body.

Keywords Fishbone, Gastrointestinal foreign body, Pharyngeal foreign body, Complications

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Background

Fish bones are common pharyngeal and gastrointestinal foreign bodies encountered in otolaryngological emergencies. Recent epidemiological data from Japan highlights a high incidence of pharyngeal foreign bodies in children, with fish bones accounting for 67% of cases and underscoring the global need for improved diagnostic strategies to prevent complications such as perforation and abscess formation [1]. The most frequent locations of fish bones are the tonsillar fossa, base of the tongue, piriform fossa, lateral pharyngeal wall, and esophageal wall. Improper handling of impacted fish bones, such as forcing the ingestion of a rice ball or dry food, can cause the fish bone to migrate, potentially into tissues, leading to severe complications. Complications following fish bone ingestion, such as perforation and abscess formation, occur in approximately 12–18% of cases, underscoring the urgency of accurate diagnosis and tailored therapeutic interventions to mitigate severe outcomes [2].In such cases, seeking professional assistance is essential. This article reviews the causes of fish bone migration, the most common and rare locations, symptoms, auxiliary examinations, and complications. A literature search was conducted in PubMed、CNKI and Embase databases from 1972 to 2024. The aim is to addresses the diagnostic challenges of ectopic fish bone impactions by identifying key clinical and imaging red flags, advocating for anatomically tailored imaging protocols (contrast-enhanced CT for suspected vascular injury versus MRI for spinal involvement), and promoting multidisciplinary team-based decision-making (integrating emergency medicine, radiology, and surgical specialties) to reduce diagnostic delays, minimize procedural risks, and improve patient outcomes through timely, precision-guided interventions.

Methods

Search strategy

Using the keyword “fishbone” a systematic search was conducted in PubMed, Embase, and CNKI databases for studies on fish bone migration. This was completed by the first author (DL) in February 2024.

Review and study selection process

Titles and abstracts identified during the database search were independently evaluated by two reviewers (DL, WTZ) to determine potential eligibility.

Inclusion criteria comprised: (1) original research articles, including case reports (individual/multiple cases with detailed clinical documentation) and case series (≥ 3 cases with aggregated analysis), published in peer-reviewed journals (non-English articles required accessible translations); (2) human patients of all ages/genders with fish bone translocation to uncommon anatomical sites, defined as perforation through the pharyngeal or gastrointestinal wall and migration to extraluminal structures (e.g., neck tissues, lungs, mediastinum, liver, biliary tract, major blood vessels), explicitly excluding common sites (tonsillar fossa, tongue base, piriform fossa, pharyngeal/esophageal); and (3) articles providing: clinical presentation (symptoms, imaging), diagnostic modality (CT, ultrasound, endoscopy), management approach (surgery, conservative therapy), or outcome data (complications, follow-up).

Exclusion criteria encompassed non-relevant studies (animal experiments, conference proceedings), insufficiently documented articles (e.g., missing outcomes or imaging details), and duplicate/redundant data (retained only the most comprehensive report).

During the screening process, discrepancies between reviewers (D.L. and W.T.Z.) were resolved via consensus; full-text articles meeting criteria were independently assessed, and reference lists were manually searched for additional literature. The PRISMA flow diagram (Fig. 1) summarizes the search strategy, with a complete list of included studies in Appendix 1.

Data extraction

In each study, extract the following data: (1) patient’s age, gender, and time from onset to presentation; (2) site of fish bone migration; (3) clinical symptoms and physical examination findings; (4) diagnostic methods; (5) treatment modalities; (6) misdiagnosis; (7) patient outcomes.

Results

This literature review, published from February 1972 to February 2024, includes 123 articles. It comprises case reports and case series of fish bone impaction in rare locations, analyzing 127 cases of patients with rare fish bone impaction sites and their associated outcomes.

From Table 1, it is evident that among these 127 patients, the maximum age was 83 years, the minimum age was 2 years, and the average age was 52 ± 17.64 years. There were 77 males, accounting for 60.63%, and 50 females, accounting for 39.37%. We observed a wide range in the time intervals from fish bone impaction to hospital presentation, with the longest interval being 12 years, where the patient presented due to recurrent pneumonia. The shortest interval was only 5 h from symptom onset to presentation. Therefore, the average time interval was 128 ± 599.72 days, with a large standard deviation (SD) of 599.72 days and a coefficient of variation (CV) of 4.681, indicating significant variability.

According to Table 2, among the 127 patients reviewed, the most frequent site of fish bone impaction was the abdomen, specifically the intestines, accounting for 25.98% with 33 cases. This encompassed various segments of the gastrointestinal tract including the

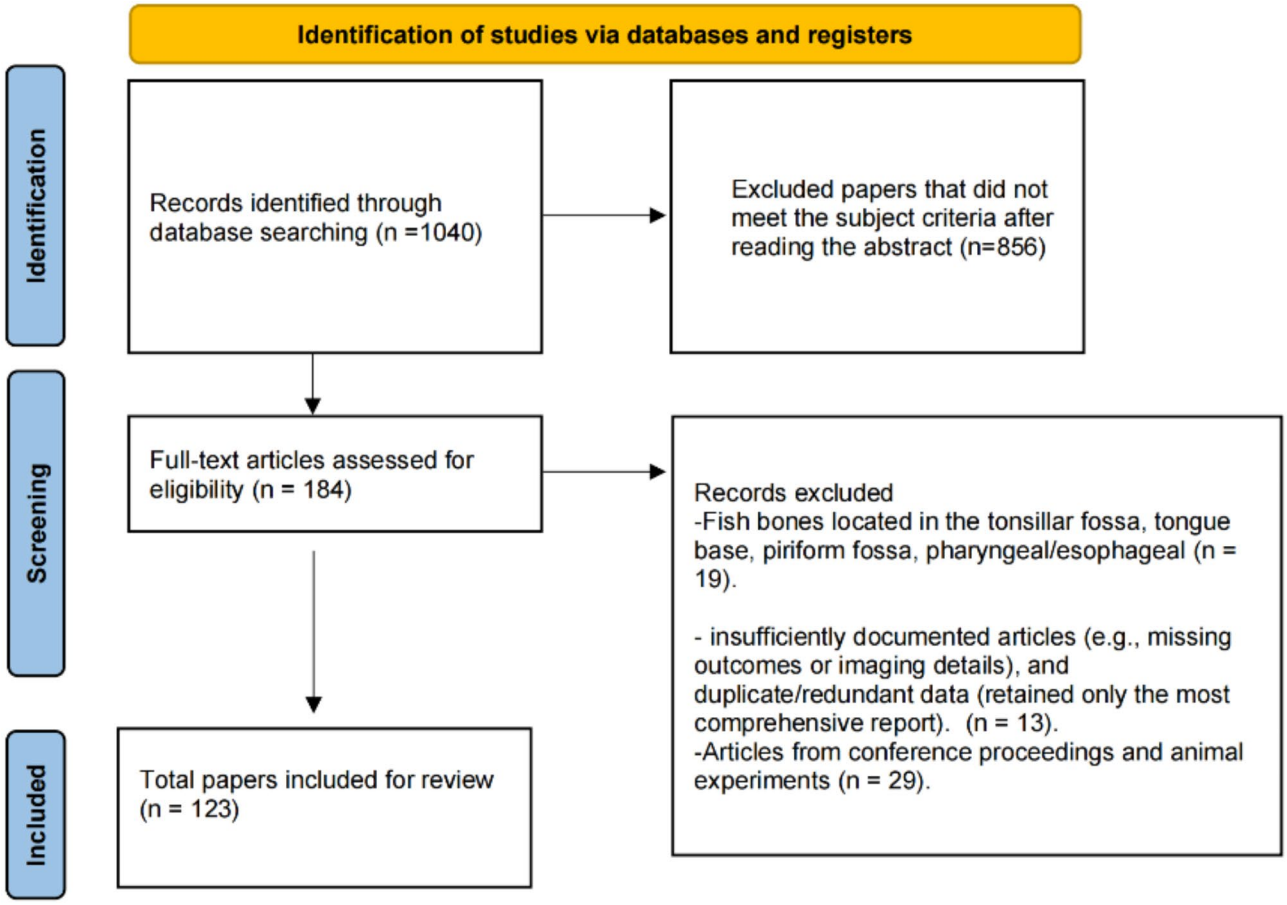


Fig. 1 Study selection flow diagram

Table 1 Patient demographics

Patients characteristics		MAX	MIN	Mean ± SD Median (IQR)*N* (%)
Characteristics				
Age (years)	52 ± 17.64	83	2	
Sex(numbers)	Male 77			60.63%
	Female 50			39.37%
Disease duration(days)	128 ± 599.72	4380	0.17	

jejunum, ileum, duodenum, appendix, Meckel's diverticulum, colon and rectum. In some instances, penetration through the intestinal wall led to complications such as omental abscesses or the long-term formation of inflammatory pseudotumors. Notably, one case involved direct penetration of a fish bone into the rectus abdominis muscle (0.79%). Additionally, there were cases where fish bones penetrated the intestines and led to abscess formation in the pelvic cavity. Furthermore, one patient even had a fish bone migrate to the uterus, accounting for 0.79%. Liver abscesses were the second most common presentation, affecting 22 patients (17.32%). These cases typically occurred following the migration of fish bones from the gastrointestinal tract into the liver, often presenting with prominent symptoms of fever. In certain cases, patients were initially misdiagnosed with liver cancer. One patient even developed a substantial liver abscess, necessitating differentiation from bacterially induced hematogenous liver abscesses [3]. Three cases involved fish bone migration to the pancreas (2.36%), with one patient misdiagnosed as chronic pancreatitis [4]. Two cases involved fish bone impaction in the spleen (1.57%). Two cases were lodged in the bile duct (1.57%), with one misdiagnosed as gallstones due to similar densities on ultrasound [5].One case involved impaction in the urachus (0.79%).

Fish bone perforations through the pharyngeal wall, leading to free migration to critical neck vessels and organs of neck, occurred in 17 cases (13.39%). Among these, the thyroid gland was most commonly affected, followed by instances of vessel puncture or infection leading to neck abscess formation. Some cases involved neck muscle involvement, such as abscess formation in the sternocleidomastoid muscle. One case even resulted in fixation of the cricothyroid joint, with symptoms including hoarseness [6]. Additionally, two cases involved

Table 2 Distribution of rare fish bone impaction sites

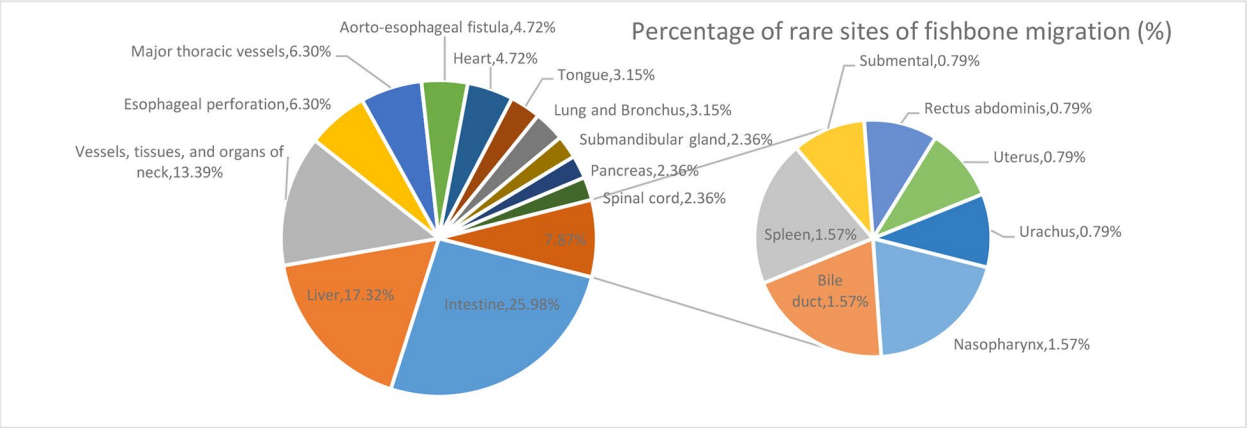
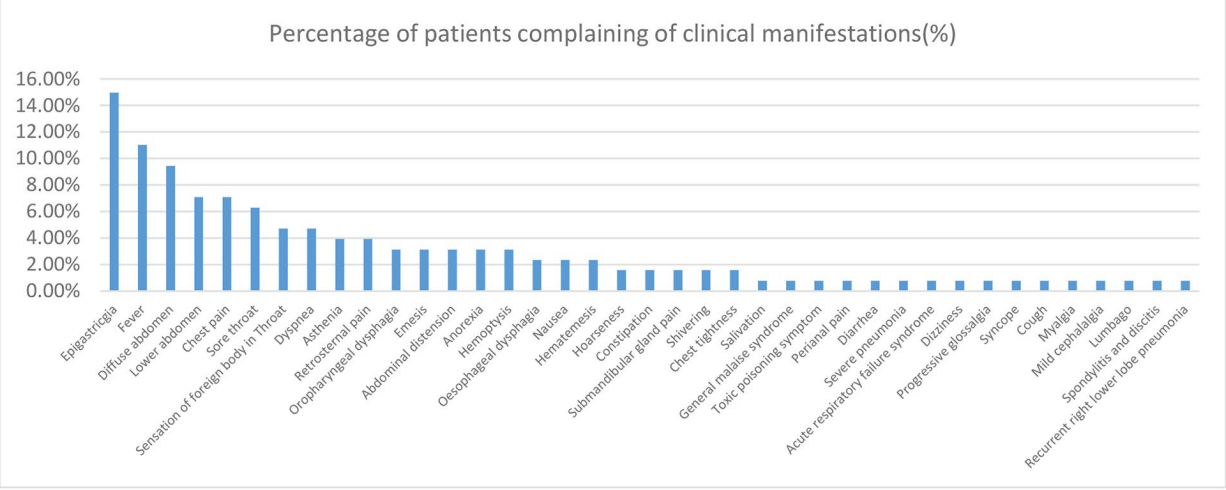


Table 3 Percentage of clinical symptoms in patients with rare-site embedded fishbone



impaction in the submandibular gland, and one in the submental region.

Fish bone perforation through the esophageal wall to reach thoracic tissues and organs was more prevalent, these patients are generally in critical condition, often presenting critically with symptoms such as chest pain and hematemesis, primarily managed with vascular repair. One case in this category resulted in death due to massive hemorrhage [7].There were 8 cases (6.30%) of patients with esophageal perforation resulting in mediastinal infection; 8 cases (6.30%) involved damage to major thoracic vessels, including 3 cases of the aorta, 1 case of the thoracic aorta, 1 case of the pulmonary artery, 1 case of the subclavian artery, 1 case of the vertebral artery, and 1 case of the brachiocephalic vein. Aorto-esophageal fistula due to fish bone penetration occurred in 6 cases (4.72%). Six patients (4.72%) experienced migration of fish bones to the heart, leading to pericardial effusion, with one patient succumbing due to refusal of treatment [8]. Four patients (3.15%) had fish bones enter the lung and bronchus post-ingestion of fish. There were 4 cases (3.15%) of fish bone impaction in the tongue. Three patients (2.36%) had fish bones migrate to the spine cord, resulting in secondary infections causing paraplegia or lower limb paralysis, with 2 cases in the cervical spine and 1 case in the thoracic spine. One patient who had a fish bone enter the cervical spine eventually died from septic shock [9]. Two cases (1.57%) involved fish bone migration to the nasopharynx post-ingestion.

Table 3 illustrates that following rare-site fishbone impaction, these patients most commonly presented with gastrointestinal symptoms: epigastric pain was accounted for 14.96%, diffuse abdominal pain for 9.45%, and lower abdominal pain for 7.09%. Subsequently, pyrexia was observed in 11.02% of cases, thoracalgia in 7.09%, and sore throat in 6.29%. Sensation of foreign body in

pharynx and dyspnea each accounted for 4.72%; Asthenia and retrosternalgia were each reported at 3.93%. Symptoms such as oropharyngeal dysphagia, emesis, abdominal distension, anorexia nervosa, and hemoptysis were each comprised 3.14%. Oesophageal dysphagia, nausea, and hematemesis were reported at 2.36%. Hoarseness, constipation, submandibular gland pain, chest constriction symptoms were reported at 1.59% each. Salivation, general malaise syndrome, toxic poisoning symptom, perianal pain, diarrhea, severe pneumonia, acute respiratory failure syndrome, dizziness, progressive glossalgia, syncope, cough, myalgia, mild cephalalgia, lumbago, spondylitis and discitis, and recurrent right lower lobe pneumonia were each accounted for 0.79%.

According to the data presented in Table 4, the most common positive physical examination findings in patients with fish bones impacted in rare locations were abdominal symptoms. The most prevalent was abdominal rebound tenderness, accounting for 10.24%, followed by abdominal tenderness, also at 10.24%. Abdominal rebound tenderness and abdominal rigidity each accounted for 4.72%, and intra-abdominal abscess was observed in 0.79% of cases. Other findings included inguinal hernia with an incidence of 0.79%, small-bowel obstruction also at 0.79%, upper abdominal mass at 0.79%, splenic tenderness at 0.79%, and epidural abscess of the abdomen at 0.79%. Next, cervical symptoms were also significant: cervical tenderness was found in 5.51% of cases, cervical swelling in 4.72%, submandibular gland swelling in 1.59%, and vocal cord paralysis in 0.79%. Tongue swelling, submental swelling, and retropharyngeal abscess each accounted for 0.79%. In terms of thoracic symptoms, pericardial effusion accounted for 2.36%, while the proportions of hemothorax and mediastinal effusion were both 0.79%. The incidence of mediastinal pneumomediastinum and diminished breath sounds in the right lung were also 0.79%. Furthermore, other signs such as shock were seen in 3.93% of cases, while the proportions of hypertension and hypotension were both 0.79%. Hemiparesis, mild lower limb paralysis, systemic air embolism, anal fistula, hematochezia, and jaundice were each observed at a rate of 0.79%.

CT: Computerized Tomography; US: Ultrasound; MRI: Magnetic Resonance Imaging; none: Nothing applied.

As evident from Table 5, the majority of patients, 67 individuals, representing 52.76% of the total, were diagnosed primarily through CT scans. A subset of 15 patients, accounting for 11.82%, underwent a combined diagnostic approach utilizing both CT and ultrasound (US). Additionally, 7 patients constituting 5.51%, were identified with fish bone fragments solely via US. In emergency medical situations where CT scans were unfeasible, 2 patients representing 1.57%, were diagnosed with fish bone presence under X-ray examination. Intriguingly, 3 patients, for 2.36%, had their fish bone detected during gastroscopy performing, as the perforation site and one end of the fish bone were visible. Additionally, another 3 patients, also accounting for 2.36%, were identified with the aid of both CT and gastroscopy. Notably, 2 patients, representing 1.57%, presented with symptoms suggestive of foreign body in the nasopharynx, which was subsequently confirmed by electronic nasopharyngoscopy, despite negative findings on multiple ancillary tests. Bronchoscopy facilitated the diagnosis in another 2 patients, 1.57%, with fish bone in the respiratory tract. One patient was diagnosed under MRI alone, while another required the combined use of MRI, US, and CT for definitive detection of the fish bone, each representing 0.79% of the total cases. Notably, 23 patients, a significant proportion, had their fish bone discovered post-operatively rather than pre-operatively,

Table 4 Percentage of physical examination findings in patients with rare-site embedded fishbone

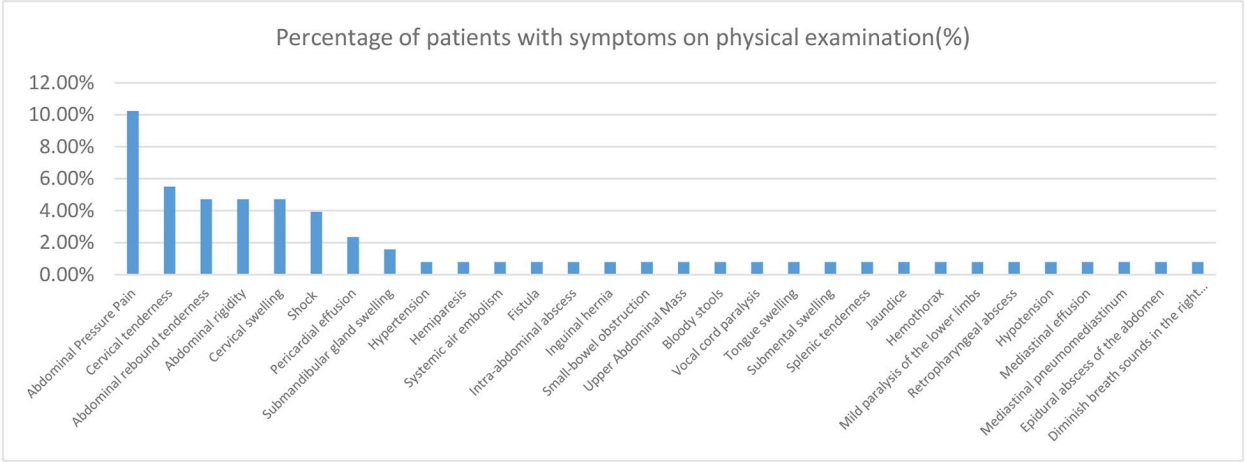


Table 5 Diagnostic auxiliary examinations used for confirmation

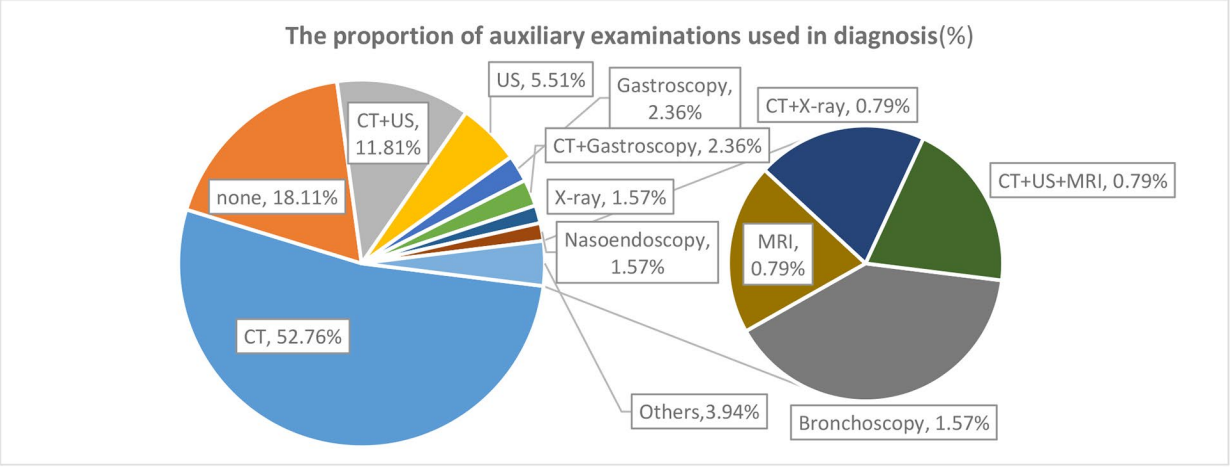
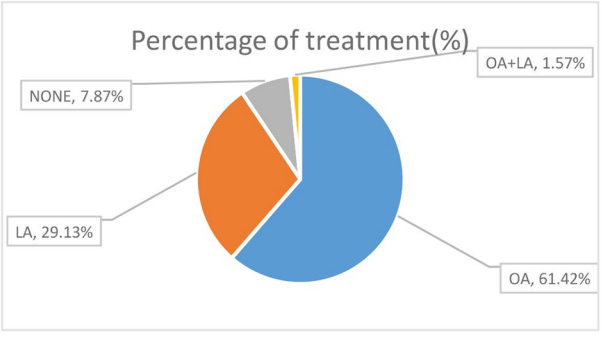


Table 6 Treatment regimens



underscoring the limitations of preoperative ancillary imaging in detecting certain instances of foreign body ingestion.

Table 6 reveals that the majority of patients underwent open surgery, totaling 78 cases (61.42%), including procedures such as percutaneous drainage or incisional drainage. Thirty-seven patients (29.13%) underwent endoscopic removal of the fishbone. Two patients (1.57%) required conversion to open surgery after failed endoscopic retrieval attempts. Ten patients (7.87%) did not undergo surgical intervention; some improved with conservative treatment while others died untreated. Most patients recovered after removal of the foreign body, except for one who declined surgery and died, and another who succumbed to septic shock.

Discussion

As far as we know, there is currently no systematic review on the rare-site impaction of fish bones; instead, case reports are prevalent. This review represents the sole comprehensive study to date on the rare occurrences of fish bone impaction in unusual anatomical locations. We systematically summarized data from reports spanning 1972 to February 2024, detailing the anatomical sites of rare fish bone impactions, reasons for displacement, patient demographics including age and duration from symptom onset to presentation, clinical manifestations, and positive findings from physical examinations. Covering a wide time span and encompassing numerous cases, this study offers critical insights and lessons for future clinical practice to prevent diagnostic errors or delays.

Causes of a stuck fishbone

Swallowing foreign objects is a common emergency in gastroenterology and otolaryngology [10]. It is frequently seen in children but can also occur in adults, particularly those who wear dentures, have mental disabilities, or abuse alcohol. Elderly patients with missing teeth or dentures may also be at higher risk because these conditions reduce their oral and tongue sensory perception, making it difficult for them to detect foreign bodies such as fish bones. Additionally, individuals with impaired chewing ability, especially the elderly, may not fully detect fish bones when swallowing food. In this review, the oldest

patient was 83 years old, and the youngest was 2 years old. Notably, foreign objects, including fish bones, are often ingested by individuals with suicidal tendencies, criminal behavior, or mental instability [11]. Gastrointestinal perforation caused by fish bones is a severe complication. In our review, the most common site of fish bone migration is the gastrointestinal tract. There are several reasons for this: Firstly, sharp fish bones can directly penetrate the gastrointestinal tract. Secondly, fish bones can cause local mucosal damage, leading to edema and necrosis over time, which may result in ulcers and perforation. Improper handling by the surgeon, patient non-cooperation, or excessive force can easily cause mucosal perforation. The ileocecal region, with its large intestinal bend and obstruction by the ileocecal valve, makes it difficult for foreign bodies to pass through, making the distal ileum the most common site for perforation in the gastrointestinal tract (33 cases) [12]. The pharynx is mainly innervated by several nerves, including the pharyngeal branch of the glossopharyngeal nerve, the pharyngeal branch of the vagus nerve, the pharyngeal plexus formed by parasympathetic and sympathetic nerves, the maxillary branch of the third branch of the trigeminal nerve, and the pharyngeal plexus branch of the glossopharyngeal nerve. This complex innervation leads to imprecise sensory localization [13]. Finally, patients, knowing a fish bone is lodged, often attempt to push it down with food boluses or vegetable leaves, resulting in deeper penetration and migration of the bone.

Clinical Symptoms and positive signs at the site of impaction

In our review, we found that the most common site of impaction was the abdomen, making abdominal pain and tenderness the most frequently observed clinical symptoms and positive signs. Within the abdomen, the digestive tract, from the esophagus to the rectum, was the most commonly affected area. Other locations were mainly due to perforation and migration of fish bones from the digestive tract. The site of impaction was closely related to clinical symptoms and positive signs, with the intestines being involved in 33 cases (25.98%). The most frequent site within the intestines was the ileocecal region (17 cases, 51.51% of intestinal cases), which is associated with the presence of the ileocecal valve. Patients primarily presented with right lower abdominal pain, often misdiagnosed as appendicitis. These patients exhibited typical signs of appendicitis, including right lower abdominal tenderness and rebound tenderness, with some developing peri-appendiceal abscesses. In 8 cases, a linear object was detected during CT scans, while 2 patients had the foreign body identified via abdominal ultrasound. The remaining 7 patients had fish bones discovered during surgical abdominal exploration. One patient had a fish bone impacted in the anal canal, initially misdiagnosed as an anal fistula [14]. This patient presented with recurrent perianal discharge for four years and had a history of mental illness, rendering them unable to care for themselves. The fish bone was finally discovered during surgical drainage of a perianal abscess. This case underscores the challenge in diagnosing fish bone impaction in patients who cannot accurately describe their symptoms or history, leading to misdiagnosis and delayed treatment.

In 22 cases (17.32%), patients developed liver abscesses, which is a significant proportion. After fish bones perforated the intestinal wall and migrated to the liver, initial symptoms of infection appeared, including fever, chills, and upper abdominal pain. Many patients were unaware of any history of foreign body impaction, making it easy to misdiagnose if the medical history was not thoroughly investigated. In one case, a patient was misdiagnosed with adenoid cystic carcinoma of the liver and received chemotherapy at a local hospital. However, the symptoms did not improve, and a subsequent CT scan at a tertiary hospital revealed a foreign body. A detailed history later revealed that the patient had consumed fish half a month prior, leading to the consideration of fish bone migration to the liver causing the liver abscess [15].

When a foreign body is present in the neck, symptoms are primarily localized to the neck region. The most common site for fish bone migration in the neck is the thyroid gland, with 7 cases (41.18% of neck cases). These patients typically present with thyroid abscesses requiring surgical extraction of the fish bone, and in some cases, partial thyroidectomy is necessary. Damage to major cervical or thoracic blood vessels can affect hemodynamic stability, necessitating urgent surgery for foreign body removal and vascular repair to prevent shock or death.

Fish bone migration to the heart is also highly dangerous. One patient was misdiagnosed with acute myocardial infarction due to similar symptoms [16], and another patient refused surgery and subsequently died [8]. Long-standing fish bones in the biliary tract, appearing as high-density objects on CT, have been misdiagnosed as biliary stones [17].Injury to the spine can result in corresponding limb function changes [18, 19]. Therefore, thorough history-taking and physical examination are crucial to avoid misdiagnosis in clinical practice.

Ancillary examinations

The detection rate of fish bones using CT is nearly 100% [20]. CT is a non-invasive examination employing thick-layer scanning, thin-layer reconstruction, and three-dimensional reconstruction techniques. This combination effectively identifies fish bone foreign bodies and their precise location. It is essential to assess the size and shape of the fish bone, as well as surrounding

abscesses, hematomas, and other complications, to guide clinical treatment effectively. Chen et al. emphasized that contrast-enhanced CT with multiplanar reconstruction significantly improves the identification of ectopic fish bones and secondary complications, advocating its use as the first-line imaging modality in suspected migration cases [21]. Goh et al. reported that CT demonstrates exceptional sensitivity (94%) and specificity (100%) in diagnosing fish bone-induced gastrointestinal perforations, with direct visualization of calcified bones in 78% of cases and reliable detection of secondary signs such as bowel wall thickening or extraluminal air, outperforming conventional radiography and ultrasonography [22]. However, Shishido et al. reported that CT has reduced sensitivity for non-calcified fish bones, risks misdiagnosis due to structural mimics, and struggles with deeply embedded fragments. Indirect signs and species-specific morphology complicate interpretation [23]. All in all, CT is significantly superior to traditional X-rays and esophagography in detecting fish bones, making it a valuable and recommended method.

Ultrasound is an invaluable diagnostic tool for locating foreign bodies in the neck and superficial soft tissues [4]. It can accurately display the size of the foreign body, its depth from the surface, and its relationship with surrounding structures (such as blood vessels and bones [24]). Contrast agent use in imaging can obscure the endoscopic view and pose a risk of aspiration, leading to acute pulmonary edema, hence it is not recommended.

Electronic gastroscopy [25]is a simple, quick, and inexpensive procedure that does not require general anesthesia. The flexible tube's small diameter causes minimal irritation to the patient. The electronic screen allows multi-angle rotation for examination, clearly displaying small foreign bodies. The small surgical instruments used in this procedure cause minimal damage to the esophagus. However, patients may experience significant pain during surface anesthesia, and the forceps may not be stable enough to extract larger foreign bodies.

Rigid esophagoscopy [26], with its larger diameter, can directly remove some foreign bodies and dilate the esophagus, facilitating the extraction of foreign bodies without damaging the mucosa. The foreign body forceps are also useful for staged removal of larger foreign bodies. However, rigid esophagoscopy has limitations in brightness and field of view, making it difficult to clearly identify small foreign bodies. Additionally, the large and rigid scope can cause significant discomfort to the patient, necessitating general anesthesia for the procedure [13].

Fiberoptic laryngoscopy with a video monitoring system allows for the extraction of pharyngeal foreign bodies under a clear view using foreign body forceps. This method offers a wide field of view, minimal injury, and low leakage rates. Indirect laryngoscopy or electronic laryngoscopy can provide a definitive diagnosis [27].

Medical navigation technology, which employs real-time instrument guidance through multimodal imaging (e.g., CT, ultrasound) or electromagnetic positioning, has demonstrated potential in enhancing foreign body retrieval. Augmented reality (AR) navigation has been increasingly explored in laparoscopic interventions. Lin et al. [4] reported that AR systems overlay reconstructed imaging data onto the surgical field, providing real-time visualization of foreign bodies and adjacent anatomical structures. However, challenges such as intraoperative tissue deformation and virtual-to-physical misalignment remain to be addressed.

Conclusion

When a fish bone penetrates the pharyngeal wall, it can lead to serious complications. In the oral cavity, it may enter the tongue tissue, forming a tongue abscess. If displaced to the submandibular or submaxillary glands, it can cause submandibular or submaxillary abscesses. Upward migration can result in a foreign body in the nasopharynx. Penetration downward through the pharyngeal wall can cause complications such as retropharyngeal abscess, thyroid abscess, muscular abscesses in the neck, and cervical epidural abscess. It may also damage the neck's blood vessels, leading to significant bleeding, or fixate the cricothyroid joint, affecting vocal cord movement.

Fish bone penetration through the gastrointestinal wall can lead to various serious complications. For example, esophageal penetration can cause mediastinitis and abscess, esophago-aortic fistula, rupture of major thoracic blood vessels, systemic air embolism, pericarditis, cardiac rupture, lung abscess, and thoracic epidural abscess. Penetration through the intestines can result in perforations at various sites such as the duodenum, stomach, small intestine, ileum, appendix, perianal abscess, pelvic abscess, omental abscess, abdominal wall abscess, uterine wall abscess, liver abscess, pancreatic infection, splenic rupture, and obstructive cholangitis. Some patients may be misdiagnosed with tumors such as liver cancer or pancreatic cancer. Among these complications, small intestine perforation and liver abscess are the most common.

To prevent misdiagnosis, several points should be noted. Firstly, a detailed medical history must be obtained to ascertain the nature, shape, and duration of the foreign body to comprehensively assess the condition. Additionally, a thorough preoperative examination is necessary. For determining whether the foreign body has caused damage to nearby tissues, organs, or blood vessels, a CT scan is preferred. Prior to performing an endoscopy, contraindications must be ruled out.

For non-metallic foreign bodies, barium meals are not recommended as they may obstruct the view, making the procedure more difficult. Before removing the foreign body, all necessary instruments must be prepared. When removing sharp objects such as blades, dentures, or needles, transparent caps and latex sheets should be fully utilized to greatly reduce mucosal damage. Operators must be familiar with endoscopic examinations and handle them gently to avoid mucosal injury. If the foreign body is difficult to remove, such as when both ends are deeply embedded in tissues, or if it is large, irregular, sharp, or has been fixed in place for a long time, surgical assistance from general or thoracic surgery is recommended. After a thorough examination in the operating room, if this approach is ineffective, referral to relevant surgery for remedial treatment should be considered. To prevent the foreign body from entering the trachea, it must be firmly grasped. In uncooperative cases such as infants, individuals with intellectual disabilities, drug users, and prison inmates, the foreign body can be removed using painless gastroscopy or under general anesthesia with endotracheal tube insertion. After removing the foreign body, it is necessary to re-examine the gastroscopy to check for gastrointestinal injuries such as bleeding or perforation. This is crucial for timely treatment and preventing leakage of small foreign bodies [11].

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13017-025-00611-9.

Supplementary Material 1

Author contributions

Deng L and Zeng WT contributed to manuscript writing and editing and data collection; Chen JC contributed to conceptualization and supervision; and all the authors read and approved the final manuscript.

Funding

Not applicable.

Data availability

No datasets were generated or analysed during the current study.

Declarations

While our search strategy focused on 'fishbone' to maximize sensitivity, future studies may benefit from standardized terminology harmonization across databases.

Ethics approval and consent to participate

This review paper was approved by the Ethics Committee of Army Medical Center of PLA Hospital and the methods were carried out in accordance with the approved guidelines.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

1. Tanaka S, Uraguchi K, Suzuki E, et al. Survey of pharyngeal foreign bodies in Japan: an ecological study using the nationwide claims data. Int J Pediatr Otorhinolaryngol. 2024;184:112055. https://doi.org/10.1016/j.ijporl.2024.112055.
2. Bathla G, Teo LLS, Dhanda S. Pictorial essay: complications of a swallowed fish bone. Indian J Radiol Imaging. 2011;21(1):63–8. https://doi.org/10.4103/0971-3026.76055.
3. Dinnoo A, Barbier L, Soubrane O. Pyogenic liver abscess: an unusual cause. J Visc Surg. 2015;152(1):77–8. https://doi.org/10.1016/j.jviscsurg.2015.04.001.
4. Lin J, Tao H, Wang Z, et al. Augmented reality navigation facilitates laparoscopic removal of foreign body in the pancreas that cause chronic complications. Surg Endosc. 2022;36(8):6326–30. https://doi.org/10.1007/s00464-022-09074-4.
5. Min Y, Huang B, Lin Y, et al. Acute obstructive cholangitis due to fishbone in the common bile duct: A case report and review of the literature. BMC Gastroenterol. 2022;22(1):234. https://doi.org/10.1186/s12876-022-02312-y.
6. Hung CC, Lee JC, Hsiao LC, et al. Vocal cord immobility caused by the long-standing impaction of a fishbone in the hypopharynx. J Laryngology Otology. 2008;119(1):228–30. https://doi.org/10.1017/S0022215107001829.
7. Huang W, Zhang GQ, Wu JJ, et al. Catastrophic vertebral artery and subclavian artery pseudoaneurysms caused by a Fishbone: A case report. World J Clin Cases. 2020;8(20):4981–5. https://doi.org/10.12998/wjcc.v8.i20.4981.
8. Li YM, Jia YH, Tsauo JY, et al. Case report: ST-segment elevation in a man with acute pericarditis. Front Cardiovasc Med. 2020;7:596485. https://doi.org/10.3389/fcvm.2020.596485.
9. Ramlee FAM, N. I., Muhammad HH. (2024). Ingested Australasian snapper (Chrysophrys auratus) bone migration to C5 vertebral body. *Skeletal Radiology*. Advance online publication. https://doi.org/10.1007/s00256-024-04646-y
10. Sun Y, Yuan Y, Yin T, et al. Misdiagnosis of thyroid penetration caused by fishbone ingestion: A case report and literature review. Annals Translational Med. 2023;12(1):121–8. https://doi.org/10.21037/atm-22-6427.
11. Xiong JG, Cheng ZW, Liu QS, et al. Experience in the treatment of 377 cases of Gastrointestinal foreign bodies via gastroscopy. Chin J Clin Gastroenterol. 2013;25(5):316–8.
12. Deng LL, Sun HB, Tian YJ, et al. A case of omental encapsulated abscess and rectus abdominis abscess caused by fishbone. J Clin Surg. 2022;30(12):1141–2.
13. Sun J, Zhu HM. Clinical analysis of 167 cases of fishbone throat impaction. Clin Med. 2013;33(11):28–30.
14. Hou MX. A case of atypical small intestinal fistula and abscess formation caused by fishbone. Mod Clin Med. 2021;47(1):79.
15. Xiao Y, Wu H. A case of liver abscess secondary to fishbone ingestion misdiagnosed as hepatic metastatic tumor. Chin J Bases Clin Gen Surg. 2018;25(1):118–9.
16. Fishbone-induced pericardial hemorrhage resulting in a misdiagnosis of acute myocardial infarction. J Coll Physicians Surg Pakistan. 2022;32(Supp1):S9–11.
17. Zhao XG, Xia EW, Wu LM. A case of common bile duct stone with suppurative obstructive cholangitis caused by fishbone. Chin J Rural Med Pharm. 2023;30(14):32–3.
18. Li SY, Miao Y, Cheng L, et al. Surgical treatment of delayed cervical infection and incomplete quadriplegia with fish-bone ingestion: A case report. World J Clin Cases. 2021;9(25):7535–41. https://doi.org/10.12998/wjcc.v9.i25.7535.
19. Chen JM, Wang ZY, Ni GX. Thoracic spinal epidural abscess caused by fishbone perforation. Medicine. 2016;95(49):e5283. https://doi.org/10.1097/MD.0000000000005283.
20. Liew CJY, Poh ACC, Tan TY. Finding Nemo: imaging findings, pitfalls, and complications of ingested fish bones in the alimentary Canal. Emerg Radiol. 2013;20(4):311–22. https://doi.org/10.1007/s10140-013-1123-y.
21. Chen CY, Peng JP. Esophageal fish bone migration induced thyroid abscess: case report and review of the literature. Am J Otolaryngol. 2011;32(3):253–5. https://doi.org/10.1016/j.amjoto.2010.02.006.
22. Chen H, Wu C, Zhang Z, et al. Migratory pharyngeal foreign bodies and related complications: analysis of 20 cases. Am J Otolaryngol. 2022;43(2):103390. https://doi.org/10.1016/j.amjoto.2022.103390.

23. Shishido T, Suzuki J, Ikeda R, et al. Characteristics of fish-bone foreign bodies in the upper aero-digestive tract: the importance of identifying the species of fish. PLoS ONE. 2021;16(8):e0255947. https://doi.org/10.1371/journal.pone.0255947.
24. Wang H, Quan CB, Shi WW, et al. A rare case of migratory fishbone foreign body in the left neck. J Clin Radiol. 2016;35(6):912–3.
25. Yi L, Cheng Z, Zhou Y, et al. Fishbone foreign body ingestion in duodenal papilla: A cause of abdominal pain resembling gastric ulcer. BMC Gastroenterol. 2020;20(1):123. https://doi.org/10.1186/s12876-020-01276-1.
26. Zhou J, Chen R, Zheng Y. Emergency nursing for esophageal perforation and cardiac tamponade caused by fishbone ingestion in children. J Nurs Rehabilitation. 2022;21(12):83–5.
27. Vallamkondu V, Carlile S, Shakeel M et al. (2013). Neck abscess and vocal cord paresis: Delayed complications of a self-extruded long fishbone stuck in throat. *BMJ Case Reports, 2013*, bcr2013201832. https://doi.org/10.1136/bcr-2013-201832

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