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A case report of successful removal of multiples sewing needles in the gastrointestinal tract and pancreas using intraoperative C-arm fluoroscopy



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ABSTRACT

BACKGROUND: Most ingested foreign bodies pass uneventfully through the digestive tract without any major disturbances.

OBJECTIVES: We reports a rare case of successful localization and surgical removal of needles in the gastrointestinal tract using C-arm fluoroscopy intraoperatively.

CASE REPORT: A 46 year old female, a non-hospitalized psychiatric patient, presented with acute abdominal pain. Imaging showed 16 needles all over the digestive tract. C arm fluoroscopy was used to successfully localize and remove all of the needles intraoperatively. One needle was withdrawn from the pancreas manually without pancreatic resection.

DISCUSSION: It is estimated that up to 10–20% cases require endoscopic removal and 1% cases with the presence of obstruction or perforation necessitate surgical interventions [1–4] (Hsieh et al., 2005; Anderson and Dean, 2011; Cheng and Tam, 1999; Ricci et al., 2014). Migration to the pancreas extremely rare [5,6] (Toyonaga et al., 2001; Yasuda et al., 2010). Timely diagnosis can be difficult [7] (Tsui and Mossey, 1997). CT scan is a modality of choice to preoperatively locate the foreign body [8] (Takada et al., 2000). We herein successfully localized and removed 15 needles using C-arm fluoroscopy intraoperatively. It is extremely useful to accurately detect radiopaque foreign bodies. On the basic of findings on CT, treatment of choice such as endoscopic removal or surgical intervention may be attempted.

CONCLUSIONS: CT scan is a modality of choice to preoperatively locate the foreign body. Sharp-pointed objects should be removed even if the patient is asymptomatic as the increased mortality and the risk of related complications. Intraoperative C-arm fluoroscopy is a feasible, cost-effective modality with real-time image to accurately detect multiple radiopaque objects especially when they are disseminating throughout the digestive tract.

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1. Introduction

Foreign body ingestions are common feature of children between 3 months and 6 years, or patients with psychiatric disorders, and it is a common scenario presenting to gastroenterologists and surgeons [1–4]. Most foreign bodies will pass spontaneously through the gastrointestinal tract without any complications. However, non-operative interventions are still necessary in 10–20% of patients and surgery in 1% [9]. Radiologic localization of these foreign bodies is mandatory when surgical intervention is planned. Nevertheless, it is difficult to localize intraoperatively when they are disseminating throughout the digestive tract and when they are too thin and short to be palpated. A metal detector may facilitate exact localization to guide accurate treatment [10], but this

instrument is not available in many institutions. Herein, we present a case of a mental retardation patient with a history of multiple laparotomies due to past foreign body ingestions who presented with peritonitis after swallowing multiple sewing needles. These were successfully localized and retrieved surgically by using C-arm fluoroscopy intraoperatively.

2. Case report

A 46 year old female, a non-hospitalized psychiatric patient, presented with acute abdominal pain. She alleged swallowing 15 sewing needles at least one week ago. She lived with her severe dementia mother. Additional history was obtained from her visiting nurses. Her medical history included moderate mental retardation with IQ of 48, adjustment disorder and 4 episodes of suicidal attempt by ingesting needles. Her current medication included eszopiclone, nitrazepam, risperidone, olanzapine. Past surgical history was significant for 4 laparotomies which were excision of

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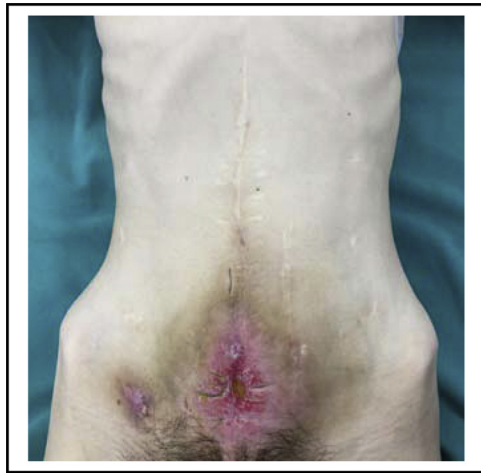


Fig. 1. Multiple midline and left paramedian surgical scars with enterocutaneous fistula in lower abdomen.



Fig. 2. X-ray shown multiple radiopaque long thin objects disseminating throughout the abdomen.

peritoneal pseudocyst, enucleation of uterine fibroid, extraction of needles ingestions and adhesiolysis with small bowel resection for small bowel obstruction.

On examination, her body mass index (BMI) was 15.6 kg/m² (36 kg/1.56m) and her baseline observation was stable: temperature 36.8 °C, blood pressure (BP) 101/85 mm Hg, heart rate (HR) 61 bpm, SpO₂ 95% on air and respiratory rate (RR) 16 breaths/min. She complained of diffuse abdominal pain, nausea and vomiting. Her abdomen was distended, tender and rebound on palpation. Bowel sounds were absent on auscultation. Excessive scar tissue and enterocutaneous fistula were observed in her lower abdomen (Fig. 1). Laboratory evaluation revealed a white blood cell count of 3.8×10^4 /L with 75% neutrophils, a hematocrit of 32%, a hemoglobin level of 10.2 g/L, and a platelet count of 295×10^9 /L. Liver and kidney function tests were normal. The abdominal X-ray (Fig. 2) and CT scan (Fig. 3) showed multiple metallic bodies disseminating throughout the digestive tract. One needle was reported penetrating the posterior gastric wall to the body of the pancreas (Fig. 4).

Even though preoperative imaging studies did not show sign of pneumoperitoneum, she developed peritonitis at time of admission. An emergent exploratory laparotomy was performed under the suspicion of needle perforation complicated with peritonitis.

Operating time was 448 min, estimated blood loss was 400 ml. No blood transfusion was required as she was hemodynamically stable. There were 3 needles found freely penetrating from the small intestine (Fig. 5). The rest was unable to identify due to extensive adhesion especially near the enterocutaneous fistula, the presence of feces and undigested food in the digestive tract. To avoid short bowel syndrome due to extensive small bowel resection, laborious adhesiolysis to identify as much as possible the continuity of intestine was performed. C-arm fluoroscopy was used intraoperatively to localize the needles in the digestive tract. There were 6 needles localized near the enterocutaneous fistula. Decision was made to dissect the small bowel containing enterocutaneous

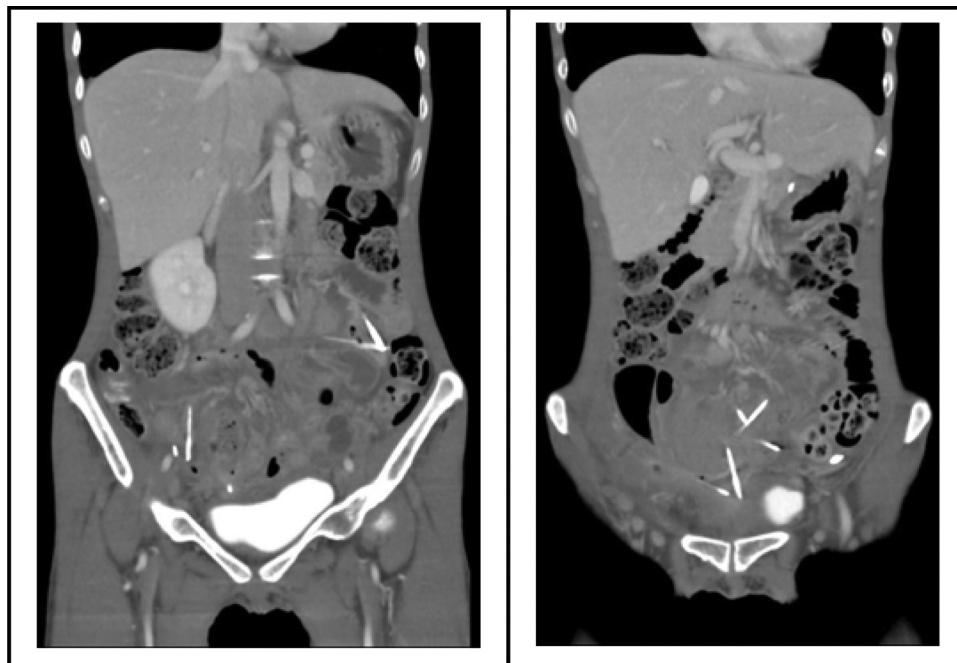


Fig. 3. CT scan shown multiple metallic long thin needles disseminating throughout the digestive tract.

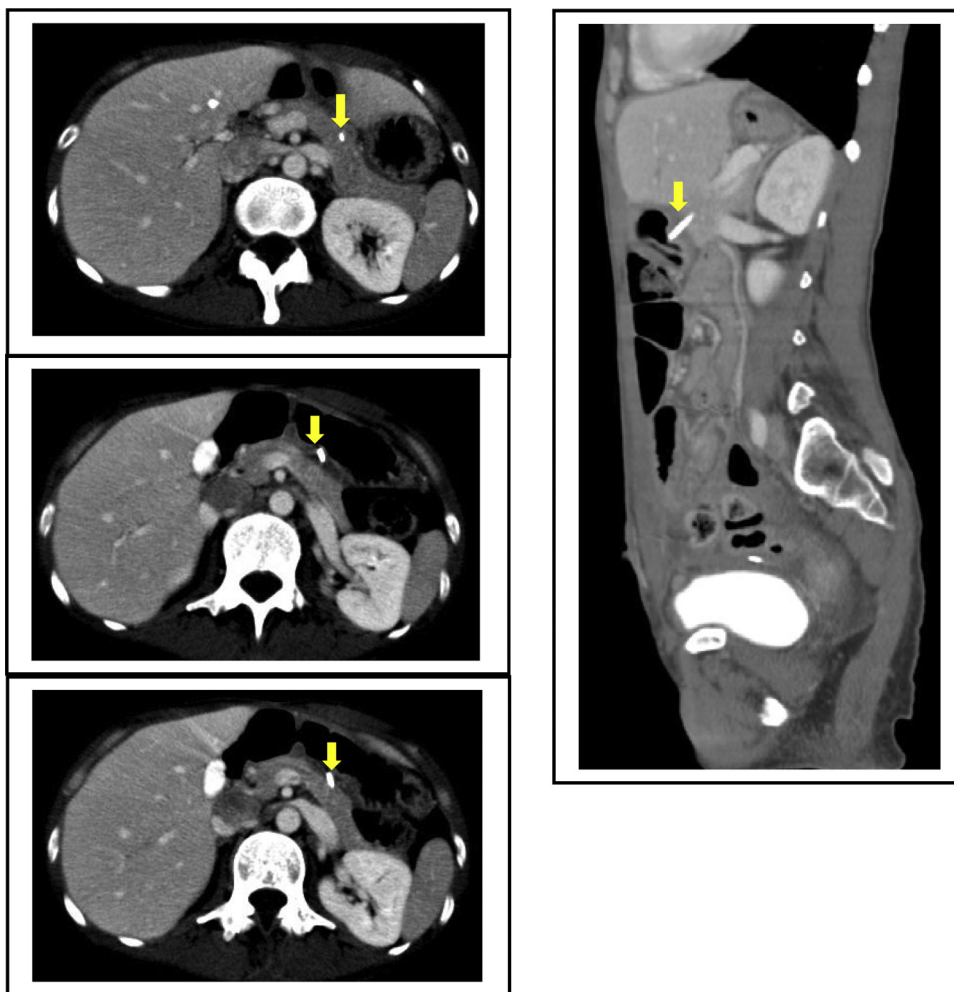


Fig. 4. Axial, sagittal and coronal image shown needle penetrating from the posterior wall through the body of the pancreas.

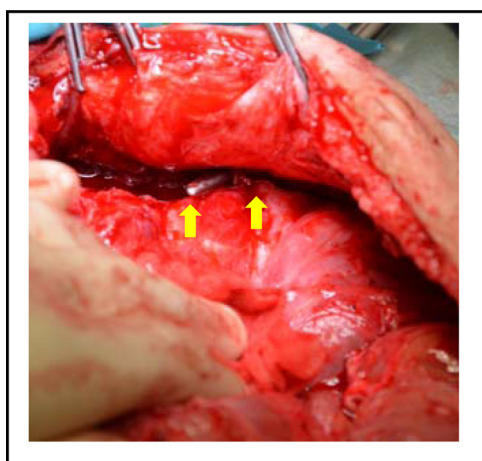


Fig. 5. Needles were found freely penetrating the intestine wall during the operation.

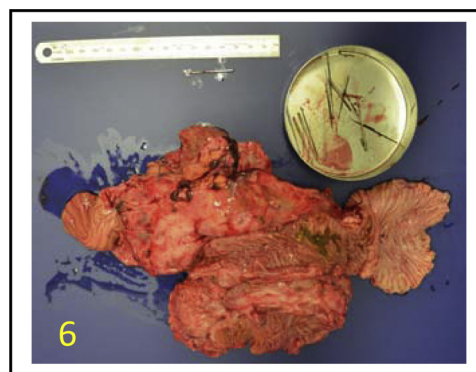


Fig. 6. Pathological findings. Jejunum containing the enterocutaneous fistula was resected. The total length of removed jejunum was 100 cm. There were 5 needles found inside the lumen of resected intestine.

fistula and all 6 needles were confirmed using C arm at the back table. The total length of 100 cm jejunum was removed. Pathology report confirmed 5 needles intraluminally and one needle embedded in the muscular layer with sign of severe peritonitis (Figs. 6 and 7). The other 5 needles were successfully localized and removed through enterotomies. To remove the needle penetrating posterior gastric wall as reported in the preoperative CT

scan, small gastrotomy was created in the anterior gastric wall but no needle was found or palpated. After confirming the position of immobilized needle by C-arm, the lesser sac was opened under the suspicion of the needle's migration inside the body of pancreas. The tip of needle was found protruding from the body of pancreas and the whole needle was extricated unremarkably without additional resection of pancreas (Fig. 8). We left one needle in the left lower abdominal wall near the resected enterocutaneous fistula. Not only because it was unchanged for the last 2 years compared to previ-

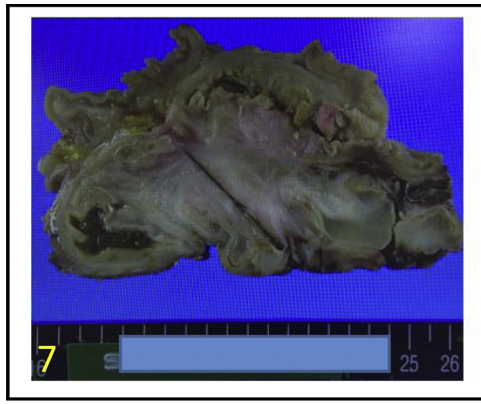


Fig. 7. One needle was found embedded in the muscular layer. Pathological finding confirmed the diagnosis of peritonitis.

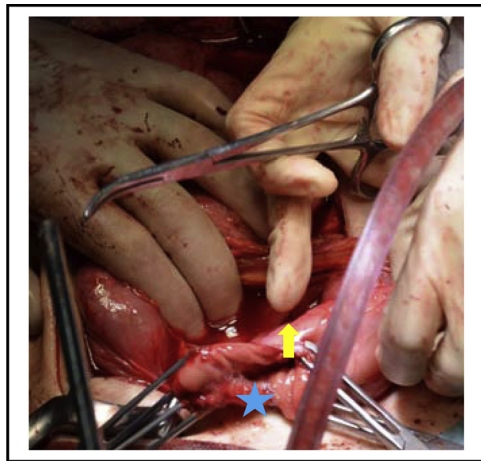


Fig. 8. Small gastrotomy (star mark) was created at the mid anterior gastric wall, but no needle was visualized nor palpated. The yellow arrow shown the tip of the needle fully migrating from the posterior gastric wall toward the body of the pancreas. Most of the needle was buried inside the pancreatic parenchyma. Great care was taken to extricate the whole intact needle from the pancreas without additional pancreatic resection.

ous X-ray (Fig. 9), but also in the concern of ventral hernia due to tremendous abdominal wall exploration to remove the foreign body. We confirmed no needle left inside the digestive tract using C-arm fluoroscopy intraoperatively (Fig. 10). A Penrose drain was left in the peritoneum and removed on post operation day 9. Post-operative course was uneventful and the enterocutaneous fistula was healed 3 months after the surgery.

3. Discussion

We here reported a rare case who presented with total 16 needles disseminating in the digestive tract. One needle was found penetrating from the posterior gastric wall through the body of the pancreas in the preoperative CT during this admission, and one needle was incubated in the left abdominal asymptotically for years before this admission. The needle penetrating the body of pancreas which was found almost buried inside the pancreatic parenchyma, was extracted intact unremarkably. Precisely preoperative CT diagnosis and intraoperative localization by C-arm fluoroscopy together with early surgical intervention were thought to attribute to avoidance of troublesome pancreatic resection and successful removal of all needles surgically.

Foreign body ingestion may occur in children at developing ages, elderly, prisoners or adults with mental illnesses [2–4]. Depending

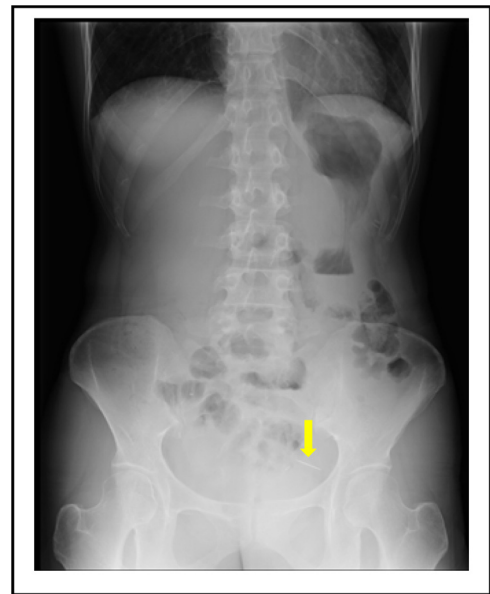


Fig. 9. Abdomen X-ray one year ago shown the same shape and size of the radiopaque object located at the left lower abdomen, which suggested the firm fixation of the needle to the abdominal wall.



Fig. 10. Intraoperative abdomen X-ray shown no needle in the digestive tract.

on the size and shape of the ingested bodies, the period of spontaneous extraction can last up to 5 days. In general, objects wider than 2 cm do not pass through the pylorus and tend to lodge in the stomach while objects longer than 5 cm tend to get caught in the duodenal sweep [2,11]. Moreover, in some cases, the ingested objects remain in the body without yielding any symptoms or unexpectedly lead to complications after a long incubated time [12] or migrate to distant sites [5,7]. Migration to the pancreas, or the anterior abdominal wall, however is extremely rare [5,6]. Once inside the pancreatic or hepatic parenchyma, they can lead to development of abscess which can further lead to pseudo aneurysm formation; they can also produce direct injury to blood vessel (portal vein, splenic vein) and sometimes may mimic other diseases affecting these organs [13,14,11].

80–90% of the ingested foreign bodies are naturally discharged from the body without any complication [9]. However, in our case spontaneous evacuation was the least likely outcome because the

capacity of bowel movement was limited due to extensive adhesion and enterocutaneous fistula resulted from multiple laparotomies. Additionally, it is recommended that sharp-pointed objects like needles in this case, should be removed even if the patient is asymptomatic as the mortality and the risk of perforations increases with these objects leading to peritonitis, abscess formation, obstruction, fistulae, hemorrhage or even death [5,14]. Our patient was presented with peritonitis hence surgical intervention was the best option.

Timely diagnosis can be difficult as the ingestion goes unreported until the onset of symptoms which may be remote from the actual event of ingestion [7]. X-ray is a useful diagnostic test to detect radiopaque objects. CT scan is a modality of choice to preoperatively locate the foreign bodies including radiopaque and radiolucent objects, and the presence of their related complications [8]. The nature of penetrating-migrating of a sharp foreign body is widely accepted and the whole process of disease entity is mostly asymptomatic and usually an event of time-dependence. Hence, it is challenging to localize ingested foreign bodies intraoperatively with unknown time to event, especially when they are difficult to palpate due to their sizes and shapes, impacted indigestive food, or widely disseminating throughout the digestive tract. Although metal detector has been advocated as a novel tool for localization of ingested metallic foreign bodies [10], it is just available in limited institutions. We herein successfully localized and extracted all of needles using C-arm fluoroscopy. C-arm fluoroscopy is a cost effective intraoperative diagnostic modality which is easily applied. It is extremely useful to accurately detect radiopaque foreign bodies, which can reduce unnecessary exploration of digestive tract and subsequently prevent possible complications.

On the basis of findings on CT, treatment of choice such as endoscopic removal or surgical intervention may be attempted. The endoscopic retrieval of foreign objects should be performed by experienced endoscopists using adequate accessories such as overtube, snares, Dormia baskets or strong toothed graspers [15,16,20]. Most of the reported cases have been dealt surgically with open method [5,6,13]. With the development of minimally invasive surgery, laparoscopic removal of foreign bodies appears as a novel, relatively accessible treatment of choice with avoidance of postoperative adhesion, better intraoperatively magnifying vision, and shorter recovery time [17–19]. The optimal approach should be individualized based on the size, structure and location of the foreign bodies, the urgency of removal, the number of ingested objects, presence of previous laparotomies and the treatment of choice that the surgeon is most familiar with. Our patient presented with sign of generalized peritonitis after unwitnessed event of multiple sewing needles ingestion, who had multiple laparotomies resulting in unhealed enterocutaneous fistula, hence emergent exploratory laparotomy was the best option.

4. Conclusions

CT scan is a modality of choice to detect foreign bodies and their related complications. Based on the findings of CT scan, the treatment of choice should be urgently evaluated. In the concern of penetrating-migrating nature of the majority of foreign bodies, intraoperative C-arm fluoroscopy not only provides a feasible, cost-effective, and quick modality to accurately detect multiple radiopaque objects especially when they are disseminating throughout the digestive tract, but also reduce unnecessary exploration of digestive tract and subsequently prevent possible complications. Early surgical intervention may avoid troublesome intraabdominal resection, life-threatening complications such as perforation, peritonitis.

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Conflict of interest

There is no conflict of interest.

Funding

There is no sources of funding for my research.

Ethical approval

This paper is morally acceptable and fully follows ethical approval of the institute.

Consent

Consent was obtained from the patient's guardian and all of identifying details are omitted.

Author contribution

Baongoc Nasri MD is a corresponding author.

Ken Yuu MD is a study design.

Masanori Tada MD is a supervisor.

Guarantor

Baongoc Nasri is the corresponding author and the Guarantor.

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