CASE REPORT

Ingestion of nine metallic nails with corrosive: what happened next?

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SUMMARY

A 20-year-old woman was brought to the surgery emergency department with the complaint of epigastric pain since 1 day following ingestion of multiple metallic nails with a cup full of toilet cleaner (corrosive acid) with a suicidal intention. Physical examination was essentially unremarkable, and the abdomen showed no signs of perforation peritonitis. X-rays of the abdomen showed multiple 'nail'-like radiopaque shadows in the abdominal cavity with no evidence of free gas under the domes of the diaphragm. A non-operative expectant management was pursued. The patient had passed all the sharps in stools without any complication and was discharged after 12 days. After 3 weeks, the patient presented with non-bilious vomiting. Further investigations revealed pyloric stenosis with no oesophageal luminal stenosis. To bypass the pyloric stenosis, a Billroth II gastrojejunostomy was performed. The postoperative period was uneventful, and the recovery was smooth.

sharp foreign bodies (FB) was pursued. Wait-and-watch policy for ingested foreign bodies, which have passed beyond the duodenum, is a reasonably acceptable strategy. This statement has its basis on the fact that most of the ingested foreign bodies pass spontaneously.¹ However, in certain cases, the foreign body may cause hollow viscus perforation and/or obstruction, which would require surgical exploration and removal.² In this particular case, not only were the ingested FBs sharps; they were multiple in number. In addition, the patient had ingested a corrosive acid. However, we were able to successfully evacuate all the sharp FBs by non-operative methods. A prompt psychiatry consultation was sought and appropriate management initiated. Any patient presenting with an episode of voluntary ingestion of FBs with suicidal intent ought to be offered psychiatric support to prevent recurrence of such incidents in future.² Eventually, the patient did require surgery (Billroth II gastrojejunostomy), although for a different reason.

BACKGROUND

The ingestion of so many sharp foreign bodies together with corrosive acid is a very rare incident. While reviewing the literature, we did not find any reported similar case. Furthermore, a non-operative approach in the successful evacuation of the multiple

CASE PRESENTATION

A 20-year-old woman was brought to the surgery emergency department of our hospital with the complaint of epigastric pain since 1 day following ingestion of multiple sharp metallic nails along with a cup full (approximately 100 mL) of toilet cleaner (corrosive acid) with a suicidal intention. Physical examination was essentially normal. Abdomen showed no signs of peritonitis. X-ray of the abdomen showed multiple 'nail'-like radiopaque shadows in the abdominal cavity, with no evidence of free gas under the domes of the diaphragm (figure 1). Since no signs of perforation were present and the patient was tolerating oral diet, a non-operative expectant management was followed. The patient was encouraged to take psyllium husk, a bulk-forming laxative agent, with water or milk and bananas. Under close monitoring, by periodic physical examination and daily abdominal roentgenograms (figures 2 and 3), the patient was managed non-operatively.

After 11 days of admission, the patient had passed all the sharps in stools without any complication and was discharged thereafter. However, on a follow-up visit after 3 weeks, she came back with complaints of multiple episodes of non-bilious vomiting and decreased appetite. An upper gastrointestinal (GI) endoscopy revealed pyloric stenosis. This was supported by a barium meal upper GI study, which showed no luminal stenosis of the oesophagus and absence of contrast beyond the stomach (figure 4), suggestive of gastric outlet obstruction.

Figure 1 Abdominal radiograph (supine)—day 1 of admission.

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Figure 2 Abdominal radiograph (supine)—day 4 of admission.

To bypass the gastric outlet obstruction, a Billroth II gastrojejunostomy (retrocolic, posterior, isoperistaltic) was performed. The postoperative period was uneventful, and the recovery was smooth. The patient was discharged on the sixth postoperative day and is being followed up periodically. Follow-up visits were done for assessing any late complications of ingested sharps and corrosive, such as oesophageal strictures and for assessment of

Figure 3 Abdominal radiograph (supine)—day 12 of admission.

complications of gastrojejunostomy. She is symptom free until the time of writing this article.

INVESTIGATIONS

1. Abdominal X-rays (erect and supine).
2. Upper GI barium meal study.
3. Upper gastrointestinal endoscopy.
4. CT abdomen.

TREATMENT

Initially, the patient was treated with a non-operative expectant approach, which consisted of administering her laxatives orally, in the form of psyllium husk, bananas and plenty of fluids. Since the patient developed gastric outlet obstruction as a sequel of corrosive ingestion, a Billroth II retrocolic, posterior, isoperistaltic gastrojejunostomy was performed.

OUTCOME AND FOLLOW-UP

The patient had completely passed all ingested sharp foreign bodies per rectally and remained asymptomatic until she developed vomiting. After Billroth II gastrojejunostomy, the early postoperative period was marred with early dumping syndrome. The patient gradually adapted to small frequent meals and was relieved of her symptoms. Follow-up visits were done every 2 weeks and the patient was asked whether there were any episodes of vomiting? Whether it was bilious or non-bilious? Any signs and symptoms of dumping syndrome were inquired for. A general physical examination and local examination was carried out. The patient is planned to undergo upper GI barium meal/oesophagography study every 6 weeks. Any subsequent stenosis or strictures revealed in the oesophagus would require endoscopic evaluation and dilatation. As of today, the patient is on regular follow-up and is doing well.

DISCUSSION

It is not uncommon for a surgeon in the emergency department to be presented with a patient with a history of ingestion of a FB, either accidentally or voluntarily. Although patients come from all ages, children who have swallowed coins, toys, safety pins or small batteries accidentally contribute approximately 80% to the sum.³⁻⁵ Adults usually present with food boluses, meat and fish bones, denture parts, nails, pins, screws and toothpicks as foreign bodies.^{6,7} Among the adult population, repeated voluntary foreign body ingestion is usually observed in those who are alcoholic, are suffering from a psychiatric illness or mental retardation or those who get some secondary gain by doing this, such as prisoners in the attempt to leave the prison.⁸ However, in cases of involuntary FB ingestion in adults, certain risk factors have been incriminated. These include presence of dentures, reduced sensitivity of oropharyngeal mucosa and neurological illnesses.⁹

The probability of foreign body impaction increases in the presence of GI strictures, diverticula, malignancy and achalasia.⁹ The regions of acute angulation or physiological narrowing in the GI tract are the sites of obstruction, impaction or perforation of FBs. Among these sites, the narrowing at the level of cricopharyngeus muscle and at the ileocaecal valve are the most important.^{10,11} The narrowing at the cricopharyngeus level is the most common site of impaction and contributes to 75% of all FB impactions.¹² However, patients with a history of GI surgery or congenital GI malformations are more predisposed to complications like obstruction or perforation.^{13,14}

Figure 4 Barium meal upper gastrointestinal study.

Although, most FBs (up to 90%) pass spontaneously within 4 days to 4 weeks, some may require endoscopic retrieval (10%–20%) and a minuscule number (1%) require a surgical procedure.^{15 16} Once the objects (including sharp pointed FBs) pass beyond the oesophagus, most of them exit the GI tract without any complications.^{15 17–19} Blunt FBs which fail to migrate beyond the stomach within 3–4 weeks or those distal to stomach, which show no movement for a week, need to be mechanically removed.¹⁵ GI perforations occur in up to 35% of those patients who have swallowed pointed metallic objects or other sharp objects. Hence, endoscopic retrieval is advocated even if the FB is in the stomach.¹⁸ Savran *et al* described the use of flexible endoscopy, protecting the GI mucosa with an overtube to retrieve 15 foreign objects, including a sharp knife, from the distal oesophagus and stomach.²⁰

Diagnosis of foreign body ingestion is often delayed and becomes only apparent when symptoms begin to appear.^{21 22} The young, mentally challenged or psychiatric patients often present with choking, refusal to eat, vomiting, drooling, wheezing, blood stained saliva or respiratory distress.^{23–26} Oropharyngeal or a proximal oesophageal perforation will usually present with swelling, erythema, tenderness or crepitus in the neck region. Perforation of the stomach and abdominal gut will present with pain, tenderness and guarding and/or rigidity of the abdomen. Signs of peritonitis are usually conspicuous.²⁷ Such presentations warrant immediate

surgical intervention and any delay during the process of seeking an endoscopy consultation should be avoided.²⁷

The initiation of management of a suspected case of foreign body ingestion should not be delayed due to unnecessary investigations. Plain radiographs with anteroposterior and lateral views of the neck, chest and abdomen usually suffice.²⁸ Furthermore, a plain radiograph of the abdomen is the most commonly used radiological investigation to identify ingested FBs in the GI tract.²⁹ Although plain X-rays are able to identify most of the FBs, they fail to reveal certain radio-lucent objects like meat, tiny bones, aluminium, glass, plastic and wood.^{30 31} Furthermore, plain radiographs have a 0.5% false negative and a 20% false positive-associated rate with them.^{32 33} Thus, the question of the use of contrast studies arises. Barium swallow or studies are generally not advisable, partly due to their risk of aspiration and partly because it makes endoscopy more difficult after covering the FB and oesophagus.¹² An alternative could be Gastrografin swallow study. However, if aspirated, there is a serious risk of severe pneumonitis.³⁴ A patient who shows signs of perforation in any region should undergo CT scan. On certain instances, metal detectors have also been employed to detect metallic FBs in children.^{27 35} The use of C-arm fluoroscopy has also been described to remove sewing needles from the abdomen intraoperatively.³⁶

Although there have been several cases highlighting ingestion of multiple types of FBs in combination, we have not come across any case in the available literature, showing concomitant ingestion

of nine nails and corrosive acid. However, ingestion of as many as 20 razor blades by a patient suffering from a psychiatric ailment, managed non-operatively, has been reported. The same patient, had previously swallowed 8 razor blades and underwent endoscopic retrieval of one razor followed by laparotomy and gastrotomy for evacuation of the remaining seven razor blades.³⁷ In the present case, all the sharp foreign bodies had already passed beyond pylorus by the time the patient presented to us, and we proceeded with an expectant approach.

The management of a patient with suspected FB ingestion depends on multiple factors; namely, patient's age and clinical condition; characteristics of the FB; anatomical location of ingested FB and expertise of the endoscopist.^{19 38} Many physicians favour endoscopic retrieval of FBs because of several reasons: it avoids surgery, has reduced costs, is easily accessible and has reduced mortality rates.³⁹ There are several indications for immediate endoscopy: presence of disk battery in the oesophagus, sharp FB in the oesophagus and an object causing a high-grade obstruction resulting in unmanageable secretions. It is absolutely necessary to remove an oesophageal foreign body within 24 hours after presentation as the risk of complications increases thereafter.^{10 15 17 18 32 40} A sharp pointed object present in the stomach or duodenum should be extracted endoscopically, usually with retrieval forceps or polypectomy snare, when a skilled endoscopist is available.⁴¹ Once beyond duodenum, daily radiographs should delineate the passage of the FB and a surgery may become unavoidable if the FB fails to travel further for three successive days.¹⁵

Learning points

- Patients may present with a combination of ingested foreign bodies to the surgeon and an accurate history and examination are indispensable.
- Wait-and-watch policy for ingested sharp objects is a well justified approach.
- Close monitoring and daily abdominal radiographs are essential components of management.
- The role of bulk-forming laxatives as an adjunct in successful passage of foreign bodies through the gastrointestinal tract is reiterated.
- Exploration of the abdomen should be done if conservative management fails and/or there are signs perforation peritonitis.

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