

Cecal Perforation Caused by an Ingested Fishbone Discovered During Laparoscopic Appendectomy for Suspected Acute Appendicitis: A Case Report

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Abstract

Ingested foreign bodies are not uncommon but are usually excreted naturally without any symptoms. Sharp objects like fishbones can impact and perforate the bowel. Ileo-caecal fishbones present with symptoms mimicking acute appendicitis. A young man presented in the emergency room with pain in the right lower quadrant of the abdomen with tenderness and rebound tenderness. Contrast-enhanced CT (CECT) was not conclusive of acute appendicitis. No fishbone was identified preoperatively or on retrospective CT review. Laparoscopic examination showed a fishbone perforating the cecum and an inflamed appendix. Appendectomy was done; the fishbone was retrieved, and the punctate perforation was repaired. Histological examination of the appendix confirmed intact mucosa and mantle zones with multiple reactive lymphoid follicles, suggesting secondary appendicitis. The patient recovered well without complications.

Categories: Radiology, General Surgery

Keywords: acute appendicitis, cecal perforation, fishbone, foreign body, laparoscopic appendectomy

Introduction

Foreign body ingestion is not uncommon. Most pass naturally through the tubular organ without symptoms. Fishbone is one of the most common foreign bodies ingested (up to 84%) accidentally [1], which may bring on severe complications such as inflammation, hemorrhage, or perforation. These complications are associated with the shape, size, and site of impaction of the fishbone within the gastrointestinal tract (GIT). As compared to other foreign bodies in the GIT, sharp fishbones have more proclivity to lodge at points of narrow lumen, acutely angulating bowel, or in less mobile parts such as the duodenal loop, distal ileum, cecum, appendix, and sigmoid colon [2], leading to inflammation and perforation [3]. Perforation in the ileo-cecal region presents with nonspecific clinical features and is apt to be diagnosed as acute diverticulitis or appendicitis [4]. Fishbone causing acute appendicitis, either primary (pathology within the appendix) or secondary (contiguous inflammation from nearby abdominal pathology), may not be visible on abdominal radiography or CT, posing a diagnostic challenge. Patients with complicated fish bones without bowel perforation can generally be managed by careful observation or endoscopic surveillance [5], but the management of perforation is mostly surgical. We report here a case of accidentally ingested fishbone causing perforation of the caecum and secondary appendicitis, presenting in the emergency with signs and symptoms mimicking acute appendicitis.

Case Presentation

A 28-year-old male, not known to have any medical illness before, presented to the emergency room with pain in the right lower quadrant of the abdomen for six hours, sudden in onset, initially moderate in intensity but increased with time, with no aggravating factors and relieved by analgesics. He complained of loss of appetite and nausea with no vomiting. There was no fever, no urinary complaint, and no change in bowel habit. His vital signs were within the normal range. On physical examination, he exhibited moderate tenderness in the right lower abdomen, with rebound tenderness and mild rigidity. There was no palpable mass. Bowel sounds were normal. Laboratory findings included a hemoglobin level of 14.2 g/dL (reference range, 13-18 g/dL); a white blood cell (WBC) count of 11,000/mm³ (reference range, 4,500-11,000/mm³), with neutrophils accounting for 64.6%; a platelet count of 230,000/mm³ (reference range, 150,000-450,000/mm³); a blood urea nitrogen level of 14.5 mg/dL (reference range, 7-20 mg/dL); and a serum creatinine level of 0.68 mg/dL (reference range, 0.6-1.2 mg/dL). The urine dipstick test showed no blood or nitrates. Abdominal X-ray was unremarkable, and no foreign body was visible (Figure 1).

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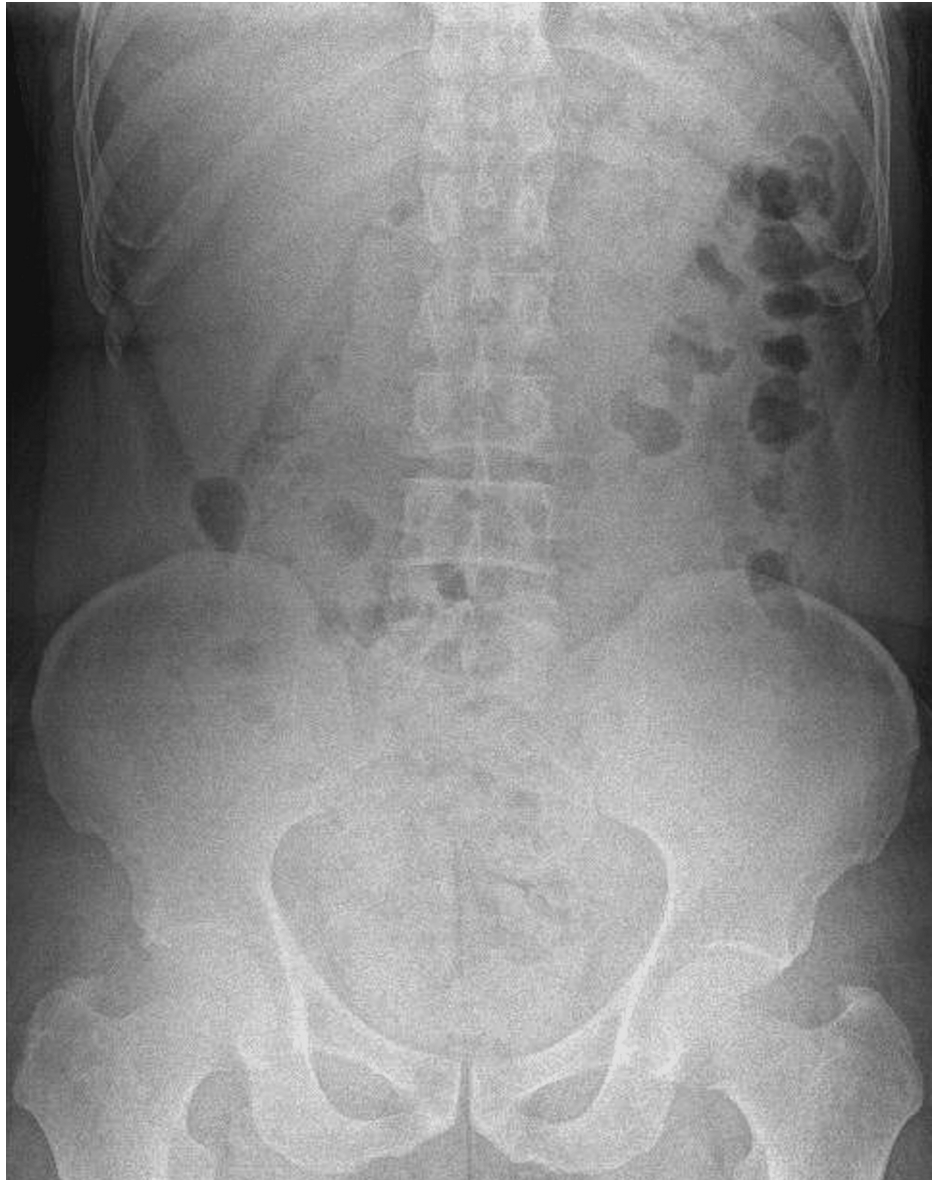


FIGURE 1: The plain abdominal radiograph was unremarkable.

The contrast-enhanced CT (CECT) scan of the abdomen revealed a non-aerated appendix, 6 mm in diameter, showing enhancing walls with multiple surrounding reactive-looking lymph nodes. There was mild surrounding fat stranding with minimal free fluid. Mild mural thickening of the cecum was noted, but no fishbone was visible (Figures 2-3).

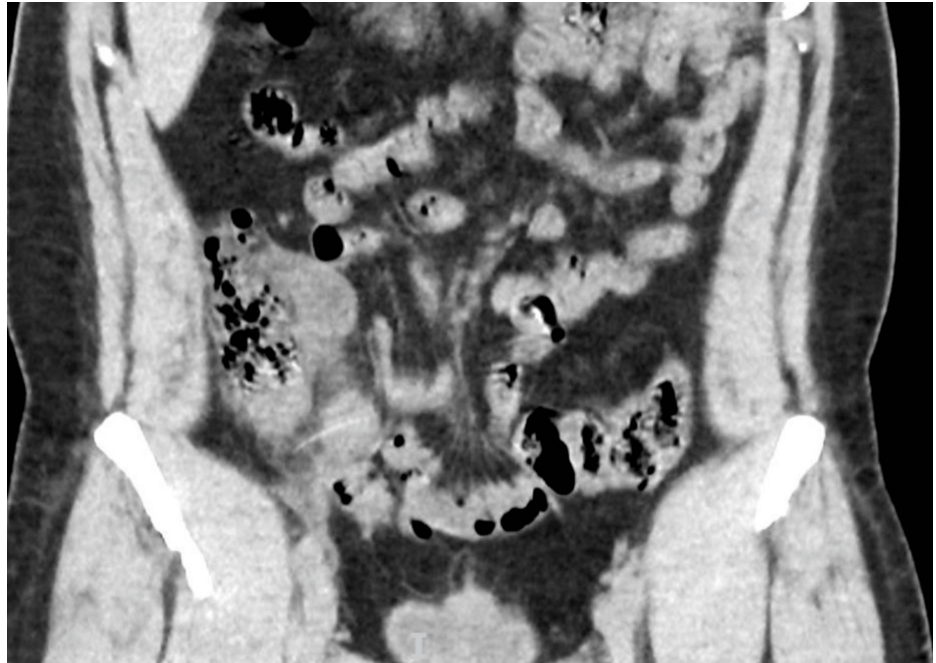


FIGURE 2: Contrast-enhanced CT of the abdomen showing fat stranding adjacent to the cecum.



FIGURE 3: Contrast-enhanced CT of the abdomen showing a nondilated appendix.

Acute appendicitis could not be ruled out, so laparoscopic examination was planned for the next morning. Under general anesthesia, pneumoperitoneum was achieved through open technique. An umbilical optical port 10 mm and two 5 mm ports in the left iliac region were placed. The surgeon found an inflamed appendix of grade I [6], which was hyperemic with a swollen distal half. The mesoappendix was also thickened. No free fluid in the peritoneal cavity and no adhesions were found. The mesentery of the appendix was cut after coagulation. On mobilization of the appendix for appendectomy, the surgeon identified a sharp white foreign body penetrating the anterior wall of the cecum and stuck to the appendix, appearing to be a fishbone (Figures 4-5).

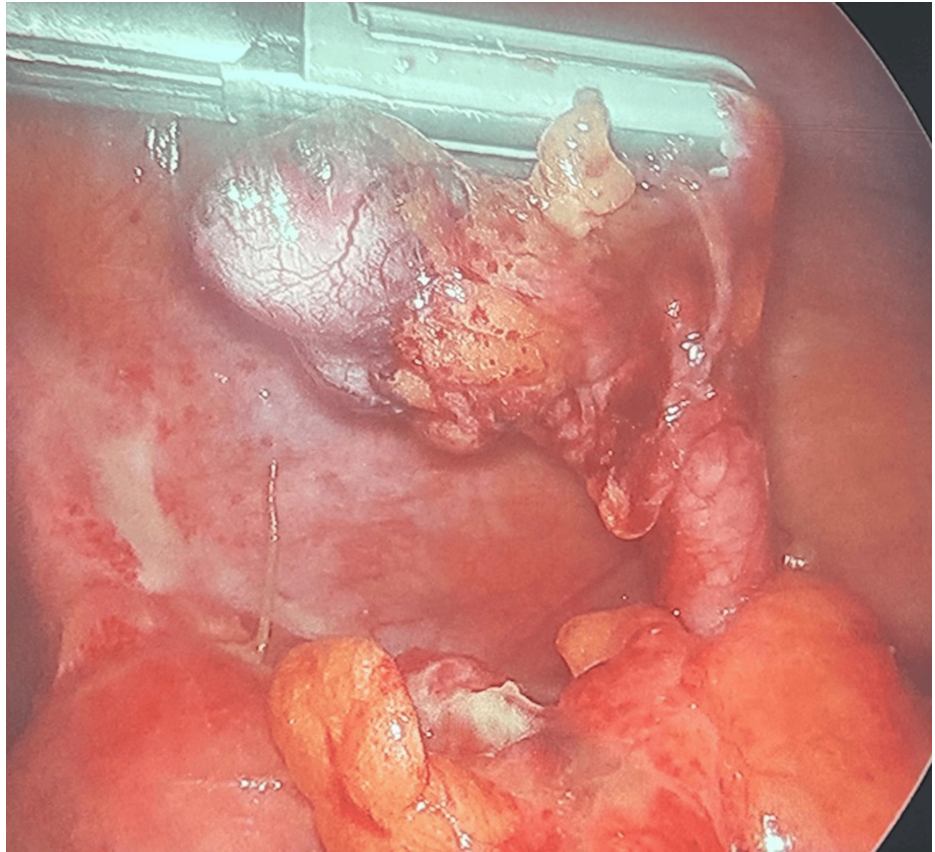


FIGURE 4: Laparoscopic view showing dilation and inflammation of the distal appendix (grade 1).



FIGURE 5: Laparoscopic view showing a fishbone penetrating the anterior wall of the cecum.

The appendix was cut between loop ligatures and removed. The foreign body was retrieved with forceps, and the punctate perforation was oversewn with a figure-of-eight suture using Vicryl 3-0 (Ethicon, Inc., Somerville, NJ, USA). A drain was placed, and the wounds were closed in routine fashion. After recovery from anesthesia, the patient was re-evaluated, and the operative findings were reported to him. He admitted to consuming fish at lunch the preceding day. CT images were re-evaluated, but no definite fish bone was identified. The drain was removed on the second postoperative day as there was no output, and an oral diet was started. After an uneventful hospital course, the patient was discharged on the third postoperative day with appropriate follow-up arrangements. He was followed in the outpatient clinic at two weeks. All wounds had healed, and the patient regained his routine life. Histopathology of the appendix showed intact mucosa and multiple reactive lymphoid follicles, with prominent germinal centers and intact mantle zones. Features suggested secondary inflammation of the appendix.

Discussion

Fishbone appendicitis and cecal perforation are rare but may cause serious complications, warranting ample consideration. The majority of unintentionally swallowed foreign bodies pass through the GIT, causing no harm. Nevertheless, they may rarely become embedded in the caecum or appendix, causing inflammation and occasionally perforation. In adults, factors responsible for the majority of cases of foreign body ingestion are related to oropharyngeal dysfunction (wearing dentures and reduced tactile sensation of the palate), cognitive impairment (substance users or alcoholics) [3], imprisonment, inflammatory bowel conditions, and the elderly [7]. Our patient was a young man with none of the above risk factors. The only understood reason was the use of cutlery and rapid ingestion of food, with deboning of fish in the mouth, which led to unintentional ingestion. Arulanandam et al. [7] explained that using knives, forks, and chopsticks to eat fish, and oral deboning of fish, are also risk factors for accidental swallowing of fishbone.

Acute appendicitis due to fishbone is rare. The large case series reported an incidence ranging from 0.005% to 0.113% [8]. The frequency of perforation is less than 1% of cases, with rare development of an intra-abdominal abscess. The rate may be higher in ichthyophagous populations with high seafood consumption [9,10]. The commonest sites of perforation in the lower GIT are the ileo-cecal and recto-sigmoid regions [11].

It is postulated that the reason for impaction of foreign bodies at acute angulations or in the less mobile segments of the bowel is the change in direction of the contents in the lumen at these sites [12]. In our patient, perforation was in the cecum close to the attachment of the appendix. The fixed retroperitoneal cecum is less generous to accommodate intra-luminal contents changing direction, as compared to the more mobile mesentery of the small intestine.

The patients with cecal fishbone impaction or perforation present remarkably similarly to that of acute appendicitis [13]. In acute appendicitis due to fecolith or lymphoid hyperplasia, patients usually present with a short history and are easily diagnosed, in most cases, on clinical grounds or by CECT. Fishbone causes symptoms due to complications such as inflammation (appendicitis), impaction, bleeding, or full-thickness perforation with or without intra-abdominal abscess. The patient usually does not remember ingesting a fishbone, and the clinician often does not inquire about less common causes. A careful history of dietary habits from patients in areas of high fish consumption with non-specific symptoms for a few days may point to early diagnosis. In most cases, the only definite tool to distinguish the two conditions is radiological assessment or surgical exploration. Plain abdominal X-rays are used as the primary radiological investigation in emergency settings but have low sensitivity for non-radiopaque objects [14]. The sensitivity ranges from 25% to 39%, but specificity is high, up to 91%, when a foreign body is visible. The small-sized low-radiopacity fish bones are not visible on plain radiographs. Therefore, CT is the preferred imaging modality for localizing fishbone and evaluating any complications [15]. According to Uchiyama et al. [3], a fishbone appears as a sharp, linear area of high density. Dung et al. [5] highlighted thickened walls of the affected segment of the intestine and localized fat stranding as notable signs of perforation on CT. In our case, plain X-ray abdomen showed no radiopaque density, and the patient underwent CECT evaluation. The enhancing walls of the appendix and thickened cecal wall with fat stranding close to the appendix raised suspicion of early acute appendicitis by the radiologist.

Although CT is the imaging modality of choice in such cases, preoperative recognition of a fishbone is difficult due to several factors, as demonstrated by Goh et al. [16]. In a study from 1996 to 2003, they identified 22 patients with intestinal perforation due to a foreign body. Of these, 15 were due to fishbones, but in five of the seven scans, the radiologist suspected a fishbone perforation preoperatively. Multiple factors were responsible, including lack of observer awareness, the poor opacification of certain types of fish bones, and some technical reasons, for example: large thickness of CT slices, movement artifacts (respiratory movements of the abdomen and bowel peristalsis), intravenous and oral contrast material, and orientation of a foreign body with respect to an axial CT scan that makes identification of fishbones challenging. They concluded that the sensitivity of CT in detecting intra-abdominal fishbones was 71.4% on initial interpretation, which increased to 100% upon retrospective review of the images. The usual CT findings may include thickening of the bowel wall, localized pneumoperitoneum or fat stranding, and signs of intestinal obstruction. All these features are non-specific, and a conclusive diagnosis demands the direct visualization of the opaque fishbone on CT scan. Klein et al. [17] found a higher sensitivity rate (100%) and specificity rate of 97.8% with CT. They observed that fishbone perforation typically appears as a linear calcified object surrounded by inflammation. Because fishbone presentations can be unusual or subtle, careful review of CT images is warranted, as subtle fishbones may go unnoticed. In our patient, localized fat stranding and thickening of the cecal wall were observed on initial reading, but even re-evaluation of CT images could not definitively locate a fishbone. This may happen in small-sized, low-radiopacity fish bones.

The surgeon found an inflamed appendix (grade I) on laparoscopy. Still, most likely this inflammation was secondary appendicitis of extrinsic type and reactive due to perforation of the cecum or irritation by the fish bone, which was adherent to the appendix. Nordback and Matikainen [18] reported a case of secondary appendicitis due to a perforated Meckel's diverticulum. On histological examination, the outer layers of the appendix were severely inflamed, but the epithelium was intact. In our patient, histological examination of the appendix revealed intact mucosa and intact mantle zones with multiple reactive lymphoid follicles, suggesting secondary inflammation of the appendix. Intra-operative vigilance is needed in such cases with ambiguous presentation.

The management of complications of a sharp object in the bowel is primarily surgical. A laparoscopic approach is effective and safe, allowing direct visualization of the fish bone for easy removal and management of perforation. Open surgery may be considered when the complication is difficult to manage through a minimal access approach. Dung et al. [5] managed the cecal perforation successfully in a 51-year-old man with a cecectomy and the removal of a 30 mm fish bone. Lau et al. [14] retrieved the fish bone and repaired the perforated cecum through a gridiron incision centered at McBurney point in a 10-year-old girl. In elderly or frail patients unable to tolerate surgery, a non-surgical approach can be attempted. Kim et al. [9] performed colonoscopy in an elderly patient who presented with an intra-abdominal abscess. They retrieved a sharp fish bone measuring 2 cm, impacted in the terminal ileum, and managed the patient with broad-spectrum antibiotics. The patient recovered without complications. Elmans Abdalla et al. [19] showed in a systematic review of case reports that 91% of patients with foreign body-induced appendicitis underwent surgery. The non-operative approaches, including broad-spectrum antibiotics, laxatives, mechanical bowel preparation, endoscopy, and serial imaging, were not successful, and patients underwent surgical operation in the end. Non-operative management was successful in only 9% of cases. In our case, the patient underwent laparoscopic appendectomy, successful removal of the fishbone, and repair of the perforation site with an uneventful postoperative recovery. Kumar et al. [15] also suggested that, in cases of

bowel perforation, the appropriate treatment is to remove the fishbone laparoscopically, suture the perforation, and drain the abscess if present.

Conclusions

Our case indicated the diagnostic and therapeutic challenges associated with fishbone-induced perforation and secondary inflammation of the appendix. Adequate history and careful evaluation of CT scans are important for the diagnosis and the early recognition of complications. Intra-operative vigilance is needed to avoid missing a pathology. The primary treatment is prompt surgical intervention by laparoscopy or open surgery to remove the fish bone and manage complications.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

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