

## Gastrointestinal Tract Perforations Due to Ingested Foreign Bodies; A review of 21 cases

Arif Hussain Sarmast, Hakim Irfan Showkat, Asim Mushtaq Patloo , Fazl Q Parray , Rubina Lone and Khurshid Alam Wani

### ABSTRACT

**Aim:** To study the etiology, presentation and complications of Gastrointestinal tract (GIT) perforations due to ingestion of foreign bodies.

**Methods:** A retrospective review of 21 patients with perforations in the GIT due to foreign body ingestion was done in the Department of General Surgery Sher-i-Kashmir Institute of Medical Sciences Srinagar (SKIMS) from January 2002 to December 2011. Data was reviewed in terms of the type and nature of the foreign objects, mode of entry into the gastrointestinal (GIT), preoperative diagnosis, perforation site, and treatment received.

**Results:** 66.6% of patients were males with age ranging from 7 to 82 years and a median age of 65 years. A definitive preoperative history of foreign body ingestion was obtained in 4 (19.04%) of the 21 patients. The mean time from ingestion to presentation was 9.3 days. The various foreign bodies recovered were chicken bones in 10 (47 %), fish bones in 7 (33.33%), toothpick in 2 (9.5%) and metallic staple in 2 (9.5%) patients. A preoperative diagnosis of acute abdomen of uncertain origin was given in 12 (57.14%) of the 21 patients. Site of involvement in decreasing order of frequency was ileum in 14 (66.6%), colon in 5 (23.8%) and jejunum in 2 (9.5%) patients. Commonest surgery done on these patients was emergency laparotomy with primary repair in 11 (52.38%) and intestinal resection with ileostomy in 10 (47.6%) patients. Complication in terms of surgical site infection was seen in 3 (14.28%) patients and 2 (9.5%) deaths were recorded.

**Conclusion:** Dietary foreign body is the most commonly ingested object giving rise to GIT perforation. Treatment consists of surgery and antibiotics. Patients are rarely aware of foreign body ingestion and a high index of suspicion is required to make a diagnosis of ingested foreign body in all acute abdomen conditions particularly at extremes of age as seen in the results.

**KEYWORDS :** foreign body, perforation, peritonitis, ileostomy

### Introduction:

Foreign body ingestion is a common occurrence, especially in children, alcoholics, mentally handicapped and edentulous people wearing dentures. However, majority of the individuals pass these objects without any complications.<sup>1</sup> Most foreign bodies pass readily into the stomach and travel the remainder of the gastrointestinal tract without difficulty; nevertheless, the experience is traumatic for the patient, the parents, and the physician, who must await the removal or the ultimate passage of the foreign body.<sup>2</sup> The alimentary canal is remarkably resistant to perforation: 80% of ingested objects pass through the gastrointestinal tract without complications.<sup>3</sup> About 20% of ingested foreign bodies fail to pass through the entire gastrointestinal tract.<sup>4</sup> Any foreign body that remains in the tract may cause obstruction, perforation or hemorrhage, and fistula formation. Less than 1% result in perforations from the mouth to the anus and those are mostly caused by sharp objects and erosions.<sup>5, 18</sup> Of these sharp objects, chicken bones and fish bones account for half of the reported perforations. The most common sites of perforation are the ileo-cecal junction and sigmoid colon.<sup>3</sup>

### Materials and Methods

This study, "Gastrointestinal tract perforations due to foreign bodies; a review of 21 cases over a ten year period" was carried out in the Department of General Surgery at the Sher-i-

Kashmir Institute of Medical Sciences Srinagar (SKIMS), a tertiary care hospital in North India, from January 2002 to December 2011. A total of 21 consecutive patients who underwent surgery for an ingested foreign body perforation of the GI tract over a period of ten years were retrospectively reviewed. Computer database and extensive case note search of patient's personal data including age, sex, residence, presenting complaints with special stress on clinical examination findings was done. The type and nature of the foreign objects, mode of entry into the gastrointestinal tract, preoperative diagnosis, perforation site, and treatment received were recorded. The complications arising due to perforation of GIT because of the foreign body ingestion and complications arising due to specific treatment received were noted. Important findings on various laboratory tests, including a complete blood count, erythrocyte sedimentation rate, [pre-op/post-op/follow up], blood cultures, and serum chemistry, chest and abdominal X-rays were penned down. Special efforts were made to identify the predisposing factors for ingestion of foreign bodies including edentulous patients with dentures, psychosis, extremes of age and hurried eating habits. Clinical, laboratory and radiological findings, treatment modalities, operative findings and therapeutic outcomes were summarized. Data collected as such was described as mean and percentage.

**Table 1:** Showing demographic profile, site of perforation, aetiology, presentation and management.

S No	Age	Sex	Site	Foreign Body	Presentation & Pre Op Diagnosis	Procedure Performed
1	78	Male	40 cm from ileo-caecal valve	Fish bone	Acute abdomen, peritonitis	Removal of foreign body and repair
2	65	Female	30 cm from ileo-caecal valve	Chicken bone	Acute abdomen, peritonitis	Resection of the perforated distal ileum and ileum stoma
3	80	Male	30 cm from ileo-caecal valve	Chicken bone	Acute abdomen, peritonitis	Resection of the perforated distal ileum and ileum stoma
4	43	Male	Jejunum	Tooth pick	Acute abdomen, peritonitis	Removal of foreign body and repair
5	10	Male	10 cm from ileo-caecal valve	Metallic staple	Acute abdomen, appendicitis	Removal of foreign body and repair
6	72	Female	Jejunum	Chicken bone	Acute abdomen, peritonitis	Resection of the perforated distal ileum and ileum stoma
7	65	Male	20 cm from ileo-caecal valve	Fish bone	Acute abdomen, peritonitis	Resection of the perforated distal ileum and ileum stoma
8	59	Male	Sigmoid colon	Chicken bone	Acute abdomen, diverticulitis	Removal of foreign body and repair
9	65	Female	30 cm from ileo-caecal valve	Chicken bone	Acute abdomen, peritonitis	Removal of foreign body and repair
10	49	Female	40 cm from ileo-caecal valve	Chicken bone	Acute abdomen, peritonitis	Removal of foreign body and repair
11	7	Male	Sigmoid colon	Metallic staple	Acute abdomen, diverticulitis	Removal of foreign body and repair
12	78	Female	15 cm from ileo-caecal valve	Fish bone	Acute abdomen, appendicitis	Resection of the perforated distal ileum and ileum stoma
13	72	Male	15 cm from ileo-caecal valve	Fish bone	Acute abdomen, appendicitis	Resection of the perforated distal ileum and ileum stoma
14	56	Male	20 cm from ileo-caecal valve	Tooth pick	Acute abdomen, appendicitis	Resection of the perforated distal ileum and ileum stoma
15	65	Male	Sigmoid colon	Fish bone	Acute abdomen, diverticulitis	Removal of foreign body and repair
16	63	Male	30 cm from ileo-caecal valve	Chicken bone	Acute abdomen, peritonitis	Resection of the perforated distal ileum and ileum stoma
17	82	Female	30 cm from ileo-caecal valve	Chicken bone	Acute abdomen, peritonitis	Removal of foreign body and repair
18	55	Female	Sigmoid colon	Fish bone	Hematochezia acute abdomen, diverticulitis	Removal of foreign body and repair
19	56	Male	20 cm from ileo-caecal valve	Chicken bone	Acute abdomen, peritonitis	Resection of the perforated distal ileum and ileum stoma
20	69	Male	Sigmoid colon	Fish bone	Acute abdomen, diverticulitis	Removal of foreign body and repair
21	71	Male	40 cm from ileo-caecal valve	Chicken bone	Acute abdomen, peritonitis	Resection of the perforated distal ileum and ileum stoma

I/V Antibiotics ( Ceftriaxone + Metronidazole ) were given in the emergency room and changed to specific therapy as per the culture sensitivity postoperatively.

## Results

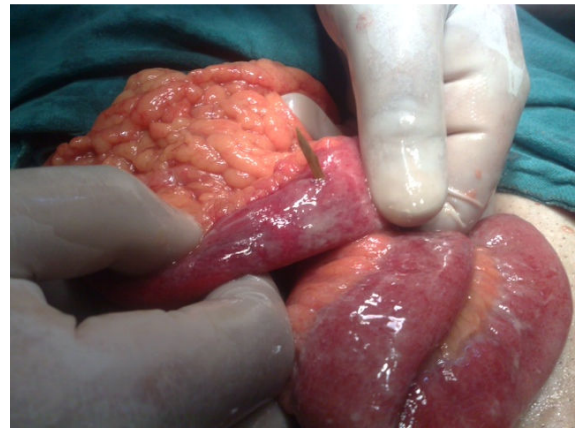
The average follow up duration was 13 months (range 7 – 19 months). There were 14 male(66.66%) and 7 female (33.33%) patients ranging in age from 7 years to 82 years with a median age of 65 yrs at the time of diagnosis . The most frequently ingested objects were dietary foreign body (n = 17). Four patients had ingested objects like toothpicks (n =2) and metallic staples (n=2) [as shown in figure 1]. Among the dietary foreign bodies fish bone was found in 7(33.3%) and chicken bone in 10(47%) [as shown in figure 2] . All the patients described their ingestion as accidental and involuntary. A definitive preoperative history of foreign body ingestion was obtained in 4(19.04%) patients and an additional 9(42.8%) patients admitted ingestion of foreign body in the post operative period. Of these 13 patients the average duration between ingestion of foreign body and presentation was 9.3 days. Remaining 8 (38.09%) patients did not recall any history of foreign body ingestion; dietary or otherwise. In terms of impaction and perforation of ingested foreign body, ileum was the commonest site with 14(66.66%) patients showing perforation near the distal portions of the ileum followed by sigmoid colon in 5(23.8%). Jejunal perforation was seen in 2(9.5%) patients.



**Fig 1:** X ray abdomen AP view showing ingested metallic pin

All our patients presented with acute abdomen and were admitted first in emergency department. Since majority of patients did not give any specific history of foreign body ingestion, they were managed as cases of acute abdomen with urgency and level of care varying according to the condition of patients. Eight patients presented with free air in the peritoneum and air under the right side of diaphragm. The most common preoperative diagnoses were acute abdomen of

uncertain origin: 12 (57.14%); acute diverticulitis:5 (23.8%) and acute appendicitis: 4 (19.04%).



**Fig 2:** Intra operative picture showing perforation of small gut due to chicken bone

All the patients underwent an emergency celiotomy and confirmation of foreign body induced perforation was possible in all the 21 patients .Patients with a suspected appendicitis were explored via classical grid iron incision and rest via midline incision. Varying degrees of abdominal contamination was present in all the patients. Out of the 21 patients 11(52.38%) underwent removal of foreign body and primary repair of their perforations after minimal debridement. Intestinal resection with stoma formation (resection of the perforated ileum and ileum stoma) was done in 10 (47.6%) of the 21 patients as shown in Table 1. Take down of stoma was done at a later date. Three (14.28%) patients developed incisional superficial surgical site infection which responded to local treatment. Two (9.5%) patients died in the postoperative period due to sepsis. One patient (Patient no. 3 in table 1) who was a diabetic on Insulin, Chronic obstructive pulmonary disease and Hypertension died on 3<sup>rd</sup> postoperative day in surgical Intensive care unit due to severe sepsis. Another patient, (Patient no. 12 in table 1 ) an elderly female with no co-morbid illness developed severe sepsis due to *Pseudomonas aeruginosa*, died on 4<sup>th</sup> postoperative day. She was managed at a peripheral primary care center for first 3 days for her vague abdominal pain with minimal signs. All the other patients had an uneventful recovery and were discharged home between 6-14<sup>th</sup> postoperative day.

## Discussion:

Foreign bodies such as dentures, fish bones, chicken bones, toothpicks and cocktail sticks have been known to cause bowel perforation<sup>6</sup>. Perforation commonly occurs at the point of acute angulation and narrowing.<sup>7, 8</sup> The risk of perforation is related to the length and the sharpness of the object.<sup>9</sup> The length of the foreign body is also a risk factor for obstruction, particularly in children under 2 years of age because they have considerable difficulty in passing objects longer than 5 cm through the duodenal loop into the jejunum. In infants, foreign bodies 2 or

3 cm in length may also become impacted in the duodenum.<sup>10</sup> The most common sites of perforation are the ileo-cecal junction and sigmoid colon. Other potential sites are the duodeno-jejunal flexure, appendix, colonic flexure, diverticulae and the anal sphincter.<sup>3</sup> Colonic diverticulitis or previously unsuspected colon carcinoma have been reported as secondary findings in cases of sigmoid perforation caused by chicken bones.<sup>11,12</sup> Even colovesical or colorectal fistulas have been reported as being caused by ingested chicken bones.<sup>13,14</sup> In our study ileum was the most common site with 14 patients showing perforation near the distal portions of the ileum followed by sigmoid colon. Jejunal perforation was seen in 2 patients.

The predisposing factors for ingestion and subsequent impaction are dentures causing defective tactile sensation of the palate, sensory defects due to cerebro-vascular accident, previous gastric surgery facilitating the passage of foreign bodies, achlorhydria where the foreign body passes unaltered from the stomach, previous bowel surgery causing stenosis and adhesions and diverticula predisposing to impaction.<sup>3</sup> Overeating, rapid eating, or a voracious appetite may be contributing factors for ingesting chicken bones. The mean time from ingestion to perforation is 10.4 days.<sup>15</sup> In cases when objects fail to pass the tract in 3 to 4 weeks, reactive fibrinous exudates due to the foreign body may cause adherence to the mucosa, and objects may migrate outside the intestinal lumen to unusual locations such as the hip joint, bladder, liver, and peritoneal cavity.<sup>16</sup> The length of time between ingestion and presentation may vary from hours to months and in unusual cases to years, as in the case reported by Yamamoto of an 18 cm chopstick removed from the duodenum of a 71-year-old man, 60 years after ingestion.<sup>17</sup> In our study the average duration between ingestion of foreign body and presentation was 9.3 days.

In a proportion of cases, definitive preoperative history of foreign body ingestion is uncertain.<sup>18</sup> Small bowel perforations are rarely diagnosed preoperatively because clinical symptoms are usually non-specific and mimic other surgical conditions, such as appendicitis and caecal diverticulitis.<sup>19</sup> In our study the most common preoperative diagnoses were acute abdomen of uncertain origin (n = 12), acute diverticulitis (n = 5) and acute appendicitis (n = 4). Patients with foreign body perforations in the stomach, duodenum, and large intestine are significantly more likely to be febrile with chronic symptoms with a normal total white blood cell count compared to those with foreign body perforations in the jejunum and ileum.<sup>18</sup> Plain radiographs of neck and chest in both anteroposterior and lateral views are required in all cases of suspect foreign body ingestion and perforations in addition to abdominal films. CT scans are more informative especially if radiographs are inconclusive.<sup>20</sup> Computerised tomography (CT) scanning and ultrasonography can recognise radiolucent foreign bodies. An ultrasound scan can directly visualize foreign bodies and

abscesses due to perforation. The ability to detect a foreign body depends on its constituent materials, dimensions, shape and position.<sup>21</sup> Contrast studies with Gastrografin may be required in excluding or locating the site of impaction of the foreign body as well as determining the level of a perforation. Using contrast is important in identifying and locating foreign bodies if intrinsically non-radiopaque substances, such as wooden checkers or fish and chicken bones are ingested.<sup>20</sup> The high performance of computed tomography (CT) or multi-detector-row computed tomography (MDCT) scan of the abdomen in identifying intestinal perforation caused by foreign bodies has been well described by Coulier et al.<sup>22</sup> Although, in some cases imaging findings can be nonspecific, however, the identification of a foreign body with an associated mass or extraluminal collection of gas in patients with clinical signs of peritonitis, mechanical bowel obstruction, or pneumoperitoneum strongly suggests the diagnosis.<sup>8,20</sup> Finally, endoscopic examination, especially in the upper gastrointestinal tract, can be useful in diagnosis and management of ingested foreign bodies.

Whenever a diagnosis of peritonitis subsequent to foreign body ingestion is made, an exploratory laparotomy is performed. However, laparoscopically assisted, or complete, laparoscopic approaches have been reported.<sup>17,23</sup> The treatment usually involves resection of the bowel, although occasionally repair has been described.<sup>8</sup> The most common treatment was simple suture of the defect.<sup>24</sup> Once the foreign body passes the esophagogastric junction into the stomach, it will usually pass through the pylorus<sup>25</sup>; however, surgical removal is indicated if the foreign body has sharp points or if it remains in one location for more than 4 to 5 days especially in the presence of symptoms. A decision should be based on the nature of the foreign body in those cases, as to whether a corrosive or toxic metal is ingested.<sup>26</sup> Occasionally, objects that reach the colon may be expelled after enema administration. However, stool softeners, cathartics and special diets are of no proven benefit in the management of foreign bodies.<sup>7</sup>

#### Competing Interests

None declared

#### Author Details

ARIF HUSSAIN SARMAST, Postgraduate scholar, Dept of Surgery, SKIMS, India. HAKIM IRFAN SHOWKAT, Postgraduate scholar, Dept of Internal medicine, SKIMS, India. ASIM MUSHTAQ PATLOO, Senior Resident, Dept of General Surgery, SKIMS, India. FAZL Q PARRAY, Additional Professor, Dept of General Surgery, SKIMS, India. RUBINA LONE, Assistant Professor, Dept of Microbiology, SKIMS, India. KHURSHID ALAM WANI, Professor & Head, Dept of General Surgery, SKIMS, India.

CORRESPONDENCE: HAKIM IRFAN SHOWKAT, Postgraduate scholar, Dept of Internal medicine, SKIMS, Srinagar, Kashmir, India.  
Email: docirfanshahi512@gmail.com

#### REFERENCES

1. Kimbrell FT Jr, Tepas JJ 3d, Mullen JT. Chicken bone perforation of the sigmoid colon: a report of three cases. *Am Surg* 1975; 41(12): 814-7
2. Eldridge WW, Jr. Foreign bodies in the gastrointestinal tract. *JAMA* 1961; 178: 665-7.

3. Cleator IG, Christie J. An unusual case of swallowed dental plate and perforation of the sigmoid colon. *Br J Surg* 1973; 60 (2): 163-5
4. Nandi P, Ong GB. Foreign body in oesophagus: review of 2394 cases. *Br J Surg* 1978; 65: 5-9.
5. Perelman H. Tooth pick perforations of the gastrointestinal tract. *J Abdom Surg* 1965; 51-3.
6. Akhtar S, Mcelvanna N, Gardiner KR, Irwin ST. Bowel perforation caused by swallowed chicken bones; a case series. *Ulster Med J*. 2007;76 (1): 37-8.
7. McManus JE. Perforation of intestine by ingested foreign bodies: report of two cases and review of literature. *Am J Surg*. 1941;53(3):393-402.
8. Singh RP, Gardner JA. Perforation of the sigmoid colon by swallowed chicken bone. *Int Surg*. 1981;66(2):181-3.
9. Sarliève P, Delabrousse E, Michalakis D, Robert A, Guichard G, Kastler B: Multidetector CT diagnosis of jejunal perforation by a chicken bone. *JBR-BTR* 2004, 87:294-295.
10. Erbes J, Babbitt DP. Foreign bodies in the alimentary tract of infants and children. *Appl Ther* 1965; 7: 1103-9.
11. Gomez N, Roldos F, Andrade R. Intestinal perforation caused by chicken bone mimicking perforated colonic diverticulitis. *Acta Gastroenterol Latinoam* 1997;27:329-330
12. Osler T, Stackhouse CL, Dietz PA, Guiney WB. Perforation of the colon by ingested chicken bone, leading to diagnosis of carcinoma of the sigmoid. *Dis Colon Rectum* 1985;28:177-179
13. Khan MS, Bryson C, O'Brien A, Mackle EJ. Colovesical fistula caused by chronic chicken bone perforation. *Ir J Med Sci* 1996;165:51-52
14. Read TE, Jacono F, Prakash C. Coloenteric fistula from chicken bone perforation of the sigmoid colon. *Surgery* 1999;125:354-356
15. Rodríguez-Hermosa JL, Codina-Cazador A, Sirvent JM, Martín A, Gironès J, Garsot E: Surgically treated perforations of the gastrointestinal tract caused by ingested foreign bodies. *Colorectal Disease* 10(7):701-707.
16. Carp L. Foreign bodies in the intestine. *Ann Surg* 1927; 85: 575-91.
17. Yamamoto M, Mizuno H, Sugawara V. A chopstick is removed after 60 years in the duodenum. *Gastrointest Endosc* 1985; 31: 51-2.
18. Goh BK, Chow PK, Quah HM, Ong HS, Eu KW, Ooi LL, Wong WK: Perforation of the gastrointestinal tract secondary to ingestion of foreign bodies. *World J Surg* 2006, 30(3):372-7.
19. Yao CC, Yang CC, Liew SC, Lin CS: Small bowel perforation caused by a sharp bone: laparoscopic diagnosis and treatment. *Surg Laparosc Endosc Percutan Tech* 1999, 9(3):226-7.
20. Maglinte DD, Taylor SD, Ng AC. Gastrointestinal perforation by chicken bones. *Radiology* 1979; 130: 597-599.
21. Matricardi L, Lovati R. Intestinal perforation by a foreign body: diagnostic usefulness of ultrasonography. *J Clin Ultrasound* 1992; 20(3): 194-6
22. Coulier B, Tancredi MH, Ramboux A. Spiral CT and multidetector-row CT diagnosis of perforation of the small intestine caused by ingested foreign bodies. *Eur Radiol*, 2004 Oct, 14 (10) :1918-25.
23. Law WL, Lo CY. Fishbone perforation of the small bowel :laparoscopic diagnosis and laparoscopically assisted management. *Surg Laparosc Endosc Percutan Tech*, 2003 Dec, 13 (6) :392-3.
24. Pinero Madrona A, Fernández Hernández JA, Carrasco Prats M, Riquelme Riquelme J, Parrila Paricio P: Intestinal perforation by foreign bodies. *Eur J Surg* 2000, 166(4):307-9.
25. Henderson CT, Engel J, Schlesinger P. Foreign body ingestion: review and suggested guidelines of management. *Endoscopy* 1987; 19: 68-71
26. Seo JK. Endoscopic management of gastrointestinal foreign bodies in children. *Indian J Pediatr* 1999; 66 (1 Suppl): S75-80.