Delayed presentation of a small bowel perforation secondary to an ingested denture

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Denture ingestion with bowel perforation is rare. We report a case, with literature review, where successful emergency surgery was performed.

Case report

A 64-year-old Caucasian woman complaining of a two-day history of acute abdominal pain with associated emesis was admitted as an emergency to our surgical unit. She had not opened her bowels or passed flatus for two days. On examination the abdomen was distended with generalized peritonitis. Digital rectal examination was unremarkable. She was hypothermic with a heart rate of 120 and a systolic blood pressure of 70 mmHg. Routine blood investigations revealed haemoglobin of 10.4 g/dL, white blood cells of $2.84 \times 10^9$/L and a C-reactive protein of 428 mg/L. Arterial blood sampling revealed a pH of 7.22, a base excess of –14.6 and a lactate of 10.8 mmol/L. Her past surgical history included a hysterectomy in 1981. Medical co-morbidities included hypertension.

The patient had been admitted three months earlier, and treated conservatively, for small bowel obstruction secondary to an accidental ingestion of her denture bridge two months prior to this. On the previous admission, a computed tomography (CT) of the abdomen and pelvis suggested that the bridge was within the caecum (Figures 1a and b). Several days later the obstruction had resolved with conservative management. Repeat plain abdominal X-ray films suggested that the denture had passed from the caecum (Figure 1c) into the sigmoid colon (Figure 1d). It was thus felt at that time that it would pass spontaneously. The patient remained completely asymptomatic until the acute presentation.

Despite aggressive fluid resuscitation, the patient continued to deteriorate and it was decided to perform an emergency laparotomy. Intraoperatively, an ileal perforation 40 cm from the ileocaecal junction was found with minimal faecal contamination. The small bowel perforation was secondary to denture erosion through the wall of the small bowel, with non-viable distal small bowel. A limited right hemicolectomy and small bowel resection was performed, with an end to end hand-sewn ileo-colic anastomosis. The patient developed a postoperative ileus, but otherwise made a good postoperative recovery and was discharged back to the community.

Discussion

The prevalence of adults wearing dentures is high, with approximately 20% of adults between the ages of 18 and 74 wearing dentures.1 Despite this, the incidence of accidental swallowing or aspiration of dentures remains rare. Webb2 reported that in a series of 192 adult patients who had swallowed a foreign body (FB), only three were dental hardware (1.56%). In our case, the patient was able to give a clear history of denture ingestion enabling a high index of suspicion that her previous denture ingestion was related to her acute abdomen. However, eliciting a clear history in such cases is often not possible as many patients may present with alcohol intoxication, dementia, learning disabilities or in moribund conditions.3 Accurate history taking, if possible, is paramount in attaining a clinical diagnosis prior to imaging. As highlighted by our review of similar cases, the presenting symptoms

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and time to presentation following denture ingestion can vary greatly (Table 1). However, similar reported cases of denture ingestion mainly presented acutely with abdominal pain as the presenting symptom (Table 1). Interestingly, our case was unusual due to the delayed presentation of our patient, five months postingestion, with an acute abdomen. It is thus imperative that the manifestation of abdominal symptoms, even several months postingestion of a denture, elicits suspicion of FB related pathology.

Symptoms related to FB ingestion can vary greatly and are usually associated with the anatomical site of obstruction, and can include dysphagia, shortness of breath, haematemesis, retrosternal pain and fever. The majority of reported

Figure 1
Imaging on initial admission. (a) Spiral computed tomography image with coronal slice reconstruction, showing dental bridge in the caecum of the large bowel on initial presentation following ingestion of foreign body. Artefact around the image is a result of ferrometalic disturbance of the foreign body. (b) Spiral computed tomography image, axial slice, showing dental bridge in the caecum of the large bowel on initial presentation following ingestion of foreign body. (c) Plain abdominal radiograph performed on initial presentation showing placement of the denture bridge in the right lower quadrant, in keeping with the caecum of the large bowel. (d) Plain abdominal radiograph performed five days after initial presentation showing placement of the denture bridge in the pelvis, in keeping with the distal, likely sigmoid colon.
Table 1
Complete literature review of reported cases presenting with bowel perforation secondary to denture erosion, including demographics, presenting history, denture characteristics, perforating site, operative procedure and results

| Author          | Year | Age | Gender | Country | Presenting symptoms                          | Denture characteristics | Site of perforation | Operation type                                           | Stoma            | Morbidity          | Mortality |
|-----------------|------|-----|--------|---------|---------------------------------------------|-------------------------|---------------------|---------------------------------------------------------|-----------------|-------------------|-----------|
| Patel PH et al. | 2011 | 64  | Female | UK      | Acute abdominal pain, vomiting              | Denture bridge          | Middle ileum       | Laparotomy, ileocaecal resection                       | No              | No                | No        |
| Bunni and Youssef | 2010 | 53  | Male   | UK      | Constant abdominal pain, peritonism         | Dental plate, single tooth | Terminal ileum     | Open Lanz incision, small bowel enterotomy for retrieval, primary closure | No              | No                | No        |
| Rashid et al.   | 2008 | 53  | Male   | UK      | Intermittent abdominal pain                 | Dental bride            | Terminal ileum     | Laparotomy, ileocaecal resection                       | No              | No                | No        |
| Ghori et al.    | 1999 | 38  | Female | UK      | Constant abdominal pain, peritonism         | Upper Denture           | Middle Sigmoid     | Laparotomy, Hartmanns procedure                        | Descending colostomy | Yes (septic shock) | Yes (day 10 post-op) |
| Peison et al.   | 1995 | 48  | Male   | USA     | Constant Abdominal pain                     | Dental plate            | Sigmoid colon      | Laparotomy, Hartmanns procedure                        | Descending colostomy | No                | No        |
| Cleator and Christie | 1973 | 62  | Female | UK      | Constant abdominal pain, peritonism         | Dental plate, double tooth | Proximal sigmoid | Laparotomy, sigmoid colectomy, primary anastomosis     | Tranverse colostomy | No                | No        |
complications associated with denture ingestion involve the oesophagus or upper respiratory tract. In addition, other complications such as per rectal haemorrhage, melaena, obstruction, perforation and fistula formation have been reported following ingested dentures. However, lower gastrointestinal complications remain rare, with only one other case describing terminal ileal perforation secondary to denture ingestion (Table 1).

Our case demonstrates that the interpretation of radiological imaging post-denture ingestion can be difficult or misleading. Most dentures consist of polymethylmethacrylate which is radiolucent and thus difficult to visualize on plain radiographs. Furthermore, CT scanning can be affected by artefact and magnetic resonance imaging is only appropriate if it is known that the ingested bridge does not contain any metal. Management of ingested FBs, such as dentures, remains controversial with no clear national guidelines available. The denture in our case was longer than 5 cm and had a diameter greater than 2 cm. Objects of this size are thought to rarely pass through the stomach, but if they do, they are associated with a high risk of ileo-caecal perforation at the valve and should therefore be removed at an early stage. The suggested management for patients with sharp FB ingestion is initially conservative, with close monitoring and observation for a period of three days. If conservative management fails, and the site of obstruction is upper gastrointestinal, then an intervention in the form of an endoscopic procedure should be considered in the first instance, as most dentures are easily retrieved in this manner. Clearly if the site of obstruction is in the lower gastrointestinal tract, then failed conservative management should lead to an early surgical intervention to prevent serious complications related to perforation (Table 1). Cases such as ours, where there are signs of peritonism or suspicion of a perforated viscus, are an indication for an emergency laparotomy. In several reported cases of large bowel perforation secondary to denture ingestion a stoma was required (Table 1). In our case, due to the prompt surgical intervention and the site of the perforation, the patient did not require a stoma. In cases of lower gastrointestinal tract obstruction associated with perforation, a stoma may be inevitable (Table 1). This should, however, be a consideration and, if possible, the patient should be informed preoperatively of the possibility of a stoma. We performed an ileo-caecal resection due to the proximity of the terminal ileal perforation to the ileo-caecal valve and the unviable distal ileum. However, as reported by Bunni and Youssef, if there is no faecal contamination it is possible to perform a small bowel enterotomy with a primary closure (Table 1). Follow-up of patients having suffered a lower gastrointestinal obstruction following FB ingestion is paramount. This should include careful histological report assessment, follow-up imaging or endoscopic procedures to exclude pathologies such as small bowel strictures as a result of neoplasia or inflammatory bowel disease such as Crohn’s colitis.

**Conclusion**

Our case highlights that the ingestion of FBs such as dentures, can lead to a delayed presentation with an acute abdomen necessitating emergency surgery. It is thus paramount to follow-up such patients after the initial ingestion to ensure that the denture or FB has passed out of the alimentary canal. The continued presence of an FB such as a denture in the lower gastrointestinal tract, should be electively managed at an early stage to avoid the risks of emergency surgery including stoma formation and mortality.

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