DOI: https://doi.org/10.53350/pjmhs2023170970

ORIGINAL ARTICLE

Diagnosing Gastric Perforation Caused by Accidental Ingestion of Fish Bones

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ABSTRACT

Background: Foreign body perforation of the gastrointestinal tract is most frequently caused by ingestion of fish bones (FB). A wide range of nonspecific clinical manifestations are observed in patients.

Objective: Our research aims to help you establish a correct presurgical diagnosis by outlining CT radiological markers that signal when to search for the FB.

Methods: Total 85 patients were presented in this study. All patients with radiological diagnosis of gastrointestinal perforation caused by fish bone detected by CT were retrospectively reviewed. An analysis was conducted to describe it. We looked for radiological signs such fatty infiltration, extraluminal air bubbles, mural thickness, and radio-opaque foreign bodies. Possible problems were also evaluated.

Results: There were 51 (60%) males and 34 (40%) females with mean age 67.13 years. Most common site of perforation was ileon found in 38 (44.7%) cases. There was localised extraluminal air bubbles in 22% of cases, mural thickening in 42%, foreign bodies in 97%, and regional fatty infiltration in 100% of cases. Abscess was just found in 23 cases.

Conclusion: Most often, fat was found to be involved in the area surrounding the fish bone-perforated intestinal segment. As a result, the radiologist must look for the presence of an object other than fat when conducting an abdominal study.

Keywords: Fishbone, Gastric Perforation, Computed tomography

INTRODUCTION

Ingestion of bones from animals, particularly fish, happens frequently by accident but typically does not cause any issues as it goes through the gastrointestinal tract. Within a week of swallowing, the majority of fish bones disintegrate painlessly. Perforation of the gastrointestinal tract by one of these pointed bones is an extremely unusual consequence that can include mucosal damage, perforation, abscess formation, fistula development, or intestinal obstruction[1]. Foreign body intake is thought to cause gastrointestinal perforations in less than 1% of cases[2]. Due to their rarity, diminutive size, delayed clinical manifestation, and absence of a distinct history, fish bones frequently go unrecognised, even though they constitute a well-documented cause. After ingesting a fish bone, the majority of patients forget about it.

Acute angulation most commonly occurs at the ileocecal junction, duodenum, and sigmoid colon, however perforation can occur elsewhere in the gastrointestinal tract. It is difficult to diagnose fish bone perforation because of the lack of memory of ingestion and the typically generic clinical presentation. From mild inflammation to more severe problems like obstruction, GI bleeding, peritonitis, or abscess formation, the symptoms might vary. They can also mimic those of other acute abdominal conditions such diverticulitis or acute appendicitis[3,4]. Diagnostic uncertainty frequently results in missed detections or inaccurate diagnoses[5].

Any portion of the gastrointestinal system, including the rectum and oesophagus, may become lodged with a fish bone. Although stomach perforations do happen, lower gastrointestinal system perforations are less frequent. Because it's hard to diagnose a patient's health effectively before surgery, most patients need either laparoscopic or abdominal surgery. Toothpicks, fish bones, and other non-metallic alien things are difficult for radiography to identify. Accordingly, CT can assist in accurately diagnosing an external perforation[6,7,8] We describe a patient who consumed a fish bone and developed a stomach perforation as determined by CT.

Received on 18-07-2023
Accepted on 25-08-2023

In addition to endoscopic or surgical procedures, conservative therapy options include antibiotics and CT scans for monitoring. Both diagnostic and therapeutic purposes are frequently fulfilled by endoscopic and surgical techniques for patients who do not have a pre-operative diagnosis.references[9,10]

The radiographic indications that are suggestive of fish bone perforation must be understood in order to search for and diagnose the disorder[11,12]

Finding the radiological symptoms that should alert a radiologist to fish bone perforation and its aftereffects is the first objective of this study. The second is to provide a detailed description of these indicators.

MATERIALS AND METHODS

This was a retrospective descriptive study,comprised of 85 patients . Patients under the age of 18 and those with perforations by foreign bodies other than fish bones were excluded from the study. The inclusion criteria were (a) a CT scan diagnosis of fish bone perforation and (b) a location of the perforation distal to the oesophagus (gastrointestinal); the two withdrawal criteria were (a) the absence of assurance through surgery, endoscopes, or X-ray for monitoring purposes, and (b) the foreign body not being a fish bone. The information technology department created a database and used certain codes to locate the patients, from which they were selected.

Upon determining the location of the perforation, the radiological results were analysed to determine whether a radio-opaque foreign body was present (attenuation, morphology, and location), whether intestinal loop wall thickening, abscesses, pneumoperitoneum, and bowel obstruction were present, and whether surrounding fat was involved. For attenuation, densitometric values (measured in Hausfeld units [HUs]) were obtained.

If an abdominal X-ray had been obtained before to the CT scan, it was determined whether or not the fish bone could be recognised on that picture. All cases were confirmed by a standard procedure (surgery, endoscopy, or X-ray for monitoring purposes).

In addition to sagittal and coronal plane photos, axial plane images were also analysed. Multiplanar reconstructions (MPRs) were then performed using maximum intensity projection (MIP)

and three-dimensional (3D) vision. A colour map depending on the composition of each element was created by post-processing the dual-energy CT scan, if one was available, using the Kidney Stones application of the dual-energy CT program (Dual energy, SyngoVia®, VA30A, Siemens). This made it possible to assess how useful the scan could be in identifying this illness.

While the resident collected the data, a diagnostic radiology fourth-year resident and a radiologist with 20 years of experience in abdominal radiology performed the image analysis.

The results of a descriptive study that analysed both qualitative and quantitative characteristics were presented as percentages and case counts. SPSS 22.0 was used to analyze all data.

RESULTS

There were 51 (60%) males and 34 (40%) females with mean age 67.13 years. Most common site of perforation was ileon found in 38 (44.7%) cases, followed by sigmoid colon and jejunum.(table 1)

Table-1: Demographics of the presented cases

Variables	Frequency (85)	Percentage
Gender		
Male	51	60
Female	34	40
Mean age (years)	67.13	
Site of perforation		
ileum	38	44.7
sigmoid colon	20	23.5
jejunum	14	16.5
stomach	6	7.1
duodenum	3	3.5
Left colon	2	2.4
Right colon	2	2.4

There were 26 punctiform bones and 53 linear or curvilinear bones in terms of axial plane morphology. In all, 65 fish bones had high densitometric values (an average of 240 HUs), whereas the remaining 20 had essentially insignificant densitometric values. In terms of location, 28 were primarily located in the intestinal loop's lumen, 28 were transmural, and 29 were extraluminal.(figure 1)

Figure-1: There are three types of fish bones: (A) punctiform intraluminal with densitometric values of 296 HUs; (B) linear transmural with densitometric values of 291 HUs; (C) punctiform intraluminal that is virtually imperceptible; and (D) linear extraluminal that is virtually undetectable.

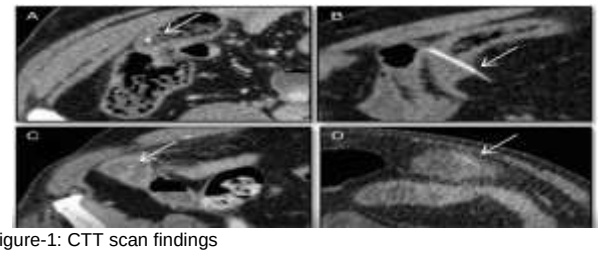

Figure-1: CTT scan findings

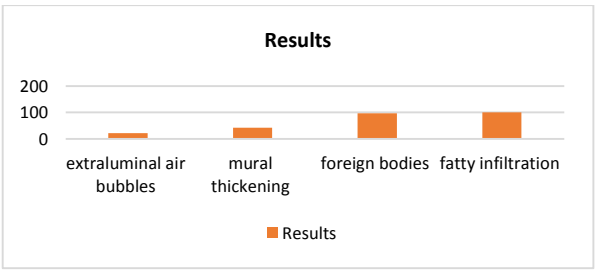

Figure 2: There was localised extraluminal air bubbles in 22% of cases, mural thickening in 42%, foreign bodies in 97%, and regional fatty infiltration in 100% of cases

Abscess was just found in 23 cases.(table 2)

Table-2: Frequency of abscess among all cases

Variables	Frequency (85)	Percentage
Abscess		
Yes	23	27.1
No	62	62.9

DISCUSSION

Bones from fish and poultry are the most often consumed bones that can result in gastrointestinal perforation. Children, people with intellectual disabilities, people wearing dentures, people who eat unfiletted fish, and those who abuse drugs or alcohol are risk factors[13]. In hindsight, the patient did not remember eating fish recently, which made the diagnosis much more difficult.

Fish bones can cause GI perforations anywhere in the gastrointestinal tract, although they most frequently happen in anatomical areas with a lot of angulation. In a retrospective analysis of 62 patients, Goh et al. found that 71% of perforations took place intra-abdominally, with the ileum and jejunum being the most frequent sites, whereas 29% happened extra-abdominally in the distal rectum or anus. Similar findings were made by Rodriguez et al., who examined 33 patients and discovered that 54.5% of perforations were extraperitoneal, mostly rectal, with the terminal ileum coming in second in 21.2% of cases[14,15]. In light of these findings, fish bone perforation should be regarded as a differential diagnosis in instances of acute abdomen with unclear cause, especially when the results of investigations, physical examinations, and clinical histories do not support more prevalent surgical disorders[16]. In our study, most common site of perforation was ileon found in 38 (44.7%) cases, followed by sigmoid colon and jejunum.

In rural and regional hospital settings, diagnosis might be made more difficult by the lack of physician familiarity with rare surgical disorders. In Australia, these groups paradoxically have a higher propensity for self-consumption and recreational fishing, which raises the possibility of unintentional fish bone intake and its consequences.

The occurrence of stomach perforation by fish bone is comparatively uncommon; there are only a few reports worldwide and no cases have been reported in Australia or New Zealand to date. Lee et al. reported a case in which a fish bone penetrated the gastric antrum, resulting in an abscess in the left lobe of the liver; the patient also presented with mild epigastric pain and intermittent fevers for more than a week[17]. The thicker walls of the duodenal, colonic, and stomach perforations may cause delayed presentation because the foreign body must gradually penetrate and migrate from these GI segments.

Due to the fact that it may not cause acute peritonitis, retroperitoneal perforations can manifest more subtly, allowing the liver and other nearby organs to seal off the perforation through the formation of an abscess[14].

A thickness of 3 mm was selected since the patients in our study did not seek therapy with a clinical suspicion of fish bone perforation. Multu et al. obtained similar results and concluded that each patient seeking therapy for acute abdomen should not have a CT scan with such a thin slice thickness[18]

The most common issue in our study was abscesses. Their prevalence was shocking, as they were detected in 23 patients (27.1%). The literature states that frank pneumoperitoneum is a rather rare finding, and that when it comes to extraluminal air, it is common to see small, isolated bubbles concentrated in the vicinity of the perforation[19, 20]

CONCLUSION

Most often, fat was found to be involved in the area surrounding the fish bone-perforated intestinal segment. As a result, the radiologist must look for the presence of an object other than fat when conducting an abdominal study.

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This article may be cited as: Farid MI, Khan MD, Akhtar NN, Khan G, Ali F, Iqbal S: Diagnosing Gastric Perforation Caused by Accidental Ingestion of Fish Bones. Pak J Med Health Sci, 2023;18(9): 70-72.