



Plastic bread clip impacted in gastrointestinal tract: a case report and review of the literature

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Abstract

A 79-year-old initially presented to her general practitioner for a 6-week history of nausea, intermittent abdominal pain and altered bowel habits. Colonoscopy was performed to investigate her symptoms and revealed a bread clip that was adherent to the sigmoid colon mucosa, unable to be retrieved. A CT scan was performed to exclude any associated complication, which showed no evidence of perforation or collection. A repeat colonoscopy by a more experienced endoscopist again failed to retrieve the bread clip. Eventually, the bread clip had to be removed through a laparotomy and colotomy. We performed a thorough literature review, which revealed 26 studies (totalling 38 cases) of bread clip ingestion. Many of the reported cases presented with abdominal pain, bowel obstruction, or perforation and carried a small mortality risk.

Keywords Bread clip · Bread tag · Colonoscopy · Computed tomography · Laparotomy

Introduction

Plastic bread clip impaction in the gastrointestinal tract is an unusual cause of abdominal pain. The incidence of bread clip impaction is rare in clinical practice and only limited to case reports in the literature. Contemporary bread clips are made of polystyrene and has a barbed U-shape appearance (Fig. 1). Millions of packets of bread are sold yearly, but ingestion of bread clips remains a rare event.

In this study, we performed a thorough review of the English literature and characterised all cases of ingested bread tag. We also present a case report of a patient with an impacted bread tag and also looked at the characterisation of the common presentation, investigation, and management of cases of bread clip ingestion in the literature.

Case presentation

A 79-year-old female initially presented with 6 weeks of nausea, intermittent abdominal pain and altered bowel habits to her general practitioner. The patient was referred to a gastroenterologist for further investigation. A colonoscopic assessment was subsequently performed and showed a plastic bread clip adherent to sigmoid colon mucosa. Further referral to the Colorectal Unit of a tertiary institution was made. Cross-sectional imaging with CT scan confirmed the bread clip in the sigmoid colon, measuring 2.1 cm with no evidence of perforation or collection—here subtly seen in the lung window (Fig. 2).

A repeat colonoscopic disimpaction of the bread clip with endoscopic forceps was attempted (Fig. 3), but unsuccessful. Further attempt to dislodge the bread clip was made with a 25 mm Rounded-Stiff snare (Boston-Scientific) aimed to hook around the toothed projection of the bread clip, which was the optimal site to snare the clip from a geometric perspective (Fig. 4). However, the retrieval was limited by the acuteness of the rectosigmoid angle, thus the bread clip could not be removed endoscopically. Spot mark was injected just adjacent to the bread clip to aid attempt at laparoscopically removing the bread clip. Subsequent combined endoscopic and laparoscopic approach was undertaken to dislodge the clip from the large bowel. It was then converted to a mini-laparotomy, where a transverse colotomy

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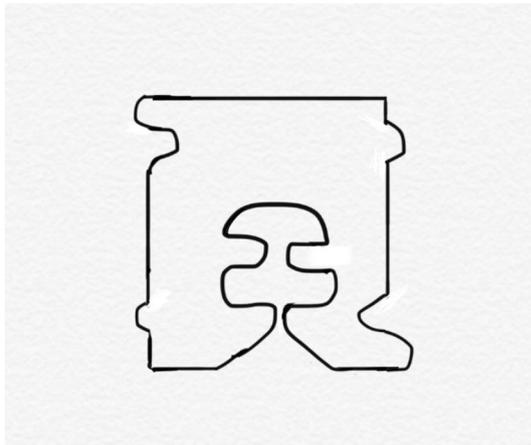


Fig. 1 Contemporary design of a plastic bread clip with its barbed U-shape appearance

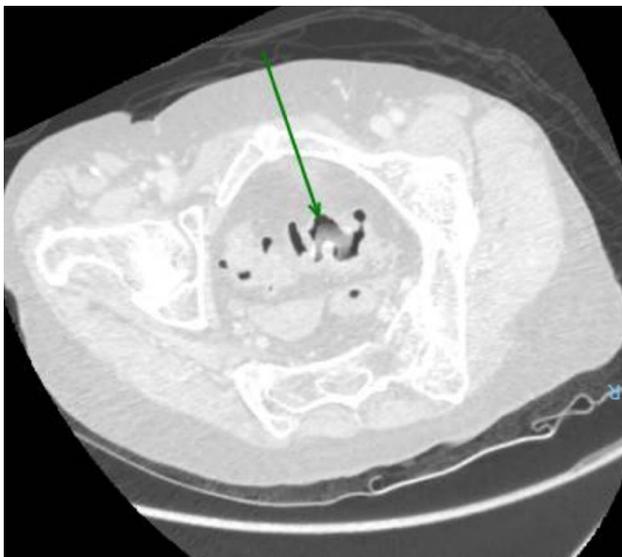


Fig. 2 CT scan of patient that shows a foreign object identified within the mid-sigmoid colon measuring 2.1 cm with appearance suggestive of a bread clip. No evidence of complicating perforation or collection

was performed over the palpable foreign body (Fig. 5). Due to the mucosal oedema, the bread clip was locked onto the colonic mucosa. The clip was divided into two in the midline and removed in separate pieces. The colotomy was closed with interrupted 3/0 PDS sutures. The patient made an unremarkable recovery.

Discussion

We performed a review of the literature by a search on MEDLINE and PubMed for ingestion or impaction of bread clips in the gastrointestinal tract. The search revealed thirty-eight

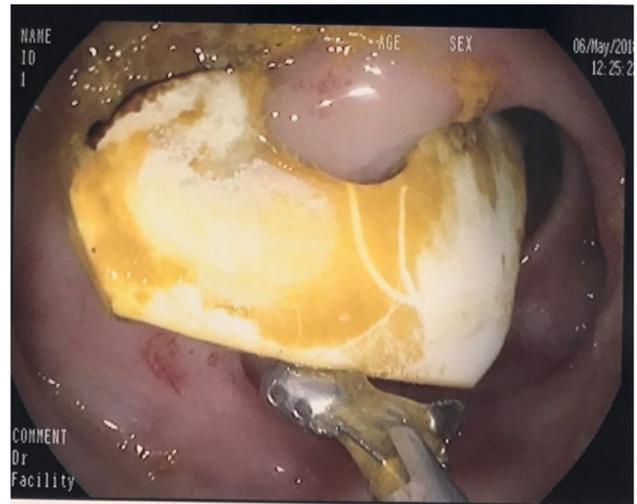


Fig. 3 Endoscopic view of the bread clip impacted to colonic mucosa lining, with an attempt to endoscopically remove the clip using a biopsy forceps

cases of bread clip ingestion in the English Literature. The characteristics of each of the cases are tabulated in Table 1.

Analysis of the published articles showed several risk factors associated with bread clip ingestion or impaction. Many studies have recognised edentulous patients and the visually impaired as an increased risk of bread clip ingestion [1–4]. Most reported cases of bread clip ingestion occurred in males at 60%, with certain studies identifying poor eating habits as the main risk factor [4, 5]. It also occurs mainly in older patients, with a median age of 61 years (IQR 50–73 years old).

Most patients present with generalised abdominal pain, secondary to the complications that arise from bread clip ingestion [2–15]. This includes bowel obstruction, bowel perforation and ischaemic colitis and arises from the design of the bread clip. Other symptoms include gastrointestinal bleeding, nausea and vomiting. Newell et al. postulated that with its reverse facing teeth, the plastic bread clip acts as a one-way valve, allowing the bowel lumen to be trapped but not extricated once caught [4]. Once firmly adhered to the bowel wall, necrosis due to ischaemia can lead to ischaemic colitis or bowel perforation. However, it is interesting to note that a minority of patients do not develop any symptoms, and bread clip diagnosis was an incidental finding either during surgery or post-mortem [14–16].

Review of the published data has also shown that plain film was most commonly used as the initial imaging modality in 32% of the cases. Many authors have stated that plain radiograph is a poor imaging modality for the diagnosis of an ingested bread clip because of the radiolucent material that makes up the clip [17, 18]. Furthermore, due to the rare occurrence of bread clip ingestions, many radiographers

Fig. 4 25 mm Rounded-Stiff snare (Boston-Scientific) hooked around the toothed projection of the bread clip, which was the optimal site to snare the clip, in an attempt to remove bread clip endoscopically

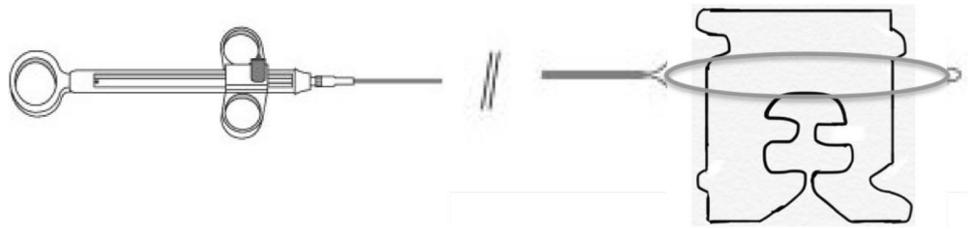


Fig. 5 Laparotomy image of a transverse sigmoid colotomy to remove the impacted bread clip, after the bread clip has been cut in half

are unable to identify such objects using plain radiographs unless notified to do so. Hence, plain radiographs cannot be relied on for the identification of bread clips. Plain radiographs need to be followed up with further diagnostic modalities including computed tomographies or diagnostic endoscopies. However, CT scans are not entirely reliable in the identification of a bread clip as well. Out of the 9 studies that employed the use of CT scans in their diagnostic workup, 3 (33%) did not identify the bread clip and required further invasive modalities for definitive diagnosis [1, 2, 6, 8, 10, 19, 20]. Hence, in the setting of high suspicion of foreign body ingestion or persisting symptoms despite non-diagnostic cross-sectional imaging, invasive modalities may be considered.

Anatomically, we found that 76% of bread clips adhered along the small intestine, while only 3% were found in the large intestine. This reflects on the length of small bowel exposed to potential impaction, with its small calibre lumen lined with irregular folds [15]. Other areas of adherence include the upper respiratory tract and oesophagus [4, 13, 18, 21].

Most ingested foreign bodies can be managed conservatively, with the object passing through in 4–6 days, while others take as long as 4 weeks [22]. However, for patients who present with abdominal pain, bowel obstruction or perforation from ingestion of a bread clip, invasive management might be warranted. Management options vary depending on the complication arising from the bread clip ingestion. A minimally invasive approach can still be employed effectively in situations where complications of impacted bread clip had occurred, i.e. bowel perforation, fistulas, and ischaemic colitis, but the majority of the time it requires a laparotomy approach (18% vs 42%, respectively) [1–14, 16, 17, 19, 20, 23]. From the literature review, most surgeons utilised a midline laparotomy with or without resection for the removal of these impacted bread clips attached along the small or large intestine. Most uncomplicated ingestion of bread clips was successfully managed via therapeutic endoscopy [18, 21, 24].

Our review found 5 mortalities (13%) attributed to the ingestion of bread clips [3, 13, 14]. In the 2 cases published by Beer et al., both patients presented with bowel perforations but were conservatively managed because they were poor surgical candidates. In 2 cases published by Sutton et al., 1 died of respiratory failure after a right hemicolectomy from intussusception, while another died from following a protracted disease after a bread tag was found in her peritoneal cavity following laparotomy. 1 patient died of multi-organ failure due to persisting bleeding, while of anticoagulation post-aortic valve replacement; and sepsis from mucosal erosion caused by the impacted bread clip. There were 4 incidental cases of bread clips being an incidental finding during a post-mortem autopsy for reasons of death unrelated to bread clips impaction [14, 15, 25].

There are several areas of concern when bread tags are ingested and areas where alterations can be made. First, the toothed U-shape design of the bread clip poses a hazard to the mucosa lining walls of the intestinal tract. With its tooth-like

Table 1 Characteristics of cases of bread clip ingestion

Author	Year	Reference	Age	Sex	Anatomical site of impaction	Morbidity	Mortality
Medline et al.	1975	Unusual cause of small-bowel obstruction	63	M	Small intestine	N	N
Jamison	1983	A plastic bread-bag—cause of intermittent intestinal obstruction					
Rivron et al.	1983	A hazard of modern day life			Small intestine		
Bundred et al.	1984	Hidden dangers of sliced bread	73	F	Small intestine	N	N
			52	F	Small intestine	N	N
Sutton	1984	Hidden dangers of sliced bread		M	Small intestine		Y
			60	F	Small intestine	(1) Complicated by small bowel fistula	Y
			49	F	Oesophagus	N	N
McKaigney et al.	1985	Picking up the tab: obstruction of the gastrointestinal tract by plastic bread bag clips	48	M	Large intestine	N	N
			81	F	Oesophagus	N	N
Guindi et al.	1987	Three cases of unusual foreign body in small bowel	82	M	Small intestine	N	Y
			65	F	Small intestine	Y	N
			57	M	Small intestine	N	N
Ellul et al.	1989	Problems with plastic bread-bag clip	66	M	Small intestine	N	N
Norrie et al.	1997	A case of upper gastrointestinal bleeding secondary to a bread bag clip	62	M	Small intestine	N	N
Fallone	2000	Plastic bread-bag clips: the saga continues	39	M	Small intestine	N	N
Newell et al.	2000	Plastic bread-bag clips in the gastrointestinal tract: report of 5 cases and review of the literature	65	M	Small intestine	N	N
				M	Small intestine	N	N
				M	Small intestine	N	N
				F	Small intestine	N	N
				F	Small intestine	N	N
Cook	2001	Dietary dangers: ingestion of a bread bag clip			Small intestine		
Beer	2002	Fatalities from bread tag ingestion	79	F	Small intestine	N	Y
			82	F	Small intestine	(1) Bronchopneumonia	Y
Tang et al.	2005	Small bowel perforation due to a plastic bread bag clip: the case for clip redesign	50	F	Small intestine	N	N
Morrissey et al.	2008	Bread bag clip ingestion: a rare cause of upper gastrointestinal bleeding	83	M	Small intestine	N	N
Losanoff et al.	2011	Intestinal obstruction caused by bread clip	57	M	Small intestine	N	N
Lehmer et al.	2011	Plastic bag clip discovered in partial colectomy accompanying proposal for phylogenetic plastic bag clip classification	58	M	Large intestine	N	N
Rosow et al.	2013	Office removal of a subglottic bread clip	34	M	Larynx	N	N
Ding et al.	2013	Retrieval of bread bag clip from the duodenum	73	F	Small intestine	N	N
Bhardwaj et al.	2014	Fatalities from bread tag ingestion	47	M	Small intestine	N	N

Table 1 (continued)

Author	Year	Reference	Age	Sex	Anatomical site of impaction	Morbidity	Mortality
Greenup et al.	2015	Gastrointestinal: bread bag clip ingestion: cause for concern	58	M	Small intestine	N	N
Karro et al.	2015	Bread bag clip ingestion: a rare cause of upper gastrointestinal bleeding	4	F	Upper respiratory tract	N	N
			1.25	M	Upper respiratory tract	N	N
			0.67	F	Upper respiratory tract	N	N
Bakia et al.	2016	The dangers of the bread clip–CT imaging and management: a case report	61	F	Small intestine	(1) Line dehiscence(2) Abdominal fascia dehiscence(3) Respiratory insufficiency	N
Nambu et al.	2016	Long-term retention of plastic bread bag clip that grips and perforates the colonic mucosa	15	M	Large intestine	N	N
Hamilton et al.	2017	Quick eating caused plastic bread bag clip ingestion and severe gastrointestinal bleed in young adult: a case report	45	M	Small intestine	N	N
Mitsui et al.	2018	Peritonitis with small intestinal perforation caused by plastic bread bag clip: a case report	47	M	Small intestine	(1) Aspiration pneumonia post-operatively	N

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pincer design, it can crush bowel wall and cause necrosis if attachment occurs. Bowel perforation can soon occur if the bread clip is attached for long enough [19, 26]. Perhaps the use of sealing tapes (which is used in the United Kingdom), can be an alternative to bread clips, as suggested by Beer et al. in 2002 [3]. Other studies have suggested using bigger clips to completely removing the pincer-like design of the bread clip altogether [15]. Another alternative is the use of dissolvable materials in the construction of the bread clip. This would prevent long-term adherence of the bread clip to mucosa if ingested and the potential complications arising from it.

Conclusion

Bread clip ingestion remains a rare phenomenon. It can present as a potentially life-threatening condition, such as bowel obstruction, intussusception, ischaemic bowel and bowel perforation. Foreign body ingestion must be suspected in the visually impaired and edentulous, which have shown to be a high-risk group. Plastic bread clips are radiolucent and can be missed in radiological imaging. Clinicians have to be vigilant in analysing radiological imaging in the high-risk group. In patients with persisting symptoms and negative CT scan, a more invasive diagnostic procedure such as endoscopy, laparoscopy, or laparotomy should be considered, depending on patients' clinical condition. Consideration should be made to a potential design or material change to this commonly used household item.

Compliance with ethical standards

Conflict of interest Amos Nepacina Liew, Thomas Surya Suhardja, Asiri Arachchi and James Lim declare that they have no conflict of interest.

Human rights All procedures followed have been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Informed Consent Informed consent was obtained from all patients for being included in the study.

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