

Surgical Intervention for Gastrointestinal Foreign Bodies in Adult Patients: A Case Series

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How to cite this paper: Abed, N.M., Al-Abri, R.M.S., Al-Mamari, A.A.A., Al-Rawahi, A.A., Al-Mamari, Y.M.H., Al-Furqani, H.M.M. and Al-Lawati, Y. (2025) Surgical Intervention for Gastrointestinal Foreign Bodies in Adult Patients: A Case Series. *Surgical Science*, 16, 182-193.

<https://doi.org/10.4236/ss.2025.163019>

Received: January 4, 2025

Accepted: March 28, 2025

Published: March 31, 2025

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Abstract

Foreign body (FB) ingestion is mainly encountered in the pediatric patient population. When encountered in the adult population, it is predominantly associated with an underlying gastrointestinal pathology or mental health disturbances. Ingested FBs can be trapped anywhere in the gastrointestinal tract (GI), including the esophagus, stomach and small bowel. Here, we present four cases of FB ingestion, all surgical interventions with excellent outcomes and prognosis.

Keywords

Foreign Body Ingestion, Small Bowel Enterotomy, Laparotomy

1. Introduction

FB ingestion is mainly seen in the pediatric patient population. When encountered in adults, it is predominantly associated with an underlying gastrointestinal pathology or mental health disturbance. Most ingested foreign bodies pass spontaneously. However, 10% - 20% of cases require endoscopic intervention, while 1% or less require surgical procedures due to complications such as bowel perforation or obstruction, or failure of non-operative measures.

Ingested foreign bodies can be trapped anywhere in the gastrointestinal tract, including the proximal esophagus, distal esophagus, stomach, and small bowel. The presenting symptoms of FB ingestion will depend on the material ingested and the site of impaction. As different materials can be ingested, patients will present with a wide variety of symptoms depending on the site. Those with FB in the

esophagus can present with pain, nausea, FB/globus sensation, odynophagia, and dysphagia [1]. If the FB is impacted in the stomach, the presentation can be with abdominal pain and symptoms of gastric outlet obstruction. Patients with FB impacted in the small or large bowel can present with symptoms related to bowel obstruction, such as abdominal pain, abdominal distension, vomiting, and constipation. Complications related to FB ingestion can present with chest pain, abdominal pain, and signs of sepsis. Note that a good percentage of patients will be asymptomatic and will only have a positive history of FB ingestion with no significant findings on physical examination.

Evaluation of FB ingestion starts with history taking, which is the most essential part of the evaluation, given the absence of physical signs in many patients, as outlined above. It is important to note the timing of the incident, the nature of the FB ingested, and presence of any pre-ingestion GI symptoms such as dysphagia or signs of bowel malignancy, which may point to an underlying GI tract pathology. It is also important to clarify the progression and severity of any symptoms present and to inquire about symptoms related to possible complications. Finally, it is crucial to obtain a thorough psychiatric history from the patient and his family. In terms of investigations, a plain radiograph is useful for FB detection in the GI tract even in the case of hair, glass, plastic, fruits, and vegetable ingestion. [2] To complement that, abdominal computed tomography (CT) is useful in patients who present with suspected complications such as perforation or obstruction. Serial imaging will help follow the ingested FB as it passes through the GI tract if a non-operative approach is planned. As expected, radiolucent objects will be more challenging to detect and follow on imaging.

We here present our experience with four cases of FB ingested encountered in the past 2 years at the Royal Hospital, Oman, who required operative intervention.

1.1. Case 1

A 76-year-old female, known to have hypertension on medication, no previous surgical history, no history of other comorbidity, presented to the emergency department complaining of abdominal pain for three days, bilious vomiting, and constipation. She has no similar previous episodes nor any history of obstructive symptoms to suggest an underlying malignancy. She was hemodynamically normal with a distended abdomen on examination and a 2 cm, non-tender, umbilical hernia. Digital rectal examination showed no blood, mucus, or masses. Her blood investigations revealed deranged renal function with low estimated glomerular filtration rate (eGFR). Initially, a nasogastric tube was inserted, and necessary medications and hydration were given. CT abdomen showed dilated proximal small bowel up to the proximal ileum, with a transition point noted just distal to it. The distal small bowel was partially collapsed. In addition, there was a small paraumbilical hernia containing omentum only (Figure 1).

The patient was taken to operation theatre for diagnostic laparoscopy. Intraoperatively, the whole bowel was run and a mass lesion was noted in the small



Figure 1. CT abdomen showed dilated proximal small bowel up to the proximal ileum, with a transition point noted.

bowel at the transition point described.

The small bowel is too distended and does not have enough space, so the procedure was converted to a laparotomy and the mass detected was found to, indeed, be an impacted FB. Therefore, small bowel enterotomy and removal of foreign body were performed distal to the area of obstruction in a healthy-looking bowel segment. The enterotomy was closed transversely and the whole bowel was run multiple times to rule out any predisposing mass lesion. The small umbilical defect was repaired primarily. Her postoperative in-hospital course was unremarkable and she was discharged home on postoperative day 4.

Two months later, the patient presented with an uncomplicated incisional hernia. She was incidentally found on cross-sectional imaging to have enlarged celiac lymph node and gastric wall thickening suspicious for malignancy, which was not seen before. She underwent esophagogastroduodenoscopy (OGD), which revealed a semi-circumferential lesion with irregular margins in the body of the stomach with no luminal obstruction. Biopsy confirmed the presence of moderately differentiated adenocarcinoma, for which she underwent subtotal gastrectomy with D2 lymphadenectomy as she was not a candidate for neoadjuvant treatment. The patient recovered well and remained clinically stable on her 6 months follow up.

1.2. Case 2

A 28-year-old female patient, known to be mentally challenged, presented multiple times with history of FB ingestion requiring repeated surgical interventions.

The first episode was in 2011 when she was admitted at the age of 16 with abdominal pain and vomiting. An abdominal X-ray at the time the presence of

multiple screws in the stomach, without signs of obstruction or perforation. Initial non-operative management was unsuccessful, as the objects did not pass beyond the pylorus. Therefore, she underwent laparoscopic gastrostomy and removal of a total of 31 metallic objects from the stomach, ranging in size between 2 cm and 10 cm with weighing approximately 1.25 Kg. Her postoperative course was unremarkable and she was discharged on day 11 post-surgery. Outpatient OGD did not reveal any underlying pathology.

The second episode was in 2020 at the age of 25. The patient presented with history of lower abdominal pain and swelling. On examination, she had mild to moderate tenderness in the right lower quadrant with no signs of diffuse peritonitis. Abdominal CT scan revealed the presence of an FB in the right iliac fossa (RIF) region extending from near the cecum to the subcutaneous tissue and surrounded by a thick collection. Notably, there was no free gas in the abdomen. The bowel appeared healthy and there were no signs of bowel obstruction.

The patient subsequently underwent exploration of the abdominal wall collection. Dense tissue resembling chronic inflammation was discovered and 15 ml of pus was drained. A needle was discovered as a foreign body in the right iliac fossa, which has likely been impacted in the terminal ileum/cecum area for a long duration, eventually eroding into the abdominal wall. Patient recovered well after her surgery.

The third episode was in 2021 when the same patient was referred to our center with history of foreign body ingestion. Again, her abdominal examination was unremarkable. Plain films showed a fork impacted in the esophagus (**Figure 2**).

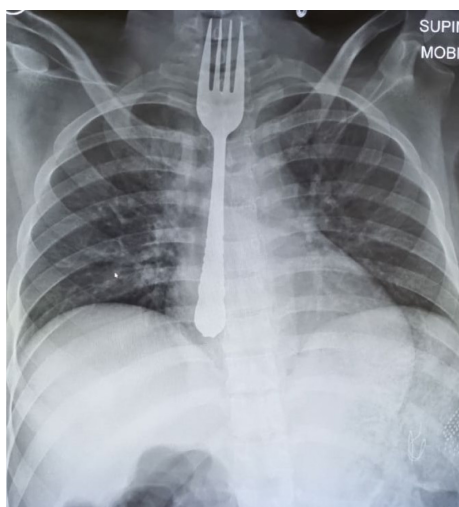


Figure 2. Plain films showed a fork impacted in the esophagus.

For that, she underwent trans-cervical esophagostomy and removal of the FB. During the procedure, a small injury to the esophagus was noted for the impacted fork. This was repaired primarily. The patient's postoperative recovery was uncomplicated.

The fourth episode was in 2023 at the age of 28. The patient presented with history of foreign body ingestion and altered mental status. Her abdominal examination was unremarkable. Upon assessment, there were no signs of stroke. Because of her mental status, the decision was made to proceed with endotracheal intubation to protect her airway. Subsequent cross-sectional imaging revealed the presence of multiple FB in the stomach and large bowel. The decision was made to start with non-operative management. She underwent OGD, which revealed multiple opaque and radiolucent objects in the stomach, none of which could be removed endoscopically. Serial imaging of the abdomen confirmed the static nature of these objects as they failed to pass through the intestine. Given the failure of non-operative management, the decision was made to proceed with surgery.

The patient underwent exploratory laparotomy, lysis of adhesions, posterior gastrostomy, and removal of various foreign bodies from the stomach, including a metallic spoon, coins, screws, plastic straw, metallic and plastic wires, and a food packet. Furthermore, foreign bodies in the cecum, such as a bolt, coin, and plastic cap, were also extracted by milking them through the large colon into the rectum. Additionally, a bolt was found and removed from the rectum (**Figure 3**).



Figure 3. Picture of foreign bodies removed from the stomach and colon.

The patient recovered well after surgery and was eventually discharged home.

The last episode occurred one month after the previous one. She presented with behavior changes and mania, along with a history of abdominal pain. Her vitals were normal and her abdominal examination was unremarkable. Abdominal imaging revealed a large metallic object, approximately 12 cm in length, located in the descending colon (**Figure 4** & **Figure 5**).

Given the location of the FB, the decision was made to follow a non-operative approach. Given that the object was not sharp, it was decided not to proceed with endoscopic extraction immediately. The patient was closely monitored with serial examination and plain abdominal films. Eventually, on the evening of the 6th day of admission, she spontaneously passed the FB. Repeated X-ray confirmed the absence of any foreign object or free air. She was therefore discharged home the

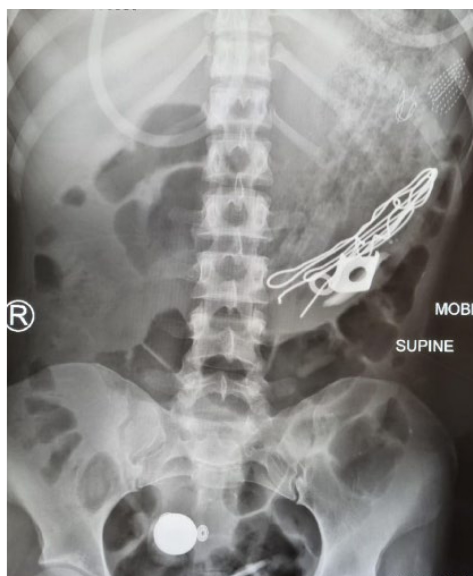


Figure 4. Abdominal x-ray showed multiple intraabdominal metallic forging bodies.

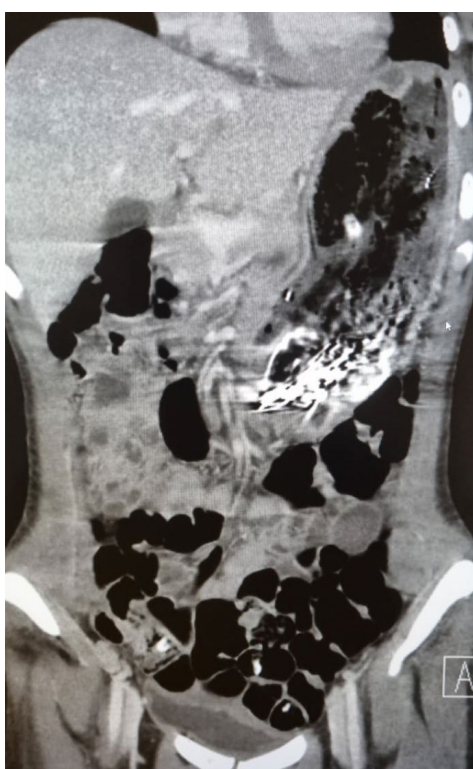


Figure 5. CT abdomen single coronal plane for same patient.

next day with continued psychiatric evaluation and support.

1.3. Case 3

A 62-year-old woman, known to have hypertension, type 2 diabetes mellitus,

dyslipidemia, and previous cholecystectomy, attended the emergency room with a 2-week history of abdominal pain, worse in the right iliac fossa. The pain was colicky in nature and associated with nausea, vomiting, and constipation. Two weeks back, the patient was admitted with abdominal pain and underwent CT scan of the abdomen and pelvis, which showed features of subacute small bowel obstruction. At the time, she was managed conservatively and her symptoms resolved. She was discharged home with a plan to investigate her condition further in the outpatient setting. Physical examination showed a soft abdomen with mild suprapubic tenderness and intact hernial orifices. Per rectum examination showed no pathology. Repeated CT scan of the abdomen and pelvis demonstrated evidence of small bowel obstruction with a transition point in the mid/distal ileum. These were deemed to be progressively worse than her previous scan, which was done two weeks prior (**Figure 6**).



Figure 6. CT abdomen Single coronal plane showed foreign body in the ileum cause small bowel obstruction.

Given her presentation, the decision was made to proceed with surgery. After a midline laparotomy, a firm mass was discovered in the mid-portion of the ileal loops. It was clear that this mass was a FB rather than a luminal tumor. Therefore, a longitudinal enterotomy was done distally in a healthy-appearing bowel segment and the FB was milked out. Upon closer examination, it was found to be undigested food content (food bezoar). The enterotomy was closed transversely. The whole bowel was run multiple times to rule out an underlying mass lesion. The remaining postoperative period was unremarkable and the patient was followed for 6 months with no complications.

1.4. Case 4

A 79-year-old female with history of hypertension and dyslipidemia on medica-

tion, she has history of previous duodenal resection with Roux-en-Y duodeno-jejunosomy for duodenal carcinoma done on, Histopatology showed moderate differentiated adenocarcinoma T3 N0, she was on regular follow up with medical oncology, the patient not has presented with history of sudden-onset abdominal pain associated with vomiting and constipation. On examination, she was vitally normal with generalized abdominal tenderness but no peritonitis or guarding. CT abdomen and pelvis showed internal herniation of small bowel loops with a transition point at the proximal ileum and collapsed distal ileum (**Figure 7**).

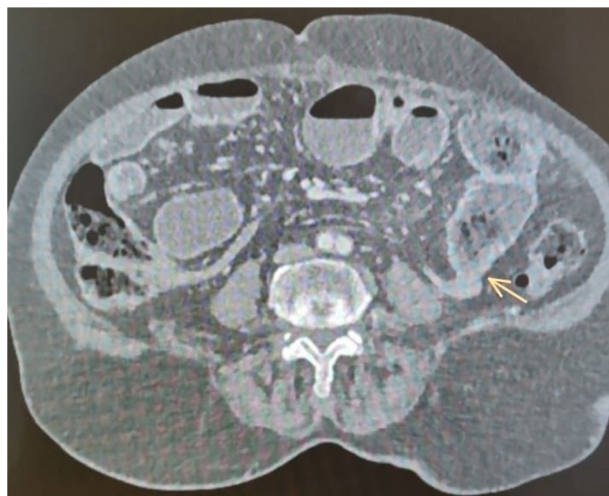


Figure 7. CT abdomen and pelvis single coronal plane slide showed internal herniation of small bowel loops with a transition point at the proximal ileum and collapsed distal ileum.

Therefore, the decision was made to proceed with operative intervention. For that, she underwent an exploratory laparotomy and lysis of adhesions. Intraoperative, she was found to have a hard, mass-like food bezoar in the mid-ileum. An enterotomy was done at the distal healthy-looking segment of small bowel and the food bezoar was removed. The whole small bowel was run to rule out anatomical pathology causing obstruction. Her postoperative recovery was complicated with a superficial surgical site infection, which was treated successfully with regular dressing change and antibiotics. Upon further history, the patient admitted suffering from difficulty chewing food because of dental problems, which likely contributed to her presentation, and she was hence referred to dentistry for an opinion.

2. Discussion

About 1500 to 1600 people die annually in the United States from complications caused by ingesting foreign bodies [3], including perforation, localized ischemia, and obstruction.

Foreign body ingestion is seen more commonly in the pediatric population, specifically between the ages of 6 months to 6 years old. We reported a case series

of 4 adult patients given that it is less commonly described in this patient population, where it usually occurs due to an underlying pathology or mental health disorder [2]. Psychiatric comorbidity is common among patients with recurrent ingestions [4], as seen with one of our patients, who presented multiple times with history of FB ingestion. None of the patients described had an underlying GI pathology to explain their presentation, although one of them was diagnosed at a later stage with gastric cancer, which was not the site of obstruction. On the contrary, other series described a number of pre-existing GI pathology such as strictures in 37%, malignancy in 10%, esophageal rings in 6%, and achalasia in 2% [5]. Otherwise, FB impaction can occur in areas of normal physiologic narrowing points along the GI tract, such as the upper esophageal sphincter, the lower esophageal sphincter, the pylorus, and the ileocecal valve. In fact, FB >2 cm in diameter is less likely to pass through the pylorus, while those >6 cm in length are less likely to pass through the C-shaped duodenum [5]. It is of vital importance to ensure that the FB is not impacted in the esophagus to avoid the risk of pressure necrosis and perforation. Such cases of FB impaction in the esophagus should be managed aggressively. Once the FB reaches the stomach, it is more reassuring to know that >80% will pass through the intestine [5]. A wide range of FB has been described in the literature, including fish bones (9% - 45%), bones (8% - 40%), and dentures (4% - 18%) [5]. In our series, at least two patients had impaction caused by food bezoar. The type of FB is extremely important to illicit, particularly magnets and button lithium batteries in children. Magnets can lead to serious complications when swallowed, especially if multiple, as they can adhere across the bowel layers, resulting in pressure necrosis, fistula formation, volvulus, perforation, or obstruction [6].

Patients with foreign body ingestion will present to the emergency department with a wide range of symptoms including vomiting, drooling, dysphagia, cough, abdominal pain, globus sensation, hematemesis, and history of foreign body ingestion. Rarely, patients with foreign bodies may have airway compromise, mainly in delayed presentation with subsequent infection or perforation [1]. Patients with mental health problems may have a less revealing history, and a high index of suspicion may be required in such scenarios.

Identification and radiographic localization are the first step in the management of the foreign body ingestion [7]. Chest and abdominal X-rays are usually sufficient to detect radiopaque foreign bodies. However, radiolucent foreign bodies can be difficult to detect, and oral contrast studies can be helpful in these situations. In the case of suspected perforations, abdominal CT scans are very effective [3], although these can sometimes be seen on plain films too.

Management of FB ingestion can be broadly categorized into conservative, endoscopic, and surgical. The best modality of treatment depends on multiple factors related to the type of FB ingested, the location of impaction, the progression throughout the GI tract on serial imaging, and the presence of complications. As mentioned earlier, the majority of foreign bodies ingested pass through the gas-

trointestinal tract and are excreted with the feces. Therefore, patients with foreign body ingestion and no signs of complications can undergo daily monitoring with serial abdominal X-rays and physical examinations, as long as the ingested objects are radiopaque, blunt, not impacted in the esophagus, and progressively moving throughout the GI tract. This management strategy excludes ingestion of lithium button batteries and multiple magnets, as highlighted previously.

Endoscopic intervention is warranted in a number of clinical scenarios of FB ingestion and has been reported to be utilized in 10% - 20% of cases [5]. Sharp foreign bodies are more likely to penetrate the bowel wall (15% - 35%; typically, around ileocecal valve [3], and therefore, it is important to remove them all endoscopically from the stomach once detected. Another situation that requires endoscopic removal is FB impact in the esophagus [7]. FB that fails to progressively move through the upper or lower GI tract can also be removed endoscopically using gastroscopy or colonoscopy. In general, endoscopic intervention is associated with high success rates [8].

Surgical intervention is required in around 1% of patients, mainly due to resulting complications such as intestinal perforation or obstruction. Other considerations to follow a surgical approach are if the FB has not progressively advanced in the GI system after three days, especially if it was sharp. Ingestion of sharp FB is associated with increased rates of morbidity and mortality [3]. On the other hand, we have shown in our series that surgical intervention, even in the presence of history of previous FB removal surgeries, is safe and is associated with low morbidity and no mortality as mentioned in Management algorithm [9] (**Figure 8**).

In recent study Published in January 2024 showed that the foreign body location within the gastrointestinal tract, found that all types of foreign body impaction were higher in the esophagus [10], in our case series 50% of food impaction happened in small bowel (2 cases for 4 cases). However, the number of cases in our study was small, so it is difficult to compare the two studies.

A number of complications have been described in the context of GI foreign body ingestion. These include the following:

- Oropharyngeal foreign bodies can lead to abrasions, lacerations, and punctures, with associated abscesses, perforations, and soft-tissue infections.
- Foreign body impacted in the esophagus may lead to mucosal abrasion, punctures, and perforations. Moreover, it can result in abscess formation, pneumomediastinum and mediastinitis. Button lithium batteries are particularly dangerous because of the risk of esophageal necrosis.
- Small and large bowel perforation, peritonitis, and septicemia.
- Small and large bowel obstruction.

Close monitoring and timely management of patients with FB ingestion are crucial to avoid any dreaded complications. In the series described above, the most common complication was bowel obstruction. However, there were no incidents of bowel perforation.

In conclusion, we have shown that surgical intervention in FB ingestion is an

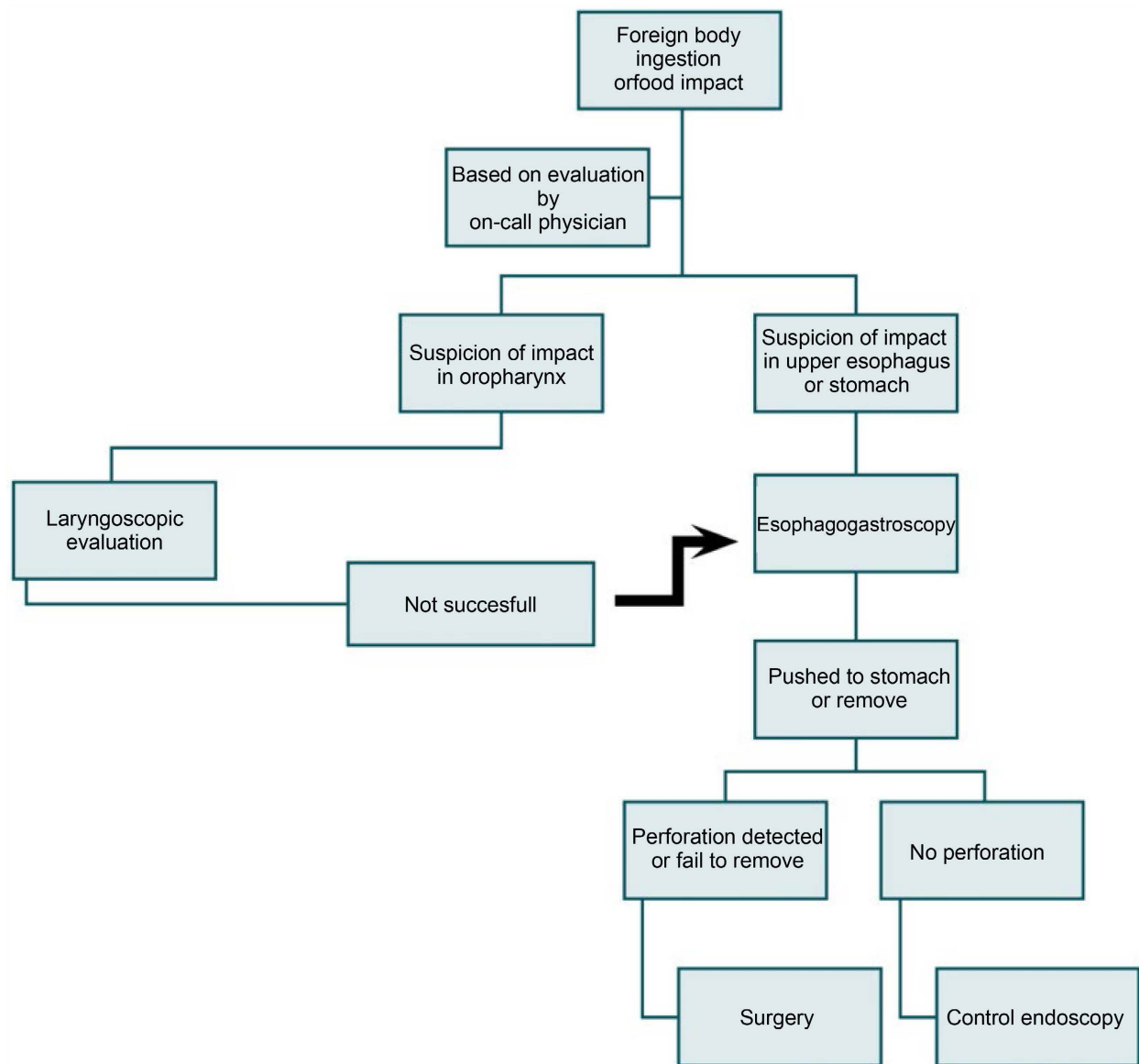


Figure 8. Management algorithm used for patients with ingested foreign objects or food impact [9].

important pillar in their management and is associated with low risk of morbidity and mortality. FB ingestion in adults requires a high index of suspicion in patients with mental health problems. In addition, every effort should be made to rule out an underlying, predisposing GI tract pathology, especially malignancies. Finally, food bezoar is an important consideration in elderly patients with dental problems, which should be addressed to prevent further similar episodes.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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