American Journal of Case Reports

e-ISSN 1941-5923
© Am J Case Rep, 2026; 27: e954338
DOI: 10.12659/AJCR.954338

Received: 2026.06.04
Accepted: 2026.08.03
Available online: 2026.08.19
Published: 2026.XX.XX

Parenchymal Injury Caused by Complete Migration of a Bone of Japanese Horse Mackerel Within the Pancreatic Uncinate Process Through a Duodenal Diverticulum, Resulting in Sepsis and Multiple Pyogenic Liver Abscesses

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABCDEF 1 Saki Aota*
ABCDEF 2 Tomohide Hori*
BDF 2 Ryutaro Nishikawa
BDF 1 Shigehito Nakashima
BDF 1 Ryohei Sakaguchi
DF 2 Satoru Umegae
and collaborators#

1 Division of Gastroenterology and Hepato-Biliary-Pancreatology, Department of Internal Medicine, Yokkaichi Hadu Medical Center, Yokkaichi, Mie, Japan
2 Divisions of Gastrointestinal and Hepatobiliary Pancreatic Surgery, Department of Surgery, Yokkaichi Hadu Medical Center, Yokkaichi, Mie, Japan

A full list of authors is available on the website

* Saki Aota and Tomohide Hori contributed equally to this work

Corresponding Author: Tomohide Hori, Department of Surgery, Yokkaichi Hadu Medical Center, 10-8 Haduyama-cho, Yokkaichi City, Mie Prefecture, 510-0016, Japan, Phone: +59-331-2000; Fax: +81-59-331-0354, e-mail: horitomo55office@yahoo.co.jp

Financial support: None declared
Conflict of interest: None declared

Patient: Male, 79-year-old
Final Diagnosis: Complete migration of a scad bone in the pancreas • pancreatic parenchymal injury
Symptoms: Abdominal pain • fever
Clinical Procedure: Endoscopic examination and emergent surgery
Specialty: Gastroenterology and Hepatology • Infectious Diseases • Surgery
Objective: Unusual clinical course

Background: An ingested fish bone may cause bowel penetration and subsequent infection, and approximately 1% of such cases require emergent surgery. Moreover, infection and hemorrhage may occur when a penetrated fish bone migrates into surrounding organs or vessels.

Case Report: A 79-year-old man ate grilled Japanese horse mackerel. Three days later, he developed abdominal pain and a sustained fever. Computed tomography detected a fully migrated scad bone embedded in the pancreatic uncus through a duodenal diverticulum, along with multiple pyogenic liver abscesses. Intravenous broad-spectrum antibiotic therapy was started for sepsis. Endoscopic removal was attempted but failed. Surgical removal was proposed, and the pancreas and duodenum were mobilized. Intraoperative ultrasonography revealed that the fully migrated scad bone had been removed from the pancreatic parenchyma and broken into 2 fragments during the surgical procedure. The 2 fragments were located in the third portion of the duodenum and the diverticular cavity, respectively. One fragment in the third portion was successfully removed by an intraoperative endoscopic maneuver. Postoperative endoscopic examination and imaging demonstrated that the other fragment in the diverticular cavity had passed spontaneously by bowel peristalsis. Intravenous antibiotic therapy with appropriate de-escalation was continued for 14 days. The multiple pyogenic liver abscesses disappeared, and the patient recovered from sepsis.

Conclusions: Pyogenic liver abscess caused by hematogenous spread is a serious infectious disease, and sepsis may be fatal. A migrated fish bone within an adjacent organ should be removed as soon as practicable because this retained foreign body may subsequently cause severe infectious complications.

Keywords: Diagnosis • Endoscopy • Liver Abscess • Pancreas • Sepsis • Surgery Department, Hospital
Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/954338

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

Introduction

Japan is an island nation and therefore has a very long coastline. Japanese horse mackerel (*Trachurus japonicus*) is a nearshore scad species found in Asia. Japan has a population of 124 million, and Japanese people traditionally eat this endemic fish. Almost all Japanese people enjoy this common fish, which is prepared in a variety of ways (eg, sushi, raw sashimi, fried fish, and grilled fish). This scad has relatively soft, flat, and straight bones.

Although the majority of ingested foreign bodies pass smoothly through the alimentary lumen [1], fish bones can perforate the wall of the digestive tract and subsequently cause acute peritonitis and abscess formation in the peritoneal cavity [1]. Approximately 1% of patients with bowel penetration by a fish bone immediately require emergent surgery [1-4]. An ingested fish bone may also penetrate the pancreas through the upper gastrointestinal lumen [1,2,5-8]. Even a subtle injury to the pancreatic parenchyma may subsequently trigger severe infectious disease and massive hemorrhage [8,9] because of intractable complications related to pancreatic juice [10-12] and surrounding vessels [13-19]. Pyogenic liver abscess caused by hematogenous spread through the hepatic blood supply (ie, hepatic arterial and portal venous flows) is a serious infectious disease [15,16], and a septic state is generally fatal [20].

Here, we present a rare case of a septic state and multiple pyogenic liver abscesses caused by a fully migrated scad bone within the pancreatic uncinate process after penetration through a duodenal diverticulum, along with a review of the literature.

Our case-based report is intended to illustrate diagnostic recognition and management considerations. We demonstrate an unusual migration; a complete migration of a scad bone through a duodenal diverticulum into the pancreatic uncus. We describe the clinical course, which was associated with sepsis and multiple liver abscesses, and clinical implications of combined antibiotic, endoscopic, and surgical management.

Case Report

A 79-year-old man ate grilled Japanese horse mackerel with his family. He subsequently experienced epigastric and right hypochondrial pain accompanied by a high fever. Three days later, he developed severe pain radiating to the right side of his back and a sustained fever of > 38.5 °C, and he was rushed to the emergency room of our hospital. His body temperature was 41.1 °C. He had no underlying disorders except for a history of treatment for hyperlipidemia. On conventional blood examination, the white blood cell count and C-reactive protein level were elevated, at 21 600 × 10^3/μL (reference range, 3300-8600 × 10^3/μL) and 29.8 mg/dL (reference range, < 0.30 mg/dL), respectively.

Dynamic computed tomography (CT) detected a straight-shaped foreign body with strong calcification that had migrated into the uncus of the pancreas (**Figure 1A-1D**), as well as multiple liver abscesses mainly located in the distal liver (**Figure 2**). The migrated foreign body was strongly suspected to be a scad bone based on the patient's recent dietary history. Dynamic CT also revealed a duodenal diverticulum in the third portion

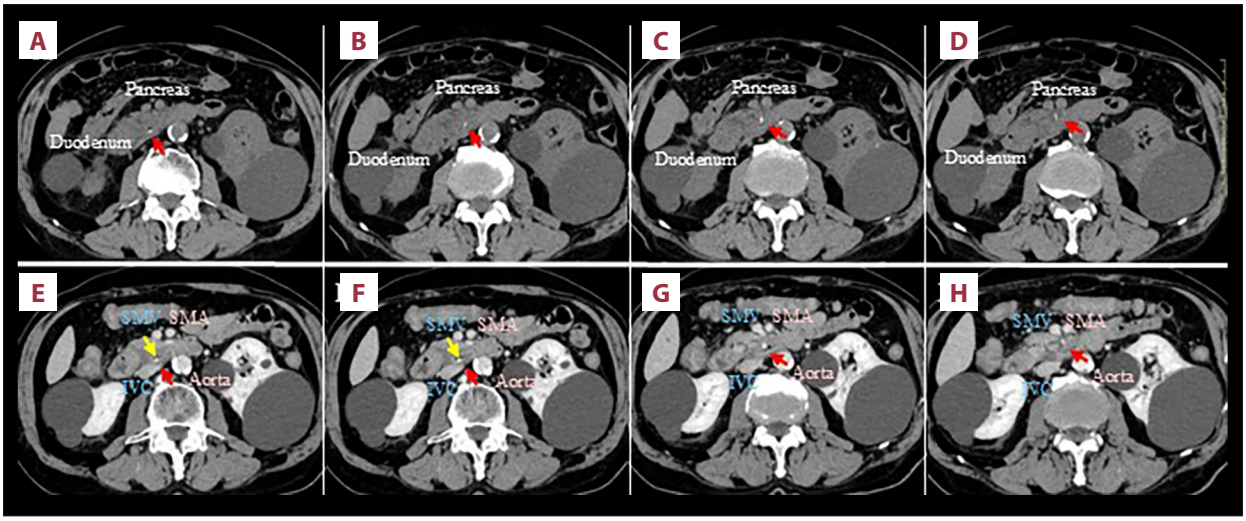

Figure 1. CT findings of a migrated scad bone within the pancreatic uncus. Plain CT detected a straight-shaped foreign body with strong calcification (red arrows) that had migrated into the pancreatic uncus (yellow arrows; **A-D**). Enhanced CT findings (**E-H**) showed a duodenal diverticulum in the third portion of the duodenum (yellow arrows) and revealed that the foreign body (red arrows) had fully migrated into the pancreatic parenchyma through the diverticulum. CT, computed tomography; IVC, inferior vena cava; SMA, superior mesenteric artery; SMV, superior mesenteric vein.

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

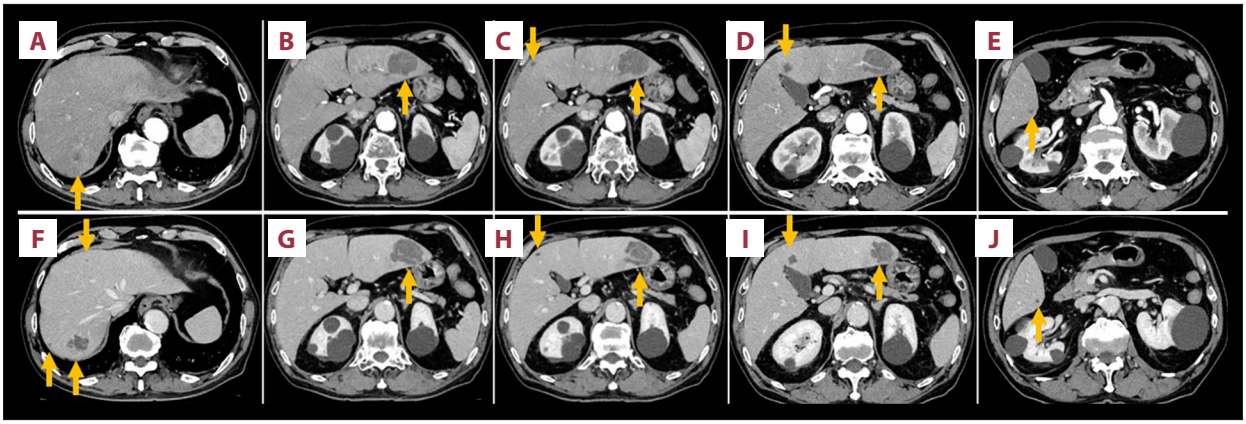

Figure 2. CT findings of multiple pyogenic liver abscesses. Early-phase (**A-E**) and delayed-phase (**F-J**) CT images are shown. Multiple liver abscesses (orange arrows) were mainly located in the distal liver. CT, computed tomography.

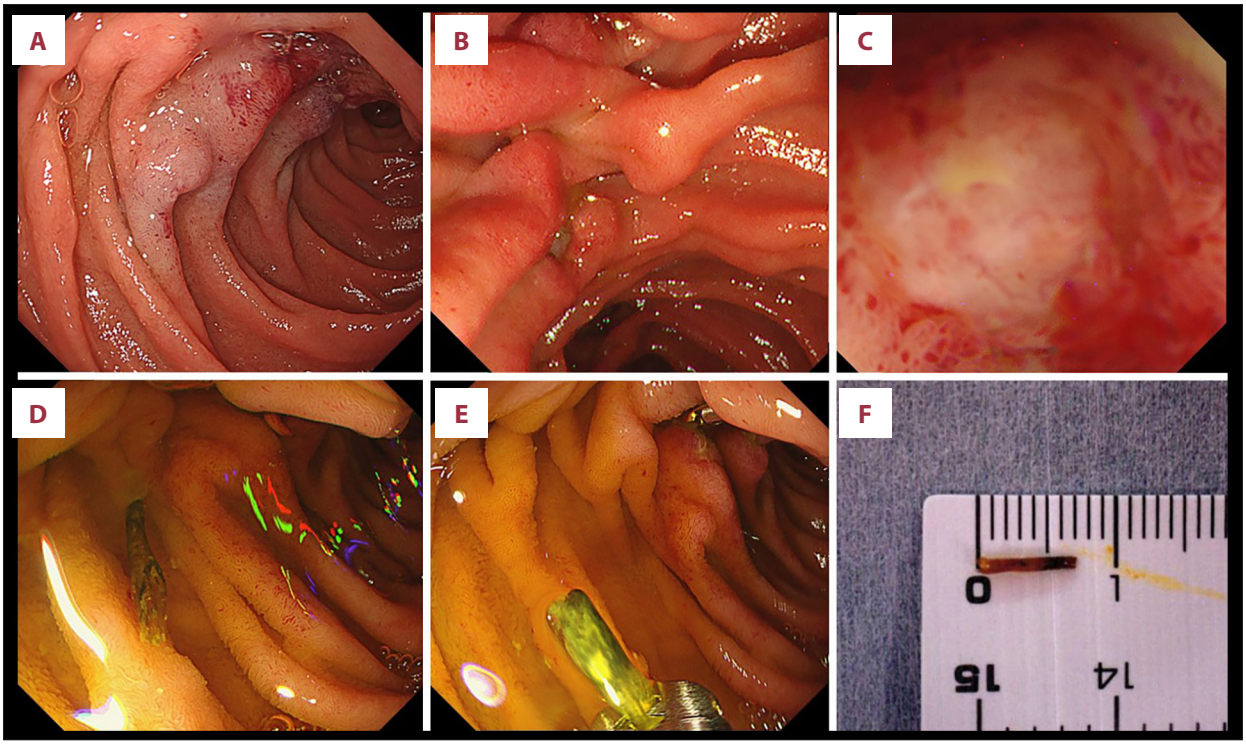

Figure 3. Endoscopic findings of the duodenum and endoscopic removal of a fragmented scad bone from the third portion. Endoscopic examination revealed an active ulcer in the second portion of the duodenum (**A**), an erosive lesion in the third portion (**B**), and a suspicious penetration site at the diverticular wall (**C**). One scad bone fragment in the third portion of the duodenum was removed endoscopically during surgery (**D, E**). The removed scad bone measured 7 mm in length (**F**).

of the duodenum (ie, the horizontal segment), and the scad bone appeared to have fully migrated into the pancreatic parenchyma through this diverticulum (**Figure 1E-1H**). A septic state was suspected, and a carbapenem antibiotic (meropenem, 1.0 g, 3 times daily) was therefore administered intravenously. Endoscopic examination of the duodenum revealed an active ulcer in the second portion (ie, the descending segment), an erosive lesion in the third portion, and a suspicious penetration site at the diverticular wall (**Figure 3A-3C**). Eight weeks of anti-ulcer therapy using a proton pump inhibitor was planned.

Endoscopic examination accompanied by hypotonic duodenography revealed that the duodenal diverticulum had a pocket-like cavity with a relatively narrow entry gate (**Figure 4A**). Endoscopic removal was challenging and ultimately unsuccessful because the fully migrated scad bone was embedded in the pancreatic parenchyma of the uncus (**Figure 4B**). Plain

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

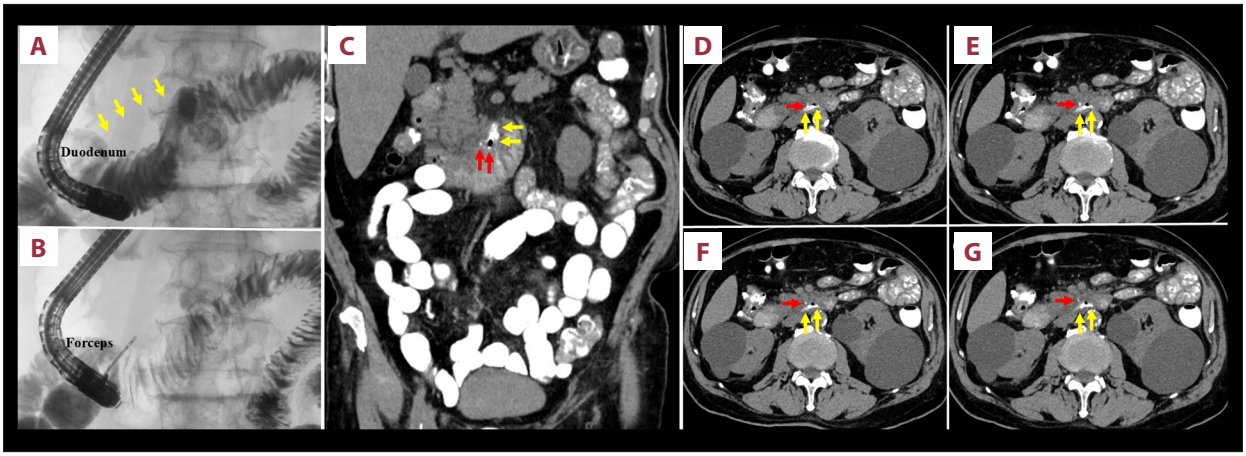

Figure 4. Findings of endoscopic examination accompanied by duodenography and subsequent plain CT. Endoscopic examination accompanied by hypotonic duodenography revealed a duodenal diverticulum (yellow arrows) with a pocket-like cavity (**A**). Endoscopic removal of the scad bone was attempted but was ultimately unsuccessful (**B**). Coronal (**C**) and transverse (**D-G**) plain CT images obtained after duodenography are shown. The scad bone, which had fully migrated into the uncus (red arrows) through the diverticulum (yellow arrows), remained in place. CT, computed tomography.

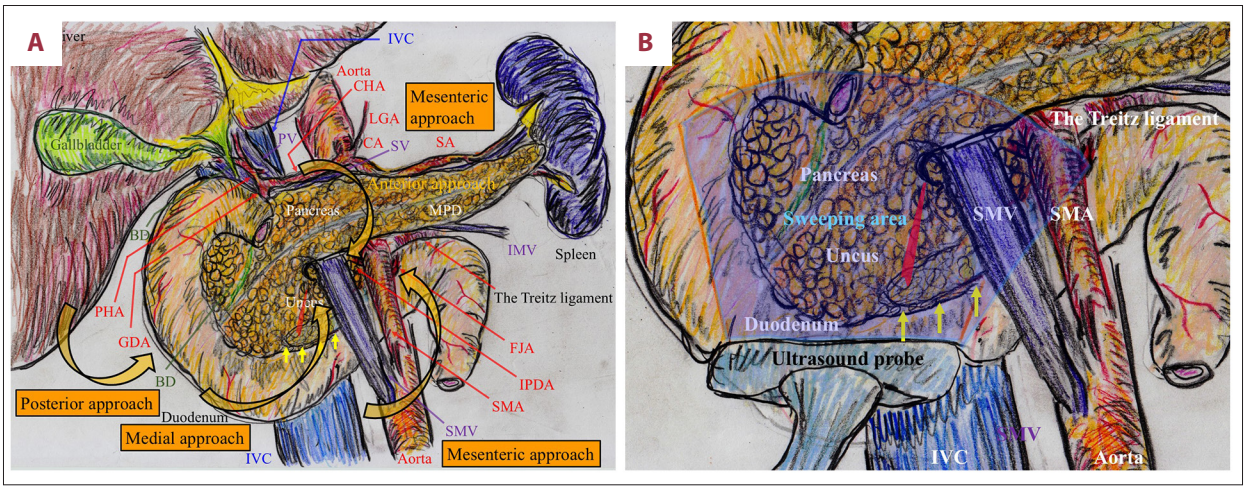

Figure 5. (**A, B**) Surgical mobilization of the pancreatic head and uncus and the duodenum, and intraoperative ultrasonography. To mobilize the pancreatic head and uncus and the duodenum, a total of 4 surgical approaches were performed. To detect the scad bone, intraoperative ultrasonography with adequate sweeping area was performed. The duodenal diverticulum (yellow arrows) was clearly observed. BD, bile duct; CA, celiac artery; CHA; common hepatic artery; FJA, the first jejunal artery; GDA, gastroduodenal artery; IMV, inferior mesenteric vein; IPDA, inferior pancreaticoduodenal artery; IVC, inferior vena cava; LGA, left gastric artery; MPD, main pancreatic duct; PHA, proper hepatic artery; SA, splenic artery; SMA, superior mesenteric artery; SMV, superior mesenteric vein; SV, splenic vein.

CT performed after duodenography revealed that the scad bone that had migrated into the uncus through the diverticulum was still present (**Figure 4C-4G**). Therefore, surgical removal under general anesthesia was proposed.

First, the pancreatic head and uncus, together with the duodenum, were mobilized using a total of 4 approaches (anterior, posterior, medial, and mesenteric approaches) (**Figure 5A**), and the Treitz ligament was divided. This surgical mobilization was completed to obtain an adequate sweeping area of intraoperative ultrasonography (**Figure 5B**). Next, intraoperative ultrasonography was used for detection of a scad bone (Figure 5B), but no foreign body could be detected within the pancreatic parenchyma of the uncus (**Figure 6A, 6B**). Unexpectedly, during the surgical procedure, the fully migrated scad bone was dislodged from the pancreatic parenchyma and broken into 2 fragments. On intraoperative ultrasonography, these 2 fragments were recognized as highly echogenic lesions with acoustic shadows (**Figure 6C, 6D**). In a word, intraoperative ultrasonography revealed that the fully migrated

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

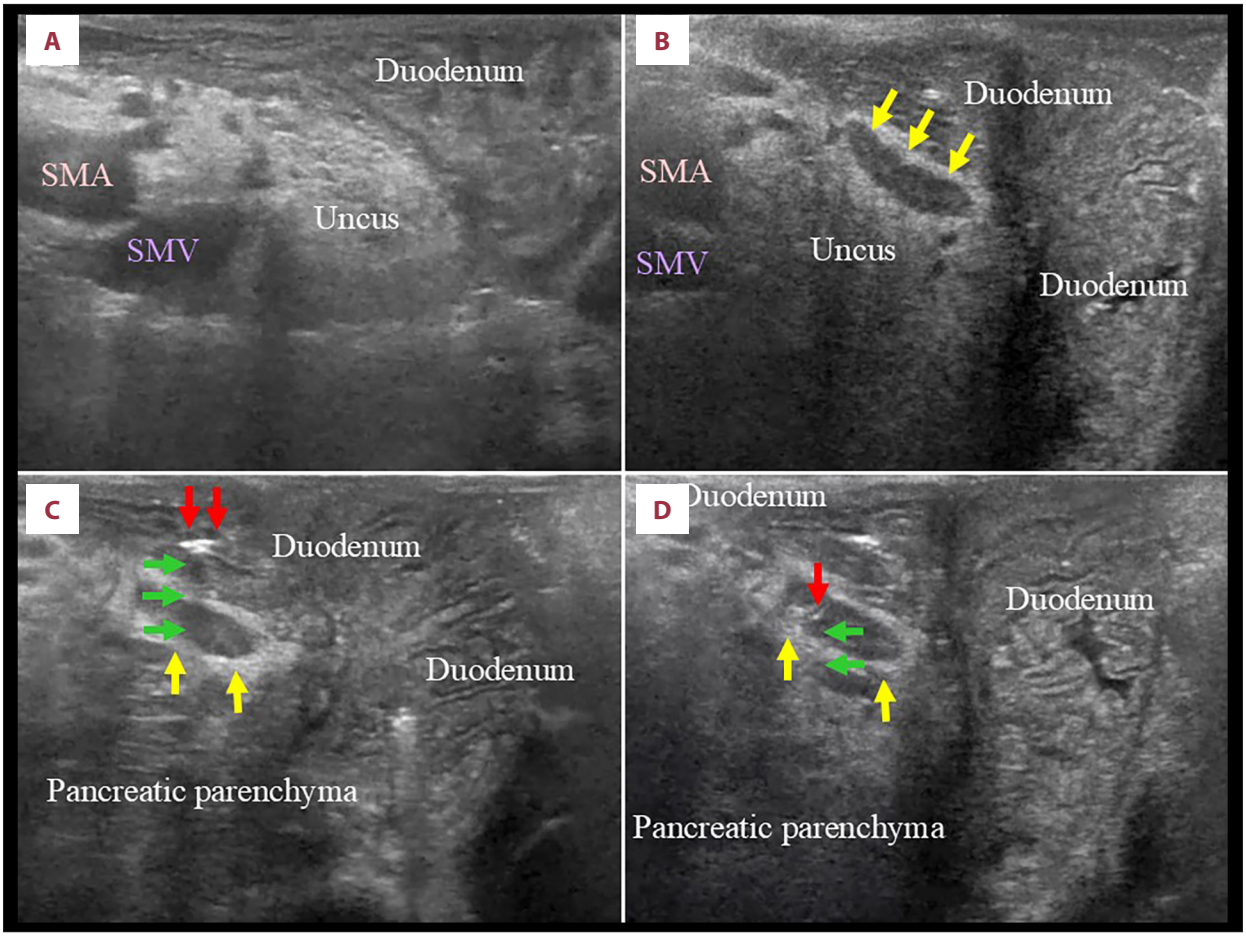

Figure 6. Intraoperative ultrasound findings. No foreign body within the pancreatic parenchyma of the uncus could be detected by intraoperative ultrasonography (**A, B**). During surgical mobilization, the migrated scad bone was displaced from the uncus and broken into 2 fragments. These fragments were located in the third portion of the duodenum (**C**) and within the diverticular cavity (yellow arrows) (**D**). Both fragments were recognized as highly echogenic lesions (yellow arrows) with acoustic shadows (green arrows) (**C, D**). SMA, superior mesenteric artery; SMV, superior mesenteric vein.

scad bone had been dislodged from the pancreatic parenchyma and broken into 2 fragments during the surgical procedure. The 2 fragments were located in the third portion of the duodenum (**Figure 6C**) and within the diverticular cavity (**Figure 6D**), respectively.

One fragment located in the third portion of the duodenum was successfully removed endoscopically during surgery (**Figure 3D, 3E**). The removed bone measured 7 mm in length (**Figure 3F**). The second fragment within the diverticular cavity unfortunately remained because an adequate field for endoscopic manipulation within the diverticulum could not be obtained during surgery (**Figure 7**). The operative time, including intraoperative endoscopic intervention, was 134 minutes, and blood loss was 76 mL.

Blood cultures obtained from peripheral veins in the emergency room revealed sepsis caused by *Streptococcus intermedius*. Therefore, intravenous antibiotic therapy was continued for 14 days. On postoperative day (POD) 5, antibiotic therapy was appropriately de-escalated from a broad-spectrum antibiotic to a third-generation cephalosporin (ceftriaxone, 1.0 g twice daily) on the basis of susceptibility testing and minimum inhibitory concentration values. At POD 5, the white blood cell count and C-reactive protein level were 17 300 × 10^3/μL and 31.0 mg/dL, respectively. However, multiple pyogenic liver abscesses had increased in both size and number by POD 8 (**Figure 8A-8G**). At POD 8, the white blood cell count and C-reactive protein level were further decreased, at 10 400 × 10^3/μL and 11.6 mg/dL, respectively.

Endoscopic removal of the remaining fragment in the diverticular cavity was attempted again; however, the fragment had spontaneously disappeared from the cavity, presumably due to bowel peristalsis. Endoscopic examination accompanied by hypotonic duodenography and ultrasonography detected no

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

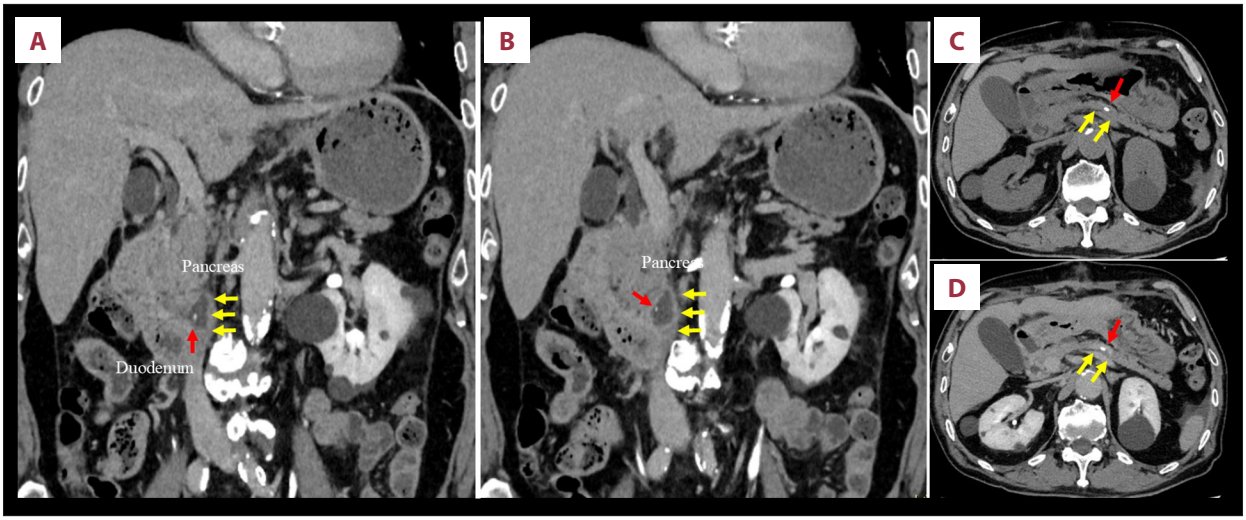

Figure 7. The remnant fragment within the diverticular cavity. Coronal enhanced CT images (**A, B**), a transverse plain CT image (**C**), and a transverse enhanced CT image (**D**) are shown. Although the first scad bone fragment, in the third portion of the duodenum, was successfully removed endoscopically, the second fragment (red arrows) within the diverticular cavity (yellow arrows) remained in place. CT, computed tomography.

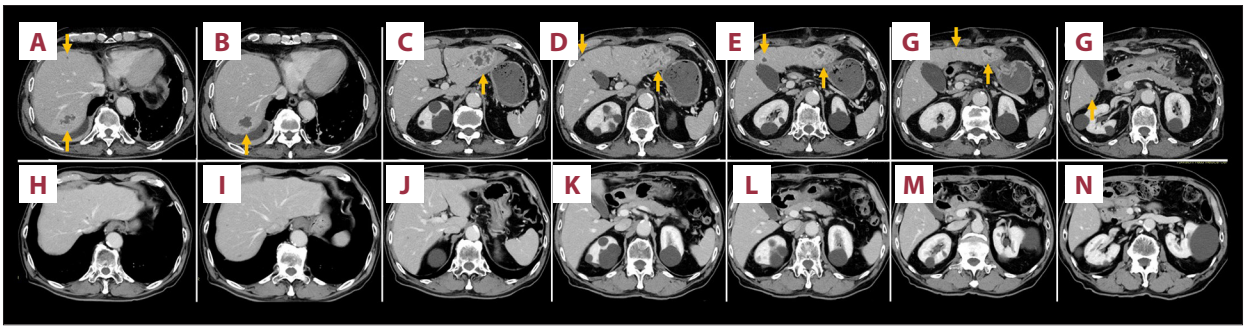

Figure 8. Changes in multiple pyogenic liver abscesses. CT revealed that the multiple liver abscesses (orange arrows) had increased in both size and number on POD 8 (**A-G**). These abscesses had disappeared approximately 4 months after confirmation of complete removal of the scad bone (**H-N**). CT, computed tomography; POD, postoperative day.

remaining fragment in either the pancreatic parenchyma or the diverticular cavity (**Figure 9**). CT also confirmed that the remaining fragment had passed from the duodenal diverticulum because of bowel peristalsis. At POD 12, the white blood cell count was normalized, and C-reactive protein level was decreased to 1.15 mg/dL.

The multiple liver abscesses gradually decreased in both size and number over time, and the patient recovered from sepsis. At POD 16, the white blood cell count and C-reactive protein level had both normalized. The patient was discharged from our hospital on POD 20. The liver abscesses had completely disappeared approximately 4 months after confirmation of complete removal of the migrated scad bone from the pancreatic region (**Figure 8H-8N**), and the patient was in good health at the time of this writing.

Discussion

Although ingested fish bones usually pass smoothly through the alimentary lumen [1], bowel penetration by a fish bone can occur in the esophagus [21], stomach [1-3,5,22], duodenum [6,23-25], small intestine [4,26,27], and colon [28-30]. Fish bones that have migrated outside the digestive tract are not absorbed [22], and severe infection and inflammatory changes caused by retained foreign bodies may persist until the penetrated fish bone is removed endoscopically and/or surgically [1,22].

Porgy and snapper species in Asia generally have hard, conical, and curved bones [27]; therefore, these fish may be more likely to cause bowel penetration following ingestion of a fish bone [21,27]. By contrast, nearshore scads in Asia (eg, Japanese horse mackerel in the present case) have relatively soft, flat, and straight bones. To the best of our knowledge, bowel penetration

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

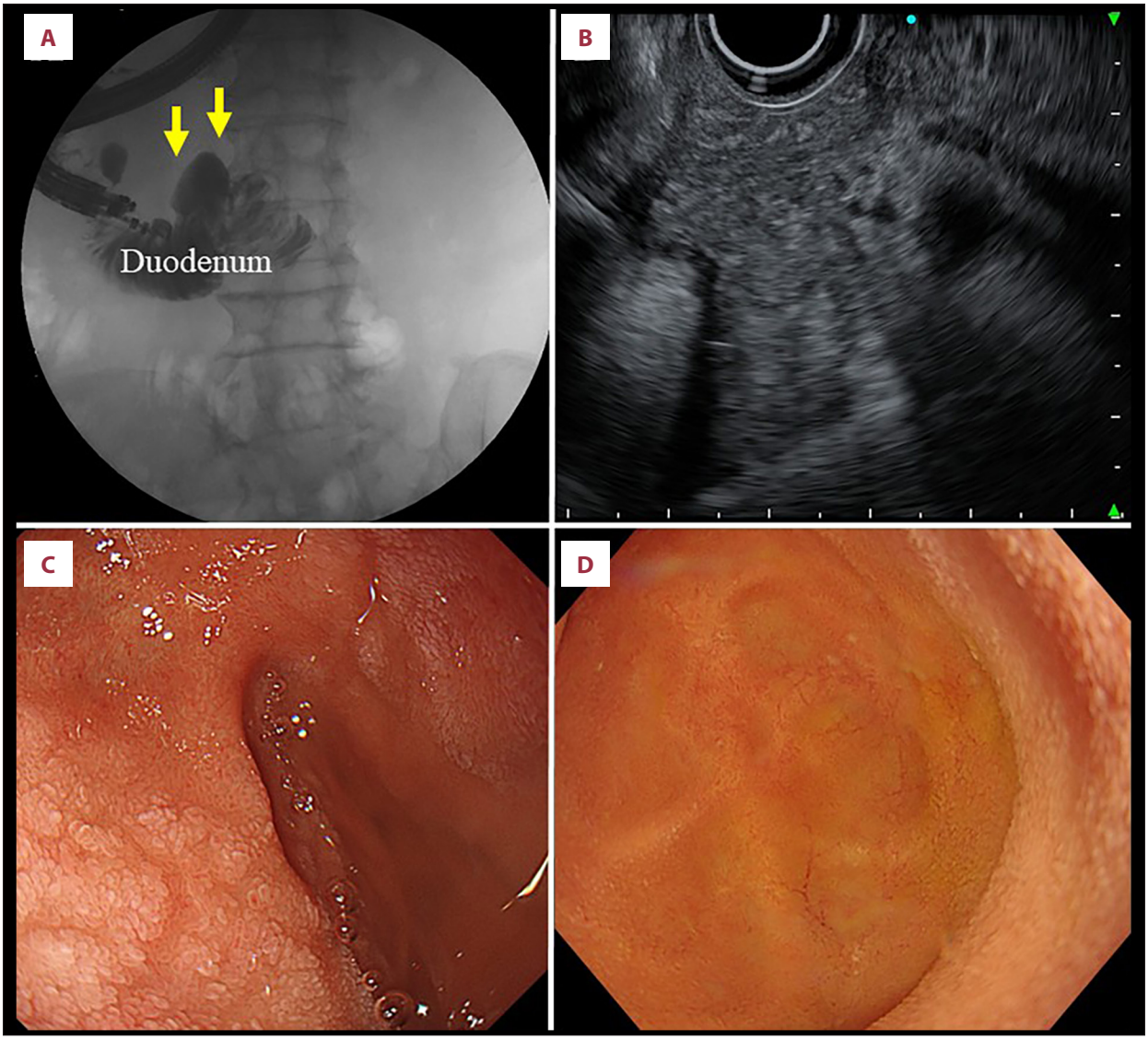

Figure 9. Findings of endoscopic examination accompanied by duodenography and ultrasound after surgery. Hypotonic duodenography did not reveal any filling defect within the duodenal diverticulum (yellow arrows) (**A**). Endoscopic ultrasonography confirmed the absence of any remnant fragment within the pancreatic parenchyma of the uncus (**B**). Endoscopic examination did not detect any remnant fragment within the diverticular cavity (**C, D**).

caused by an ingested scad bone has not been documented previously. We speculated that the ingested scad bone penetrated the pancreatic parenchyma in our patient because the duodenal diverticulum created a focal weakness in the duodenal wall. Because full migration of a scad bone into the pancreas is a rare phenomenon based on previous literature review, we hypothesized that this anatomical variant might be a possible explanation in our patient. From the standpoint of clinical management, a recent dietary history, a history of possible fish bone ingestion, and imaging studies obtained in the emergency room are crucial for accurate diagnosis and appropriate treatment in patients with unexplained abdominal pain and severe infection caused by a penetrated fish bone [5,8].

A fish bone that has penetrated the digestive tract may subsequently migrate into adjacent organs (eg, the pancreas, liver, and bladder) or even nearby vessels [1,2,5-8,23-25,28,31]. In such cases, inflammatory masses or pyogenic pseudotumors may be detected on imaging studies [8,9], and severe infectious complications may subsequently occur because of abscess formation around the penetrated fish bone [8,9]. In our patient, pancreatic parenchymal injury resulted in a septic state and pyogenic liver abscesses. Penetration of a fish bone into the pancreatic parenchyma through the stomach or duodenum has been documented previously [1,2,5-8]. Successful therapeutic strategies for removal of fish bones embedded in the pancreatic parenchyma have also been reported [1,2,5-8],

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

including advanced endoscopic and laparoscopic techniques [1,2,5,7]. However, in our patient, the ingested scad bone had become a fully migrated foreign body embedded within the pancreatic uncus. Surgical procedures for pancreatic mobilization are well established [32] and have been classified into 6 approaches: anterior (inferior supracolic), posterior (right posterior; so-called Kocher mobilization), medial (medial uncinate or right uncinate), mesenteric (inferior infracolic or artery-first), superior, and left posterior approaches [32]. In the present case, we initially performed pancreatic mobilization using 4 of these 6 approaches to facilitate removal of the fully migrated scad bone embedded in the uncus. During mobilization, the foreign body was fortunately displaced from the pancreatic parenchyma into the third portion of the duodenum and the diverticulum. The fragmented bones were subsequently retrieved intraoperatively by endoscopic maneuver or passed spontaneously because of bowel peristalsis.

Fish bone penetration into the pancreatic parenchyma may result in severe and potentially life-threatening complications. Even a subtle injury to the pancreatic duct may lead to severe infectious complications related to pancreatic juice leakage [10]. Pancreatic leakage can result in fatal complications, including intractable abscess formation due to necrotic infection and hemorrhage caused by arterial pseudoaneurysm [10-12]. In addition, hemosuccus pancreaticus (defined as bleeding into the pancreatic duct) [17-19] can result in massive and potentially fatal hemorrhage [17-19]. Fortunately, major pancreatic duct injury was not evident in the present case because abscess formation did not occur within the pancreatic parenchyma.

Conclusions

We recognize that a single case report has potential limits due to bias, and that our conclusions depend on a clinically supported consideration of previous reports of similar scenarios. We illustrated diagnostic recognition of an unusual migration of a fish bone embedded in the pancreatic uncus, and presented management considerations for a potentially fatal condition associated with sepsis and multiple liver abscesses. We anticipate that this case report will be informative for clinicians in the fields of gastroenterology and hepatopancreatobiliary medicine.

Institution Where Work Was Done

Yokkaichi Hadu Medical Center, Yokkaichi, Mie, Japan.

Patient Consent for Publication

The patient involved in this report provided written informed consent authorizing the use and disclosure of his protected health information.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

References:

1. Wang Y, Luo X, Zhang J. Successful laparoscopic treatment for sustained abdominal pain due to fish bone migrating into the neck of the pancreas: A case report and thinking about surgical approach through the literature review. Surg Case Rep. 2021;7:91
2. Mima K, Sugihara H, Kato R, et al. Laparoscopic removal of an ingested fish bone that penetrated the stomach and was embedded in the pancreas: A case report. Surg Case Rep. 2018;4:149
3. Mulita F, Papadopoulos G, Tsochatzis S, Kehagias I. Laparoscopic removal of an ingested fish bone from the head of the pancreas: Case report and review of literature. Pan Afr Med J. 2020;36:123
4. Alkhatib AA, Umar SB, Patel NC, Harrison ME. Balloon-assisted enteroscopy for the treatment of a sealed jejunal perforation: Removal of a penetrating fish bone (with video). Gastrointest Endosc. 2013;77:133-35
5. Xie R, Tuo BG, Wu HC. Unexplained abdominal pain due to a fish bone penetrating the gastric antrum and migrating into the neck of the pancreas: A case report. World J Clin Cases. 2019;7:805-8
6. Yasuda T, Kawamura S, Shimada E, Okumura S. Fish bone penetration of the duodenum extending into the pancreas: Report of a case. Surg Today. 2010;40:676-78
7. Nunez Martinez O, Sanz Garcia C, Perez Enciso I, et al. Endoscopic resolution of gastric perforation with pancreas penetration by a fish bone. Gastroenterol Hepatol. 2018;41:567-68
8. Senapathy G, Vengala S, Muriki R, et al. Pancreatitis from posterior gastric wall perforation by ingested metallic wire-case report and review of literature. BJR Case Rep. 2023;9:20230070
9. Huang YH, Siao FY, Yen HH. Pre-operative diagnosis of pancreatic abscess from a penetrating fish bone. QJM. 2013;106:955-56
10. Duncheskie R, Anjum F. Pancreatic fistula. Treasure Island (FL): StatPearls Publishing; 2026
11. Hori T, Ogawa K, Yamamoto H, et al. Impact of continuous local lavage on pancreatic juice-related postoperative complications: Three case reports. World J Clin Cases. 2019;7:2526-35
12. Kamada Y, Hori T, Yamamoto H, et al. Fatal arterial hemorrhage after pancreaticoduodenectomy: How do we simultaneously accomplish complete hemostasis and hepatic arterial flow? World J Hepatol. 2021;13:483-503
13. Tani R, Hori T, Yamamoto H, et al. Severely calcified true aneurysm: A thought-provoking case of solitary origin and postoperative management. Am J Case Rep. 2019;20:620-27
14. Szuak A, Nemeth K, Korom C, et al. Pancreaticoduodenal arterial arcades: Their dominance and variations-their potential clinical relevance. Clin Anat. 2018;31:544-50
15. Mazza O, De Santibaries E. Pyogenic liver abscess: Liver infection and infestation. In: Jarnagin W, editor. Blumgart's surgery of the liver, biliary tract, and pancreas. 5th ed. Philadelphia: Elsevier Saunders; 2012;1006-16
16. Yoo BH, Kim SH, Baek YJ, et al. Hepatobiliary and pancreatic: Liver abscess not responding to drainage and antibiotics. J Gastroenterol Hepatol. 2021;36:851
17. Hori T, Yamamoto H, Harada H, et al. Inferior pancreaticoduodenal artery aneurysm related with groove pancreatitis persistently repeated hemosuccus pancreaticus even after coil embolization. Am J Case Rep. 2019;20:567-74

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

18. Yu P, Gong J. Hemosuccus pancreaticus: A mini-review. Ann Med Surg. 2018;28:45-48
19. Liu B, Contreras FJ, Ward TJ. Hemosuccus pancreaticus. J Vasc Interv Radiol. 2017;28:1194
20. Singer M, Angus DC, Annane D, et al. Sepsis. Lancet. 2026;407:1276-88
21. Kim HU, Song HJ. Clinical characteristics of an esophageal fish bone foreign body from Chromis notata. J Korean Med Sci. 2012;27:1208-14
22. Masaoka R, Masaoka R, Hayashi K, et al. Two cases of gastric penetration by fish bones with differing courses. Oxf Med Case Reports. 2021;2021:omab060
23. Wang R, He J, Chen Z, Wen K. Migration of fish bones into abdominal para-aortic tissue from the duodenum after leading to duodenal perforation: A case report. BMC gastroenterol. 2021;21:82
24. Kadowaki Y, Tamura R, Okamoto T, et al. Ruptured hepatic abscess caused by fish bone penetration of the duodenal wall: Report of a case. Surg Today. 2007;37:1018-21
25. Nguyen VD, Le VN, Nguyen QP, Le TD. Bacteraemia with hepatic abscess due to *Actinomyces odontolyticus* associated with gastrointestinal foreign body. Eur J Intern Med. 2025;12:005985
26. Shibuya T, Osada T, Asaoka D, et al. Double-balloon endoscopy for treatment of long-term abdominal discomfort due to small bowel penetration by an eel bone. Med Sci Monit. 2008;14:CS107-9
27. Hsu SD, Chan DC, Liu YC. Small-bowel perforation caused by fish bone. World J Gastroenterol. 2005;11:1884-85
28. Okuma T, Nagamoto N, Tanaka E, et al. Repeated colon penetration by an ingested fish bone: Report of a case. Surg Today. 2008;38:363-65
29. Kim YM, Lee TH, Jung SH, et al. Hepatic abscess that formed secondary to fish bone and had a fistula with the ascending colon. Dig Dis Sci. 2007;52:3515-18
30. Kitagawa H, Matsukura S, Miyahara K, et al. [A case of granulomatous inflammation of the sigmoid colon caused by a fish bone that resembled cancer.] Nihon Shokakibyo Gakkai Zasshi. 2017;114:1658-64 [in Japanese]
31. Jarry J, Nguyen V, Stoltz A, et al. A fish bone-related hepatic abscess. Clin Pract. 2011;1:e115
32. Hori T, Yasukawa D. Technical aspects in pancreaticoduodenectomy and therapeutic strategies for pancreatic cancer: History, current status, and future perspectives. Hepatobiliary Pancreat Dis Int. 2022;21:600-2

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]