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Foreign body ingestion in an adolescent – A case report and literature review

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CASE STUDY

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ABSTRACT

Foreign body ingestion (FBI) more commonly occurs in paediatric, psychiatric and intellectually impaired patients. Current guidelines primarily focus on paediatrics and adults with less emphasis on the adolescent population.

We present a case of a 16-year-old male with autism spectrum disorder (ASD), who presented with generalised abdominal tenderness. Abdominal X-Ray showed a radio-opaque sharp object in the right upper quadrant. Subsequent CT revealed a needle-like object in the proximal small bowel. Clinically, his symptoms continued to worsen despite no radiographic evidence of complications. However, his symptoms markedly improved without intervention and he was managed conservatively. This patient subsequently passed a 5cm needle three days after presentation. This article discusses the challenges involved in managing and communicating with intellectually impaired patients who present with foreign body ingestion. Guidelines from the most recent literature on managing adolescents with foreign body ingestion, particularly sharp object ingestion, are also discussed.

Key Words
Foreign body ingestion, FBI, sharp object, needle, adolescent, intellectual impairment, autism spectrum disorder, ASD

Implications for Practice:

1. What is known about this subject?
Foreign body ingestion is more commonly seen in paediatric and psychiatric populations. Most cases can be managed conservatively.

2. What new information is offered in this case study?
Current literature focuses either on paediatric or adult populations, often omitting the adolescent population. This case highlights the challenge of managing foreign body ingestion in an adolescent with intellectual impairment and reviews the most recent literature on the management of sharp object ingestion in adolescents.

3. What are the implications for research, policy, or practice?
A high index of suspicion for foreign body ingestion is required especially for intellectually impaired patients who present with non-specific abdominal pain or irritability. While most adolescents can be managed according to the current adult guidelines, management for each adolescent patient should still be individualised and contextualised.

Background

Foreign body ingestion (FBI) is most commonly encountered in paediatric, intellectually impaired and psychiatric populations.[1] The treatment approach of foreign body ingestion depends on the type and location of the foreign body, presence of complications and most importantly the clinical state of the patient.

While the general consensus is that most sharp object ingestions can be managed conservatively, some expert opinions differ due to readily identifiable cases of these objects causing perforation and extraluminal migrations.[2]

Current guidelines target either paediatric or adult populations, making it a challenge to guide decision making for adolescent patients.[2]

We report a case where a patient continues to deteriorate clinically despite reassuring radiographic findings. This case highlights that foreign body ingestion can be missed if clinicians are not vigilant. More importantly, it highlights the challenges involved in managing and communicating with an intellectually impaired patient. This article also reviews the most recent literature regarding guidelines for management of sharp object ingestions in adolescents.

Case details

A 16-year-old male with a background of autism spectrum disorder was referred to the emergency department by his general practitioner due to concerns regarding acute appendicitis. He presented with a one–day history of generalised abdominal pain and irritability.

On examination, the patient was in moderate distress but haemodynamically stable and afebrile. There was diffuse abdominal pain in all four quadrants with trivial rebound tenderness. Rovsing's sign was unable to be elicited.[3] Bowel sounds were present. Cardiorespiratory examination was unremarkable.

This patient's blood panel was unremarkable with no leucocytosis. Clinical impression at this stage was not convincing of a classical acute appendicitis. He also only scored 5/10 on the Alvarado Score for acute appendicitis.[4] Ultrasound of the abdomen was ordered but was unable to be performed due to non-compliance. Plain chest and abdominal X-rays were subsequently ordered. His chest x-ray showed no abnormalities. His abdominal X-ray revealed a thin radiopaque foreign body located within the right upper quadrant (Figure 1).

A computed tomography (CT) scan of his abdomen was performed to further define the location and features of the foreign body. The foreign body was located in the proximal small bowel in the middle-left abdomen (Figures 2). There was no pneumoperitoneum to suggest perforation and there was no intra-abdominal free fluid or collections identified. Endoscopy was not performed after discussion with the surgical team, as the foreign body had already migrated beyond the oesophagus and into the stomach.

The patient became increasingly distressed and complained of worsening abdominal pain. He also became tachycardic, with other vital signs remaining stable. Further discussions with the radiological and surgical teams were undertaken. Despite no convincing radiological evidence of complications demonstrated, it was deemed that this patient may require emergent surgical intervention if he deteriorated clinically. It was also not known at this stage whether the patient had ingested other radiolucent foreign bodies.

The patient's pain improved markedly not long after, raising the suspicion of a behavioural element in his presentation as opposed to a true acute abdomen. A decision was made to closely monitor this patient with further imaging or surgical interventions if the patient showed any signs of deterioration.

Intervention

This patient was managed conservatively without any complications. He remained clinically stable and passed a 5cm-long needle three days after presentation. Repeat abdominal x-ray confirmed no residual foreign body. Possible abuse or neglect was considered but not reported and there were no other signs of abuse identified on examination. On discharge, we advised the patient's mother to store potentially hazardous objects in a safe and secure place to prevent further episodes.

Discussion

Most accidental foreign body ingestions occur in paediatric, intellectually impaired and adult populations with psychiatric impairments.[1] Eighty per cent of FBI cases are reported in the paediatric population, with the majority of cases occurring in children between one and three-years-old.[1,5] Multiple FBI and repeated presentations are not commonly seen; but they are more prevalent in patients with developmental delay and behavioural difficulties.[6]

This case illustrates the challenges in managing intellectually impaired patients who present with FBI. This was highlighted by conflicting collateral history and worsening symptoms despite reassuring radiographic evidence. It can be difficult to interpret and communicate with this population particularly when symptoms may be multifactorial. In this case, the worsening pain can be attributed to physical factors such as increased bowel peristalsis and mucosal irritation surrounding the FB.[7] In addition, the psychological element of distress over FBI, frustration at difficulties communicating concerns and being in an unfamiliar environment adds to the complexity of management.

Strategies to approach these presentations include obtaining a detailed collateral history, using visual aids or hand gestures whilst communicating. In the health care setting, drawings and paper-based tools are frequently used. Furthermore, utilising short and simple phrases are effective as patients may only be able to understand one concept at a time. Efforts should also be made to minimise sensory stimuli in the environment to minimise distractions. Finally, parental involvement is important as they are often more capable of interpreting their child's behaviour.[8]

Patients with developmental disorders are more susceptible to FBI. There are a number of proposed mechanisms which could explain this[6]:

1. Impaired motor skills resulting in poor hand-mouth coordination.
2. Tendency to have prolonged oral phase with extended period of chewing objects.
3. Oral and pharyngeal dysphagia along with reduced oral sensation.
4. Impaired pharyngeal protective mechanisms with delayed swallowing reflex.
5. Difficulties communicating or signalling that they have swallowed a foreign object.
6. Pica – a pathological behaviour where patients are unable to differentiate between nutritive and non-nutritive items. This has been reported to be associated with patients with developmental disorders, including autism spectrum disorders.[6,9]

This case demonstrates that patients with intellectual impairment are particularly vulnerable to accidental FBI. Clinicians should remain vigilant regarding the possibility of child abuse or neglect. Wadhera et al.[10] reported several cases of FBI secondary to child abuse. One of the cases involved a two-year-old child being fed bolts and nuts. The bolt was removed surgically from the hypopharynx and the two nuts passed naturally through the gastrointestinal tract.[8] Child abuse or neglect was considered in this case but deemed to be unlikely. Reasons include this being the patient's first hospital presentation, no signs of suspicious injury on examination and no concerns noted from the patient's regular general practitioner.

Medical imaging plays a vital role in defining the location of foreign objects. However, a negative radiographic film does not preclude the presence of a foreign object, as some may be radiolucent.[1,2] The treatment approach of FBI depends on the features and location of the foreign body, presence of complications and most importantly the clinical context of the patient. Up to 90 per cent of accidental FBI will resolve without any intervention, 20 per cent will require endoscopy and less than one per cent will require surgery.[1] Emergent endoscopy is warranted in patients with oesophageal obstruction, disk batteries or sharp objects in the oesophagus. A foreign body should not remain in the oesophagus for more than twenty-four hours after presentation. Current adult guidelines recommend that in cases where the foreign body has already passed into the stomach, conservative management is usually sufficient in a clinically stable patient, with the exception of batteries, magnets, objects longer than 6 cm or with a diameter greater than 2.5 cm[1,2,11,12] Complications of FBI include gastrointestinal perforation, abscess formation, gastrointestinal obstruction, ulcer, laceration, tracheo-oesophageal fistula and aorto-oesophageal fistula.[1,2,11,12] Aperients and laxatives have not been shown to be clearly beneficial in assisting passage of foreign bodies.[13]

Management of FBI in adolescents is more debatable as there are no large case series or meta-analyses specifically for adolescents. A review by Sahn et al.[2] on the management of FBI in adolescents in 2014 showed there are some controversies regarding how aggressive endoscopic or surgical intervention should be for sharp objects. It is generally accepted that sharp objects located in the oesophagus or in a symptomatic patient should be removed emergently. Previous review articles cited perforation rates of up to 35 per cent for sharp object ingestion.[2] The authors challenged that perforation rates may actually be lower than stated as some of the data was published prior to the widespread use of endoscopic foreign body retrieval. Furthermore, enteroscopes that examine the whole length of small bowel are also available today. Locations with the highest risk of perforation include the oesophagus, duodenum and ileocecal valve.[2]

Straight sharp objects with blunt-ends generally pass spontaneously without complications, as long as it travels past the oesophagus and its length is able to pass through the duodenal C-loop.[2] However, some expert opinions vary due to reported cases of perforation and extraluminal migration of sharp objects (discussed below). Therefore, it is not uncommon for certain practices to proceed directly to endoscopic retrieval. Currently, there are no validated criteria used to predict successful spontaneous passage of sharp objects based on the ratio of object size to patient size. The American Society for Gastrointestinal Endoscopy Guidelines recommend that objects larger than 6cm are less likely to traverse the duodenal C-loop and should be retrieved if possible.[2] While most adolescents are adult size, some teenagers are smaller and a smaller cut-off may be

more suitable. Some paediatric gastroenterologists have recommended cut-offs of 5cm long or 2cm wide objects for larger paediatric patients.[2,14] In the context of sharp objects, Sahn et al.[2] recommended a conservative approach in asymptomatic adolescents with a straight sharp object that is less than 3cm beyond the oesophagus. The authors advocated for retrieval if multiple or longer sharps are ingested in this teen population due to risk of complications.[2]

Similar cases of needle ingestion have been published in the literature before and have all been managed conservatively with success. Srivastava et al. reported a case where a needle detached from a syringe during a dental procedure which resulted in accidental ingestion by a 16-year-old patient.[15] The needle passed naturally in the stool twenty-four hours later without causing any pain or complications. Gokhshtein et al. reported a 14-year-old girl who swallowed over 50 pins but managed to pass the pins in her stools without intervention.[16]

Uncommon complications such as extraluminal migration of the ingested foreign body have also been described before, with most cases warranting surgical intervention. Graffstadt et al. reported a 14-year-old girl who swallowed a needle used for fixing her headscarf.[17] The needle was initially found to be in the right main bronchus but subsequently travelled to the abdomen and was excreted naturally. Frang et al. described a young female patient swallowing a needle where it travelled to her kidney after perforating her duodenum.[18] Ozkan et al. reported a 20-year-old female who swallowed a sewing needle, which was observed to be in the stomach initially but found to be in her left lung ten days after presentation.[19] Cekirdekci et al. reported a 16-year-old female presenting with a cardiac tamponade secondary to migration of an ingested needle to the myocardium.[20]

Conclusion

We present a case in which a 16-year-old patient with autism spectrum disorder passed an ingested sewing needle spontaneously without any complications. This case highlights that conservative approach is appropriate in clinically asymptomatic adolescent patients, consistent with current evidence published in the literature. Most ingested sharp metallic bodies that have already passed into the stomach will pass through the gastrointestinal tract in four to six days without causing any complications.[2,6,11] These patients can be managed conservatively with follow up radiographs and stool examinations to confirm passage of the foreign body, provided they are clinically stable. If the patient does become symptomatic or clinically unstable, surgical intervention should not be delayed. Clinicians should always be mindful of possible foreign body ingestion in intellectual impaired patients as they are more likely to have atypical presentation due to difficulties in communication. There remains a need for a large case series or meta-analyses of FBI in the adolescent population to help establish guidelines tailored specifically for adolescent patients.

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PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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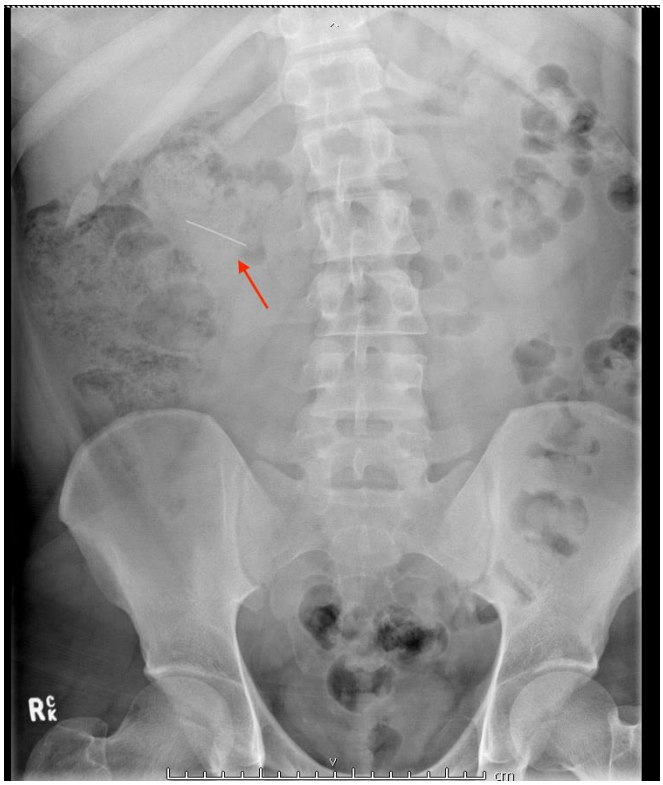
PATIENT CONSENT

The authors, *Yu A, Lee S, Chen N, Nguyen J, Chou C* declare that:

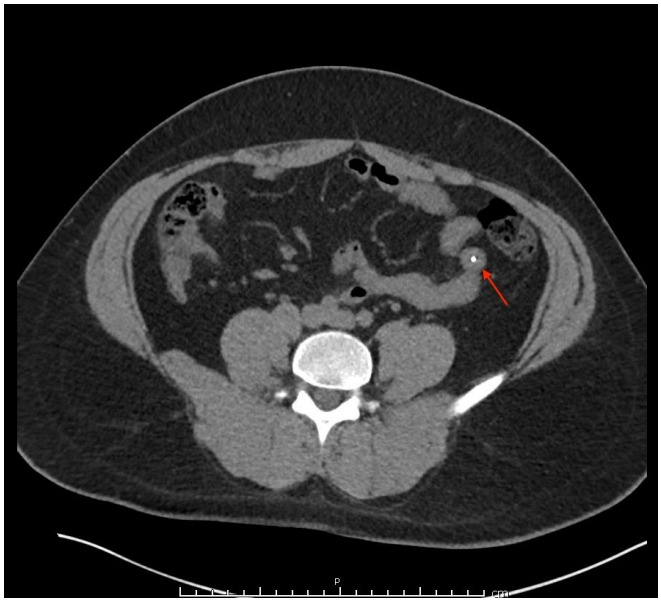
1. They have obtained written, informed consent for the publication of the details relating to the patient(s) in this report.
2. All possible steps have been taken to safeguard the identity of the patient(s).
3. This submission is compliant with the requirements of local research ethics committees.

Figure 1: Abdominal X-ray



Abdominal X-ray showed a needle-like object in the right upper quadrant.

Figures 2: CT of abdomen



The needle-like object is visible in the proximal small bowel in the left mid abdomen. There are no adjacent extraluminal gases or pneumoperitoneum to suggest perforation.