



Case report

A fatal perforation of the distal ileum from an ingested fish bone: A case report

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ABSTRACT

Introduction and importance: Foreign body-induced perforations of the ileum are rare consequences among adults. **Presentation of case:** This is a case report of a delayed presentation of an ileal perforation and concurrent faecal peritonitis presented as an acute abdomen, resultant from an ingested fishbone, which led to fatality despite urgent laparotomy.

Clinical discussion: Perforations following ingested foreign bodies are frequently unanticipated clinically, and diagnosed during advanced imaging studies or surgical interventions. Endoscopy, laparoscopy, and laparotomy have been used during surgical management in reported cases; however, prior early identification is pivotal for good outcomes as delayed presentations and delayed diagnosis carry a poorer prognosis.

Conclusion: Despite fish bones being frequent foreign bodies in the gastrointestinal tract and the majority causing no life-threatening adverse effects, they are the leading foreign bodies instigating gastrointestinal perforations. A high degree of suspicion is required when attending to patients with suspected gastrointestinal perforations and absent typical findings in routine imaging, where fish bones could be the aetiology.

1. Introduction

Ingested foreign bodies (FBs) in the gastrointestinal tract are not uncommon, mainly consisting of fish bones, dentures, and toothpicks [1]. While most of FBs pass through safely, a few result in complications such as bleeding and perforation. Perforations are common with sharp FBs in the areas of acute angulations in the intestinal tract such as the ileum [2]. The outcomes had been poorer in the cases of ileal perforations caused by FBs [3]. Simple radiological imaging such as the X-ray specially in low-resource settings might not yield characteristic gas under the diaphragm [4] while the diagnosis is challenging due to non-specific clinical features and aetiology being unnoticed and infrequently considered by both the patient and the attending clinician [5]. Here we present an unusual case of a mortal ileal perforation leading to faecal peritonitis caused by an ingested fishbone, initially presented as acute peritonitis with septic shock, requiring emergency exploratory laparotomy, only during which the former was detected. A brief account of national emergency laparotomy (NELA) audit risk assessment and its utility in local settings is additionally included. The case report is

reported in line with SCARE criteria [6].

2. Case description

A 61-year-old, 60 kg, South Asian male, a farmer by profession, was admitted to the emergency treatment unit of a coastal District General Hospital of Sri Lanka, with a three-day history of abdominal pain, distension, vomiting, and constipation. He was well before this episode and his gradually deteriorating clinical condition alerted the relatives. He was diagnosed with type 2 diabetes mellitus and hypertension for the last 15 years with good control with oral hypoglycemic agents (Metformin and gliclazide) and a single antihypertensive (amlodipine). There was no history of similar complaints or surgeries. He was a non-smoker and a non-alcoholic. On examination, he was febrile and confused with a Glasgow coma scale of 10. The pulse was low volume and thready with a rate of 130 per min. Noninvasive blood pressure was recorded as 70/40 mmHg. The breathing was rapid (25 per min) and peripheral oxygen saturation was 88 % on room air. The abdomen was grossly distended with gas and flank dullness. There was diffuse tenderness with guarding

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and rigidity. Bowel sounds were not audible. A presumptive diagnosis of septic shock due to possible intra-abdominal focus was made. The patient was admitted to intensive care. In accordance with current guidelines, arterial blood gas analysis, septic screening, broad-spectrum antibiotics, and a 30 mL/kg intravenous fluid bolus were commenced. A subclavian central venous line was inserted to initiate noradrenaline and an adrenaline infusion with persistently low mean arterial pressure (50 mmHg) and a markedly elevated lactate level of 15 mmol/L. Invasive arterial pressure monitoring was commenced. The vasopressor requirement went up rapidly necessitating elective intubation of the trachea. Inferior vena cava distensibility of 35 % and left ventricular volume status in the 2d echocardiogram were both suggestive of hypovolaemia and moderately impaired cardiac contractility. Another 1 L of crystalloid was administered and a dobutamine infusion was commenced. Concurrently, left lateral decubitus X-ray abdomen revealed grossly distended small bowel loops in the absence of air under the diaphragm (Fig. 1a, b). Ultrasound of the abdomen showed moderate ascites and features suggestive of acute kidney injury.

A nasogastric tube was inserted to decompress the stomach, with mildly bilious drainage of 500 mL, which was promptly replaced. Random blood sugar was 250 mg/dL. Urine ketone body was absent. To achieve glycemic control, subcutaneous soluble insulin 0.1 U/kg (6 units) was administered. The repeated capillary blood sugar at 1 h was 190 mg/dL. A variable-rate intravenous insulin infusion was commenced to achieve a blood sugar target of 120–180 mg/dL. Blood urea and serum creatinine were elevated (8.4 mmol/L and 2 mg/dL respectively). Liver and clotting profiles were in the normal range. His hemodynamics were stabilized and an emergency exploratory laparotomy was scheduled following informed, written consent from the daughter.

A midline laparotomy was performed by an experienced general surgeon under general anaesthesia which was directly supervised by a consultant anaesthetist. Four-quadrant gross faecal peritonitis with grossly distended small bowel was noted. On further examination, a hooked fishbone was found in the distal ileal mesenteric border leading to a sealed 5 mm perforation with surrounding purulent exudate (Fig. 2a-c).

A 10 cm portion of the distal ileum was resected and proximal and distal ends were taken out as end stomas with the plan of anastomosis later. Peritoneal lavage was performed and pelvic drainage was inserted. During the surgery, vasopressor and inotropic requirements further

increased necessitating the fourth vasopressor. Intraoperative cardiac output monitoring was not carried out due to unavailability. For the last 4 h, no urine output was noted. Despite fluid therapy, serum lactate rose to 20 mmol towards the end of the 2-h surgery with severe metabolic acidosis. Intravenous sodium bicarbonate infusion of 20 meq/L was commenced following discussion with the nephrologist as continuous renal replacement therapy was only available in a tertiary center 150 km away. Intravenous sedation and analgesia were provided. In the intensive care, his condition further deteriorated over the next few hours. He passed away following cardiac arrest 8 h after his admission.

3. Discussion

Gastrointestinal FBs are commonly lodged in natural acute angulations or narrowing of the tract such as the distal ileum [7]. Around 1 % of retained FBs lead to perforations [1] while fish bones are considered the leading cause [4,8]. In regions where fish is a staple food, fish bones are not uncommon culprits of FBs [9]. The jagged, sharp nature of fish bones makes them more prone to inflict mucosal injuries and subsequent perforations. The clinical presentations following retained FBs in the gastrointestinal tract are largely nonspecific [10]. Fever and abdominal pain are among the commonest symptomatology specially in cases of sinister underlying pathology such as perforations or intestinal obstruction [11]. There are reported cases of perforations initially presented as acute appendicitis, diverticulitis, or perforated peptic ulcers [12,13]. Generally, the clinical course of small bowel perforations is acute where guarding, rigidity, and diffuse tenderness might suggest more sinister clinical sequelae such as faecal peritonitis [14], akin to our patient.

Diagnosis of perforations following impacted fish bones in the gastrointestinal tract using basic imaging modalities such as the X-ray carries high false negativity. As perforations are sealed off, the amount of escaped gas detected is minimal, thus the absence of 'gas under the diaphragm'. The sensitivity of plain X-ray is quoted as between 20 and 32 % in different studies [3,4,15]. Plain X-rays may detect radiopaque fish bones, however, smaller, radiolucent fish bones could be missed [9]. In the case of our patient, paralytic ileus in the background of gross peritoneal contamination was evident in the X-ray as grossly distended small bowel in the absence of other radiological evidence of perforation except for free fluid in the ultrasound study. Computed tomography (CT) yields more useful information illustrating fish bones as demarcated

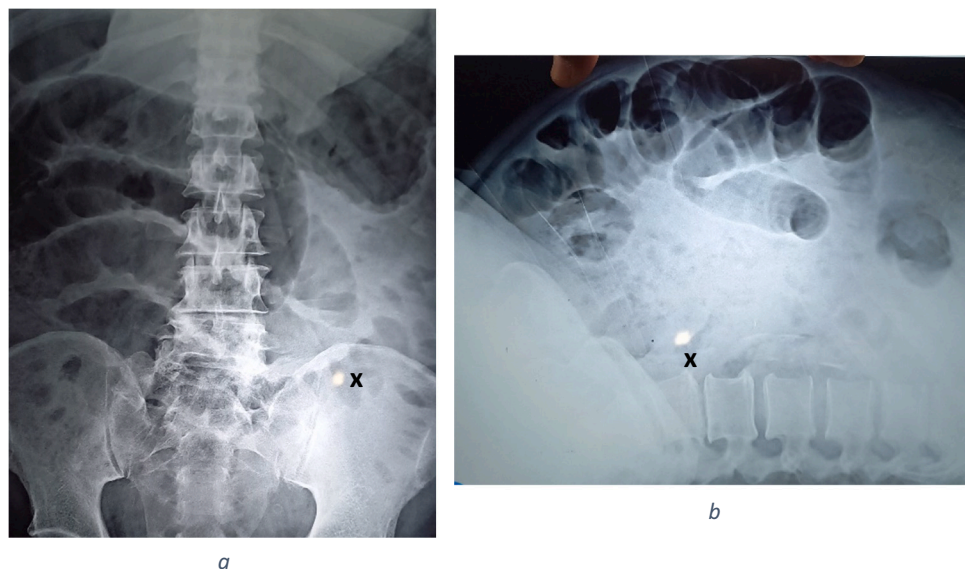


Fig. 1. a, Erect X-ray abdomen; b, lateral decubitus X-ray abdomen illustrating distended small bowel loops; x, reflection artefact produced during the image acquisition.



Fig. 2. a, b; Fishbone (f) causing ileal perforation with surrounding exudative material detected during laparotomy; c, after extraction.

linear, calcifications [2]. The unavailability of CT studies in low-resource settings (similar to our center) provides an additional obstacle to the definitive preoperative diagnosis (which is around 23 %) [3,16], requiring surgical interventions for diagnosis and therapy.

Endoscopy is a well-recognized treatment modality for suspected gastrointestinal FBs [17,18]. Blunt objects can be safely retrieved through endoscopy specially the ones lodged in the upper gastrointestinal tract with very high success rates (>95 %). Only 1 % of the FBs require surgical extraction [5] including complicated cases [19]. Laparoscopy has become a mainstay of surgical therapy and is considered the preferred therapy by some [20]. Patients who are hemodynamically unstable, and in septic shock due to gross peritoneal contamination are unsuitable candidates for laparoscopic exploration due to risks of worsening cardiorespiratory parameters, the need for thorough peritoneal lavage, and ease of performing bowel resection and defunctioning colostomy in required cases by laparotomy. In our patient, a 2 cm hooked fish bone perforation had led to ileal perforation and subsequent faecal peritonitis. Had he presented earlier and been subjected to advanced imaging, there was a possibility of early detection of his worsening acute abdomen aided by biochemical markers and concurrent

early antibiotic therapy, and interventions, with a resultant favorable outcome.

The NELA risk adjustment model is considered to provide valid prognostication following emergency laparotomy [21]. In addition, it advocates the place of post-operative care in high risk patients such as high dependency or intensive care. It takes into consideration a multitude of variables including patient demographics and exercise tolerance, biochemical parameters, imaging, data pertaining to the surgery (urgency, severity of surgical intervention, anticipated blood loss, likely intraoperative findings), etc. The higher the NELA score, the poorer the outcome and concurrent need for direct inputs from consultant surgeon/s and consultant anaesthetists and intensive post-operative care. The adoption of NELA risk adjustment has resulted in increased preoperative CT scans, reduced hospital stays, and significant improvements in 30-day mortality [22]. We calculated the NELA score retrospectively in our patient as it is not routinely implemented in preoperative setting in our center or nationally. The NELA risk scoring was found to be 78 % for the patient with markedly reduced 30-day survival. In retrospect, we felt that we could have opted for damage control surgery to minimize operating times and subsequent surgical stress by keeping stapled,

resected bowel ends intraoperatively, later to be anastomosed. Gross faecal contamination demanded thorough peritoneal lavage adding to the extended surgical time. This learning experience resulted in adopting NELA scoring in our institution, the feasibility, obstacles, and outcomes of which will be assessed prospectively. Nonetheless, it is the duty of the clinicians to promote the utility of these validated scoring systems in such settings, which will forecast probable postoperative outcomes and degree of care and prepare closed ones for worse outcomes.

4. Conclusion

Fish bones are common foreign bodies in the digestive tract with relatively innocuous transit.

Gastrointestinal perforations are rarely caused by fish bones but the presentation is largely nonspecific, and frequently diagnosed during surgical interventions. The outcome is favorable in most instances, however, late presentation narrows the crucial recoverable therapeutic window, while low resources such as lack of advanced imaging modalities confound the outcome by delayed diagnosis. A high degree of suspicion is nonetheless mandated in cases of acute abdomen and atypical findings in imaging, especially in regions where fish is a regular part of the meal.

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Declaration of competing interest

None.

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Consent

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Our institution does not require ethical approval for reporting individual cases or case series.

Author contribution

Clinical management of the patient, concept, consent- **BM, CK** literature review, drafting of the initial and final manuscript, approval of the final manuscript- **All authors**.

Research registration

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