Case Report **IJCR (2023) 7:294**

International Journal of Case Reports (ISSN:2572-8776)

Duodenal and inferior vena cava perforation due to a rosemary branch ingestion: a Case Report

Simone Gianazza[1], Davide Inversini[1], Lorenzo Latham[2], Sabrina Garbarino[1], Matteo Zanchetta[1], Marika Morabito[1], Natalia Palamara[1], Giuseppe Ietto[1] and Giulio Carcano[1]

[1]General, Emergency and Transplant Surgery Department, ASST-Settelaghi, University of Insubria, 21100 Varese, Italy; [2]UO Chirurgia Generale, Ospedale SacraFamiglia – Fatebenefratelli, 22036 Erba, Italy

ABSTRACT

Introduction: Foreign body (FB) ingestion is frequently observed in surgical and endoscopic practice. They are often removed from the body cavities without causing any severe complications but occasionally they lead to serious damages. We report a case of a rosemary branch ingestion causing a duodenal and Inferior Vena Cava (IVC) perforation. **Case Presentation:** A 61 year-old man was admitted in ER with abdominal pain, vomiting and with a single episode of melaena. Vital parameters were stable. The abdomen was mildly distended but tender. Computed tomography (CT) scan revealed a foreign body in the second part of duodenum, passing through it, reaching and perforating the Inferior Vena Cava (IVC). An urgent Esophagogastroduodenoscopy (EGDS) confirmed the presence of a rosemary branch passing through the duodenum in correspondence of the lower duodenal knee. An emergency surgery with a median xifopubic laparotomy was performed. The foreign body removed firstly from the duodenum, then from IVC. No complication were observed in the postoperative period. **Discussion:** This case peculiarity was the paucisymptomatic presentation related to the severe lesion to the vessels and the bowel. Laparotomic approach was chosen to permit a secure and effective bleeding control. Probably the lack of symptoms, was due to the presence of an extended fibrotic reaction around the rosemary branch. **Conclusion:** Duodenal perforation and large vessels lesions due to foreign body ingestion are rare conditions that can lead to severe complications. Not withstanding the utilization of Computed Tomography (CT) scans and endoscopic procedures, the surgical management of bowel perforation induced by foreign bodies continues to present a formidable challenge. The optimal course of acting to ensure a favorable clinical outcome frequently relies upon the surgical approach adopted by the operating surgeon.

Keywords: Foreign body, case report, duodenal perforation, inferior vena cava perforation

***Correspondence to Author:**
Simone Gianazza
General, Emergency and Transplant Surgery Department, ASST-Settelaghi, University of Insubria, 21100 Varese, Italy

How to cite this article:
Simone Gianazza, Davide Inversini, Lorenzo Latham, Sabrina Garbarino, Matteo Zanchetta, Marika Morabito, Natalia Palamara, Giuseppe Ietto, Giulio Carcano. Duodenal and inferior vena cava perforation due to a rosemary branch ingestion: a Case Report. International Journal of Case Reports, 2023, 7:294

eSciPub LLC, USA.
Website: http://escipub.com/

Introduction

Foreign body (FB) ingestion represents a challenging clinical scenario frequently observed in practice with more than 100000 cases registered per year only in the USA.

Approximately 1500 deaths occur in the United States annually because of ingestion of FB. [1]. More than 300 cases of bowel perforation caused by foreign bodies have been reported in the literature.

The most frequent category of patients involved are children (80%) with small or large size FB ingested. The peak of incidence is between 6 months and three years. The other 20% is represented by the elderly, mentally impaired and psychiatric patients.[1][2][3][4][5] .The most commonly swallowed objects in children are coins, small magnets, and button batteries.

According to the current literature, the frequency of swallowed foreign bodies in adults vary widely, mainly reported are fish bones (9-45%), bones other than fish bones (8-40%), dentures (4-18%) [6] Most of the times patients are unaware of ingestion; anamnestic recollection may be unuseful in leading to a correct diagnosis. [7] [8]

Most blunt ingested FB, approximately 80%, pass through the gastrointestinal tract (GI) without sequelae, but 10-20% requires endoscopic removal and less than 1% needs surgical intervention.[8][9] The clinical presentation of the symptomatic cases is often mild with abdominal pain followed by more general symptoms of fever, chills, anorexia, weight loss, and fatigue [10].

However severe forms of clinical presentation may include frank peritonitis, abscess formation, intestinal obstruction and hemorrhage, perforation, ulcers and infections. Some cases may produce a digestive tract perforation leading to serious complications such as secondary damage to the liver, pancreas, kidney, heart or major vessels. [11] This depends on the size, material and shape of the objects.

The most common sites of foreign body impaction are the cricopharyngeal sphincter, constrictions of the esophagus, distal ileum and ileocaecal junction. Sharp objects, which represent 5-30% of swallowed objects pose a risk of perforation. Of these sharp objects, chicken bones and fish bones account for half of the reported perforations [8].

The most common sites of perforation are small bowel with 39.8% followed by duodenum (22%), Colon (20.3%), rectum (10.6%) and sigmoid colon (5.5%). Patients with prior abdominal surgery, acute angulation, physiological narrowing in the GI tract, or congenital gut malformations are at an increased risk for such complications.

Other risk factor that increase the probability of perforation is the presence of intrinsic bowel diseases, such as adhesions, inflammatory bowel disease, tumors, diverticula, and hernia [6]. As seen perforation may occur in every gastrointestinal tract, but are more common in areas of angulation like the C loop of the duodenum and the ileocecal valve. The risk of perforation rises with the number of FB swallowed.

Foreign objects lodged in the esophagus must be emergently removed for their life-threatening complications. [12]

No definite guidelines are available for objects that pass through the pylorus, the usual therapeutic approach is a watchful waiting within 2-3 weeks until its expulsion. If watchful waiting does not lead to the passage of these objects to the stomach the recommendations suggest an endoscopic removal. The same recommendations are suggested for long objects that have difficulties negotiating the duodenal sweep; in adults objects greater than 10 cm should be removed to prevent them to pass the pylorus and risk becoming lodged in the duodenum.

We report a case of a rosemary branch ingestion that caused a duodenal and inferior vena cava (IVC) perforation.

Case Presentation

A 61 year-old man with diabetes was admitted to

Emergency Room [ER] referring mild abdominal pain (VAS 5) which started 10 days prior, constipation, vomiting and a single episode of melaena. Objective exams showed stable vital parameters, without fever and the abdomen was mildly distended without sign of peritonism. A rectal exploration showed no signs of feces in the ampulla. A mild pain was present in the right abdominal quadrants. A blood sample was performed showing: WBC 10,98* 10^9/L; HB 13,7 g/dL, PCR 243,8 mg/L; Creatinine 1,94 mg/dL.

Furthermore, radiological exams were programmed to reach a proper diagnosis At first, an Abdominal Radiography was performed without evidence of pneumoperitoneum. Due to the ambiguous clinical presentation, the patient was submitted for an additional ComputedTomography (CT) scan. The exam was performed without a contrast medium due to mild renal deficiency. The CT scan revealed in the Inferior Vena Cava (IVC) lumen, proximally to the second part of the duodenum, a linear, hyperdense image, passing through both IVC and duodenal lumen, referable to a foreign body (Fig 1). However, the patient did not report any peculiar ingestion of a non-edible material. An urgent EGDS, performed to ensure a direct vision of the foreign body and to exclude misdiagnosed secondary lesions, confirmed the presence of a rosemary branch passing through the duodenum in correspondence of the lower duodenal knee. Due to the coexistent lesion of IVC and Duodenum Vascular and General surgeons opted for a laparotomic surgical approach

A combined surgical procedure was performed by General and Vascular Surgeons. Median xipho-pubic laparotomy was performed without evidence of intra-abdominal effusion. The gastrocolic ligament was opened to reach the lesser sac. Afterward, the colic hepatic flexure was mobilized, then a Kocher maneuver was performed to mobilize the duodenum. At the level of the inferior duodenal flexure was detected a foreign body surrounded by a phlogistic area.

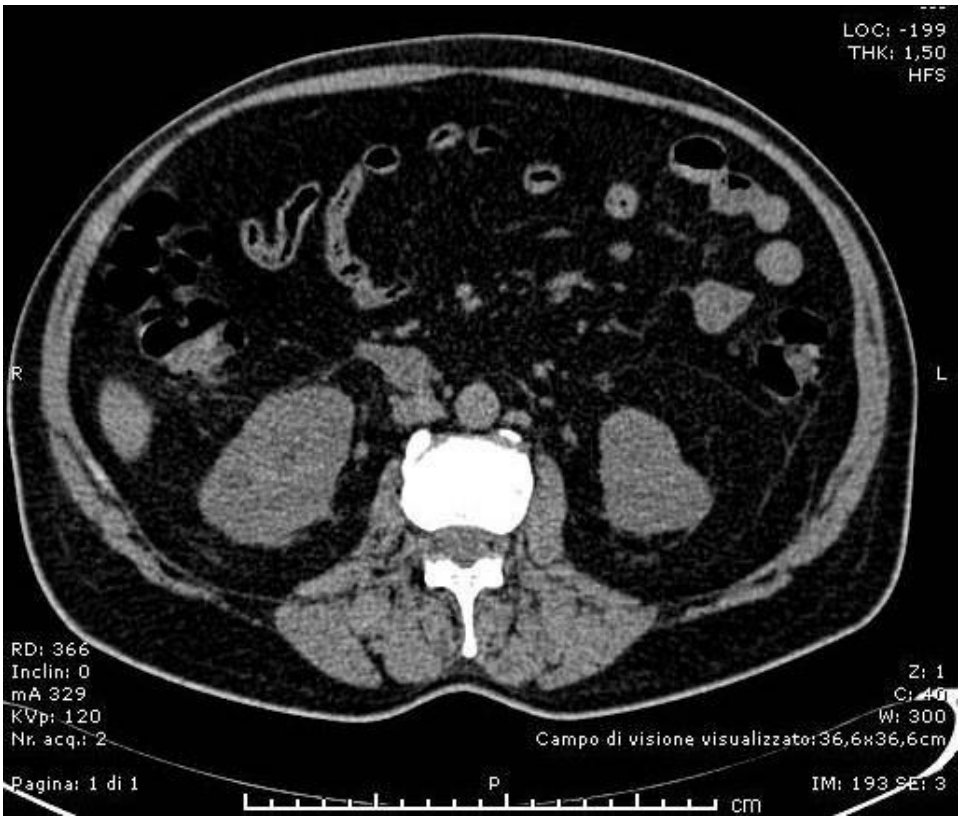

Fig 1: Abdomen CT scan with a linear foreign body between the duodenum and the IVC

Fig. 2: The six centimeters Rosemary branch surgically extracted

The inferior vena cava (IVC) was completely freed from its adhesions with the duodenum and inflammatory fibrosis permitting the extraction of a foreign body from the duodenum which was identified as a rosemary branch.

Unfortunately, the rosemary branch remained in the inferior vena cava. A double-layer suture was executed to seal the duodenum. Methylene blue was administered via nasogastric tube to confirm no persistence of no postprocedural intestinal leak. Subsequently, the Vascular Surgeon performed a tobacco pouch suture around the rosemary branch with absorbable braided 3/0 to remove in complete safety the foreign body while suturing the IVC (Fig 2). Surgical fibrin glue was applied to reinforce the suture. No signs of blood spillage were detected with satisfying hemostasis obtained. During the postoperative period, the patient remained relatively healthy. Five days after the intervention, another dose of methylene blue was given by a nasogastric tube, so that we could confirm that, in absence of methylene blue spillage from the surgical drainages, there was no gastrointestinal leak and then oral feeding was reintroduced.

The patient was discharged nine days after surgery and no problems were referred at a one-month surgical follow up.

Discussion

The ingestion of foreign bodies is well-documented clinical evidence. FB ingestion is more common in children (80 cases%), elderly patients with dental prostheses, alcoholics and psychiatric patients [13]. Although most cases are classified as accidental, some cases are purposeful eg drug addicts ingesting mirrors or razor blades to create self-harm scenarios. The American Society for Gastrointestinal Endoscopy divides ingested FB into the following groups: (i) food bolus, generally of meat; (ii) blunt objects, such as coins; (iii) long objects, longer than 6–10 cm, such as toothpicks; (iv) sharp-pointed objects, such as fish bones or small bones; (v) disk batteries; and (vi) narcotic packets wrapped in plastic or latex. The predominant types of ingested FB vary with geography and eating customs, with fish bones being more common in oriental countries and meat bolus in western countries. The nature of

the FB and the lesions they cause vary considerably. FB can be organic or inorganic and can have different shapes; rounded objects tend to cause obstructive clinical presentation, whereas sharp-pointed objects usually cause perforation. The most dangerous FB are thin, long and sharp [4]

Coins, small toys, pins, dentures, fish bones, chicken bones and nails are the commonly ingested materials, followed by toothpicks and cocktail sticks. It's estimated that 80% of swallowed foreign objects pass through the gastrointestinal tract without causing any problems within a week. Once an object reaches the stomach, it can pass almost without any problems through to the ileocecal region. The passage through the duodenum depends on the diameter as well as the length of the ingested foreign body. Foreign bodies with lengths of more than 6 cm and diameters of more than 2.5 cm pass the duodenum with difficulty. The successful passing through the GI tract to the rectal canal may be observed by serial radiological investigations. [6]

Regrettably, foreign objects that are swallowed can require endoscopic removal in 10-20% of cases. However, less than 1% may necessitate surgical intervention. [9][10] Typically, the primary symptom is abdominal pain followed by other indications such as fever, chills, loss of appetite, blood in stool or weight loss and tiredness[10][14].

Severe issues mentioned in academic writing include peritonitis, formation of abscesses, blockage of intestines and bleeding, rupture, sores and contagions. If foreign bodies migrate along the GI tract and cause perforation, secondary organ damage may occur. Secondary lesions more commonly occur in the aorta, pericardium, coronary artery, lung, liver, portal vein, hepatoduodenal ligament, inferior vena cava, peritoneum, bladder, retroperitoneum, pancreas, kidney, ureter and perianal space. [5][15] Several personal characteristics of the patients impact the risk of complications after the ingestion of foreign bodies, such as sensory defects resulting from cerebrovascular accidents, previous surgery facilitating the passage of foreign bodies through the GI, achlorhydria in which the object passes unaltered from the stomach, previously present bowel pathologies like diverticular disease and intestinal stricture, and so forth. In any case, there is a possibility that FB could become impinged due to all of these conditions. The normal anatomical sites of foreign body impaction are the cricopharyngeal sphincter, the esophagus, the distal ileum, and the ileocecal junction. Impaction can also occur in pathological areas like oesophageal rings, pyloric stenosis, intestinal strictures, and congenital malformations.

The incidence of perforation caused by foreign body penetration is reported to be less than 1%. The average time from the ingestion of foreign bodies to the occurrence of perforation was 10.4 days . Rarely, the ingested object remains undetected for a considerable period until symptoms such as nausea, vomiting or abdominal pain appear.[16] Gastrointestinal perforations due to foreign bodies occur along the GI tract due to acute bowel angles, the reduced caliber of the lumen and the transition from a a mobile tract of the bowel, like the ileum and sigmoid; to a fixed one such as cecum and rectum. [17] The analysis performed by Chung showed that the most common sites of perforation are the small bowel with 39.8% followed by duodenum (22%), colon (20.3%), rectum (10.6%) and sigmoid colon (5.5%) [7] [8]. Additionally, there are other less-represented areas of perforation such as the duodenojejunal flexure, the appendix, the colonic flexure, diverticula, and the anal sphincter. Colonic diverticulitis or undiagnosed colon carcinoma have been reported as secondary findings in the case of sigmoid perforation. Diagnostic tools useful in these cases included X-Ray, CT, ultrasonography and endoscopy; although CT plays a predominant role. [18] CT shows a sensitivity between 42 to 78% in the detection of FB and is paramount to making a correct diagnosis [11][14]. It allows identifying the

localization of the FB, the shape and its relation with the surrounding organs and eventual complications, which helps plan surgery [11] [12]. It makes it possible to recognize an inflammatory reaction surrounding the foreign body, linear objects (eventually encircled by a thickened intestinal wall), fat infiltration, peritoneum and intra-abdominal abscess when perforation occurs [7]

If a CT scan detects any foreign bodies stuck in the upper part of the small intestine or large intestine, then endoscopy should be done for diagnosis and treatment. [12] Endoscopy is crucial because it can help diagnose and treat these foreign body obstructions. Although CT scans can locate them in different parts of your digestive tract, they might not show all possible complications that come with such objects being lodged inside the GI tract. Sometimes even after undergoing an abdominal X-ray or CT examination which shows no abnormalities, endoscopy may still detect issues since only mucosal edema and external pressure are visible under an endoscope if a foreign body is completely covered by mucosa.

When foreign objects are larger than 2-2.5 cm in diameter they might not pass through the ileocecal valve and objects longer than 5-6 cm might have difficulty passing through the curve of the duodenum. In these cases, an endoscopy should be performed as soon as possible to avoid serious complications. The foreign bodies impacted in the esophagus or stomach can be extracted endoscopically. A surgical extraction is indicated in failed endoscopic retrieval [8]

Even in cases of FBs that cause perforations or migrations endoscopy removal of FB is feasible and then managed by conservative treatment. Although, in order to exclude further complications that may occur shortly after the procedure, it is mandatory to perform an abdominal X-Ray at 6 to 8 hours intervals monitoring the vital signs of the patient. If the perforation site is located in the upper gastrointestinal tract or colorectum without any complications of secondary injuries to the liver or the pancreas, nor the formation of an intra-abdominal abscesses, then the FB may be removed by therapeutic endoscopy [12] Endoscopy should be the first choice of treatment for patients in whom a foreign object is demonstrated to be fixed in the upper GI system even for the technical difficulties to perform, in those cases, surgery of the duodenum. In cases in which endoscopic extraction fails, surgery should be considered. [6]

It was reported that chopsticks and iron bars in 2nd part of the duodenum were taken out with upper GI endoscopy. But there is no literature on foreign bodies in the 3rd and 4th part of the duodenum. Although gastroduodenoscopy has been developed for many years, the 3rd and 4th part of the duodenum is still difficult to see clearly [1]

Whether or not surgery is necessary when FBs cause perforation is still controversial. Indication for surgery exists in cases of perforation or complications that cannot be resolved endoscopically. Surgery should also be considered for objects located distal to the duodenum but in the same place for >1 week. For sharp-pointed objects, the recommended observation time is 3 days.

During the process of removal, the complete removal of the FB should be confirmed, if the FB is not completely removed or failed to be removed by endoscopy, then the patient should proceed to surgery [12]

Most of those cases doesn’t represent an emergency situation but surgical intervention must be performed urgently. In the surgical management of FB ingestion is crucial to pay special attention to signs of secondary injury sites. According to the literature the surgical approach is predominantly performed via laparotomy even if laparoscopic removal is safe and feasible in the management of foreign bodies that are not removable endoscopically. Although the laparoscopic approach represents less than 10% of cases. Laparoscopic surgery shows the advantages of smaller incisions, better cosmesis, less pain and faster recovery.

Intraoperatively laparoscopic assures a broad visual field, the access to the epigastrium is adequate, the perforation site can be repaired via an intracorporeal suture, local drainage can be inserted at the infected site to prevent further abdominal contamination and the entire abdominal cavity can be washed out at the same time. [11] For diagnosed abdominal foreign body extraction, the laparoscopic approach should be preferred especially in stable nonacute patients [19] The complication rates of laparoscopy and open surgery are similar, but laparoscopy shows a shorter postoperative hospital stay, decreases post-operative pain, and better integrity of the abdominal wall. [12]

Conclusion

Ingested foreign bodies are well described in clinical practice. Most of them pass through the gastrointestinal tract without sequelae although severe complications such as perforation and penetration in the adjacent organs are anecdotal but observed. The use of CT scans is a big fundamental in these diagnoses and allows a correct definition of dimension, sharpness and allocation of foreign bodies. It also might detect secondary damages and concomitant complications permitting the definition of a step-up approach. A successful endoscopy is feasible in most of cases, although in case of failure or incomplete extraction of FB surgery might be mandatory. Surgery can be safely performed both in laparotomic than in laparoscopic approach, nevertheless bowel perforation by foreign bodies remains a surgical challenge due to the possibile complications.

The surgeon approaching such cases must rely on personal expertise and the capabilities of the institution in treating this type of patients.

Legends: Foreign Body (FB), Inferior Vena Cava (IVC), Emergency Room (ER), Computed Tomography (CT), Esophagogastroduodeno-scopy (EGDS), Gastro-Intestinal (GI), Recurrent Laryngeal Nerve (RLN), Non Recurrent Inferior laryngeal Nerve (NRLN), Aberrant Right-Subclavian Artery (ARSCA), Aberrant Left Subclavian Artery (ALSCA), External Carotid Artery (ECA), Electomiography (EMG), Ultrasonography (USG), Magnetic Resonance Imaging (MRI), Right Common Carotid Artery (RCCA)

Author Contributions: D.I. And S.G. conceived and planned the manuscript. L.L., S.G. And S.G. Performed the operation. M.Z., M.M., and N.P. Critically revised the literature. D.I. And G.I. Performed the revision of the article. G.C. Approved the final version to be published. S.G. took the lead in writing the manuscript. All authors provided critical feedback and helped shape the research, analysis and manuscript.

References

[1]. 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 Feb 23;21(1):82. doi: 10.1186/s12876-021-01662-3. PMID: 33622248; PMCID: PMC7903620.

[2]. Wyllie R. Foreign bodies in the gastrointestinal tract. Curr Opin Pediatr. 2006 Oct;18(5):563-4. doi: 10.1097/01.mop.0000245359.13949.1c. PMID: 16969173.

[3]. Lam HC, Woo JK, van Hasselt CA. Management of ingested foreign bodies: a retrospective review of 5240 patients. J Laryngol Otol. 2001 Dec;115(12):954-7. doi: 10.1258/0022215011909756. PMID: 11779322.

[4]. ASGE Standards of Practice Committee; Ikenberry SO, Jue TL, Anderson MA, Appalaneni V, Banerjee S, Ben-Menachem T, Decker GA, Fanelli RD, Fisher LR, Fukami N, Harrison ME, Jain R, Khan KM, Krinsky ML,Maple JT, Sharaf R, Strohmeyer L, Dominitz JA. Management of ingested foreign bodies and food impactions.Gastrointest Endosc. 2011 Jun;73(6):1085-91. doi: 10.1016/j.gie.2010.11.010. PMID: 21628009.

[5]. Weiland ST, Schurr MJ. Conservative management of ingested foreign bodies. J Gastrointest Surg. 2002 May-Jun;6(3):496-500. doi: 10.1016/s1091-255x(01)00027-0. PMID: 12023005.

[6]. Mehrabi S, Yavari Barhaghtalab MJ, Hosseinpour R. Duodenal obstruction due to accidental swallowing of adental prosthesis: a case report and review of the literature. J Med Case Rep. 2020 Aug 15;14(1):131. doi:10.1186/s13256-020-02456-z. PMID: 32799932; PMCID: PMC7429697.

[7]. Poretti D, Pescatori LC, Mauri G, Sconfienza LM, Brambilla G. Inferior vena cava septic thrombosis due togut perforation after accidental toothpick ingestion. BJR Case Rep. 2016 Jun 29;3(1):20150522. doi:10.1259/bjrcr.20150522. PMID: 30363322; PMCID: PMC6159286.

[8]. Sahoo MR, Kumar A. Duodenal perforation caused by a bird feather. BMJ Case Rep. 2013 Feb15;2013:bcr2013008635. doi: 10.1136/bcr-2013-008635. PMID: 23417953; PMCID:PMC3603951

[9]. Pavlidis TE, Marakis GN, Triantafyllou A, Psarras K, Kontoulis TM, Sakantamis AK. Management of ingestedforeign bodies. How justifiable is a waiting policy? Surg Laparosc Endosc Percutan Tech. 2008Jun;18(3):286-7. doi: 10.1097/SLE.0b013e31816b78f5. PMID: 18574418.

[10]. Glick WA, Simo KA, Swan RZ, Sindram D, Iannitti DA, Martinie JB. Pyogenic hepatic abscess secondary toendolumenal perforation of an ingested foreign body. J Gastrointest Surg. 2012 Apr;16(4):885-7. doi:10.1007/s11605-011-1711-7. Epub 2011 Oct 12. PMID: 21989581.

[11]. Yang Z, Wu D, Xiong D, Li Y. Gastrointestinal perforation secondary to accidental ingestion of toothpicks: Aseries case report. Medicine (Baltimore). 2017 Dec;96(50):e9066. doi: 10.1097/MD.0000000000009066.PMID: 29390302; PMCID: PMC5815714.

[12]. Hu T, Zhang J, Liu Y, Chen L, Cen W, Wu W, Huang Q, Sun X, Stock S, Zippi M, Zimmer V, Basharat Z, HongW. Evaluation of the risk factors for severe complications and surgery of intestinal foreign bodies in adults: asingle-center experience with 180 cases. Gastroenterol Rep (Oxf). 2022 Aug 11;10:goac036. doi:10.1093/gastro/goac036. PMID: 35966628; PMCID: PMC9366183.

[13]. Li C, Yong CC, Encarnacion DD. Duodenal perforation nine months after accidental foreign body ingestion, acase report. BMC Surg. 2019 Sep 10;19(1):132. doi: 10.1186/s12893-019-0594-5. PMID: 31500608;PMCID: PMC6734462.

[14]. Park HO, Choi JY, Jang IS, Kim JD, Kim JW, Byun JH, Kim SH, Yang JH, Moon SH, Kim KN, Kang DH,Jung JJ, Choi SM, Kim JY, Lee CE. Perforation of inferior vena cava and duodenum by strut of inferior venacava filter: A case report. Medicine (Baltimore). 2019 Nov;98(47):e17835. doi:10.1097/MD.0000000000017835. PMID: 31764778; PMCID: PMC6882657.

[15]. Steinbach C, Stockmann M, Jara M, Bednarsch J, Lock JF. Accidentally ingested toothpicks causing severegastrointestinal injury: a practical guideline for diagnosis and therapy based on 136 case reports. World JSurg. 2014 Feb;38(2):371-7. doi: 10.1007/s00268-013-2307-z. PMID: 24166027.

[16]. Rodríguez-Hermosa JI, Codina-Cazador A, Sirvent JM, Martín A, Gironès J, Garsot E. Surgically treatedperforations of the gastrointestinal tract caused by ingested foreign bodies. Colorectal Dis. 2008Sep;10(7):701-7. doi: 10.1111/j.1463-1318.2007.01401.x. Epub 2007 Nov 12. PMID: 18005196.

[17]. Ben-Ishay O, Haloon K, Khouri R, Kluger Y. Trans-colonic foreign body penetration of the retro-hepatic vena cava. Report of a case and review of the literature. Trauma Case Rep. 2017 May 25;9:49-51. doi: 10.1016/j.tcr.2017.05.014. PMID: 29644326; PMCID: PMC5883228.

[18]. Wang Z, Du Z, Zhou X, Chen T, Li C. Misdiagnosis of peripheral abscess caused by duodenal foreign body: a case report and literature review. BMC Gastroenterol. 2020 Jul 23;20(1):236. doi: 10.1186/s12876-020- 01335-7. PMID: 32703254; PMCID: PMC7376966.

[19]. 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 Jun 25;36:123. doi: 10.11604/pamj.2020.36.123.23948. PMID: 32849978; PMCID: PMC7422735.