

Extraction of a foreign body in the liver using single incision laparoscopic surgery: a new application for minimally invasive surgical procedures

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Abstract

Ingestion of foreign bodies is a common medical problem frequently observed in children, psychiatric patients and prisoners. Various cases have been found in the medical literature, with different diagnostic and therapeutic approaches. We report a case of a 41-year-old male inmate, hospitalized for right upper quadrant pain of the abdomen due to the ingestion of two syringe needles two weeks previously. We describe the diagnostic procedure and the removal of one of the two needles that had migrated into the liver parenchyma, using a single-incision laparoscopic surgical technique. The operation was carried out safely through a 2.5 cm transverse incision below the umbilicus. The dissection and the removal of the foreign body were easily conducted under direct visualization using a minimally invasive surgical technique. Our case report demonstrates the efficacy and the security of the laparoscopic treatment in such a challenging area, employing a single port access only.

Key words: laparoscopic surgery, liver, ingestion, needle, foreign body removal, single port incision.

Introduction

The development of laparoscopic surgery is increasing worldwide, and it is performed for various surgical diseases, including gastrointestinal cancers. The decrease in postoperative pain, the shorter hospital stay, the earlier return to work, and the cosmetic benefits need no additional evidence [1].

Many ways for foreign bodies to enter the liver have been described: the most frequent from the gastrointestinal tract: i) after swallowing, both by accident or intentionally, ii) percutaneous, after

penetration through the abdominal or thoracic wall, iii) iatrogenic, after operation or examination, or iv) through the bloodstream, which is very rare. Migration of an ingested needle to the liver is nevertheless very uncommon [2].

This case report highlights the removal of a syringe needle, which after ingestion had migrated into the right liver lobe parenchyma, using single-incision laparoscopic surgery, demonstrating the utility of this technique to easily and usefully resolve [3] a dangerous and potentially fatal condition [2].

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Case report

We report the case of a 41-year-old male inmate admitted to the First Aid Service of a tertiary hospital in June 2011 for right upper quadrant pain. He then admitted that two weeks earlier, during a routine medical examination, he had ingested two syringe needles. Until the day of admission to the hospital, he was completely asymptomatic, and at the first physical examination in the emergency room, no signs of peritonitis were recorded. Blood tests, including leucocyte count and C-reactive protein (CRP), were normal and showed no signs of systemic inflammation.

An initial abdominal supine X-ray showed the profile of a needle in the right hypochondrium, and a computed tomography (CT) scan was then performed (Photo 1 A). The CT scan showed a linear density at the edge of the right lobe of the liver with a mild surrounding inflammation secondary to the presence of a foreign body. The existence of a second ingested object, with a pointed form near the apex

of the twelfth rib, became manifest after three-dimensional reconstruction of the CT scan (Photo 1 B).

It was assumed that the transfer of the needle to the liver had occurred through either the lesser curvature of the stomach, or more likely through the wall of the second and third part of the duodenum. This part of the duodenum is almost entirely retroperitoneal, and the superior and inferior flexures could act as obstacles for the needle.

The removal of the foreign body was considered necessary due to the risk of complications such as hemorrhage, peritonitis, infection or digestive fistula formation [4].

A single dose of antibiotic prophylaxis was given. Under general anesthesia in the supine position, a 2.5-cm long incision under the umbilicus was performed, a subcutaneous tunnel was shaped and a multifunctional laparoscopic port was inserted. After the induction of pneumoperitoneum, three trocars with a 5 mm diameter were placed into the single-incision laparoscopic surgical (SILS) port. The first

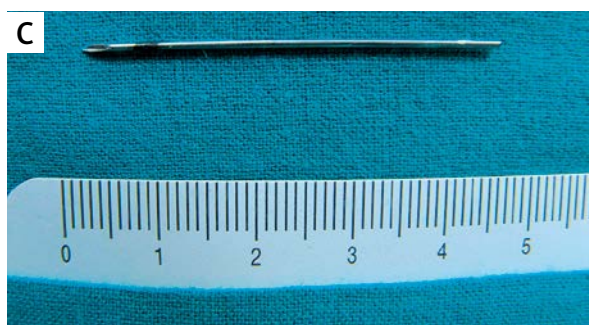
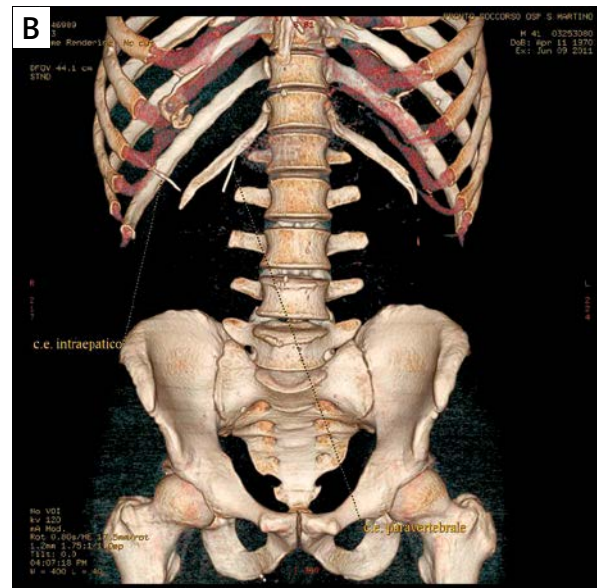
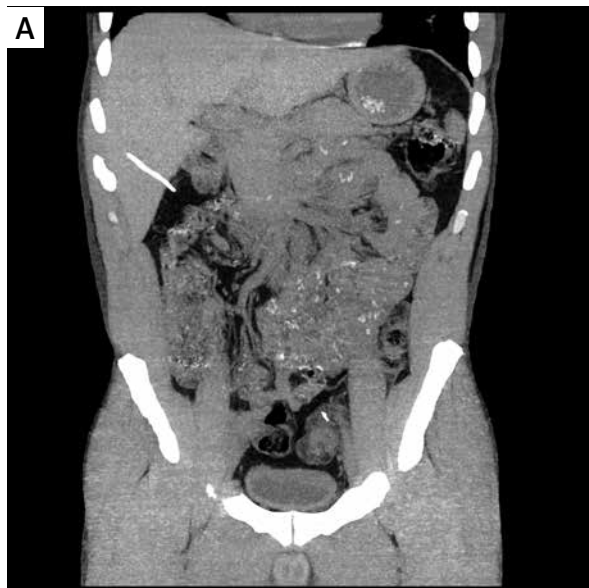


Photo 1 A–C. Extraction of a foreign body in the liver using single incision laparoscopic surgery: a new application for minimally invasive surgical procedures

exploration of the abdominal cavity was negative for the detection of severe adhesions or foreign bodies. The whole supramesocolic space was covered by the greater omentum, and there were no physical signs of inflammatory reactions. After gently moving the greater omentum to the left, some adhesions between the liver and the second and third part of the duodenum, confirming the migration route of the needle, could be visualized. After careful adhesiolysis, without any injury to the duodenal wall, the 4.5 cm long needle was recognized penetrating into the liver parenchyma. Without any bleeding, the needle was extracted using a laparoscopic grasper (Photo 1 C).

The fascial layer of the abdominal incision was closed and the skin was sutured using a buried suture. The surgical time was 45 min, and there was no blood loss. Three days after surgery the patient was fully recovered and discharged from the hospital. He then returned to prison and spent a few more days being monitored in a medical facility inside the prison. The other foreign body, trapped inside the soft tissues of the abdominal wall close to the twelfth rib, was left in its position due to the absence of symptoms.

Discussion

Ingestion of foreign bodies are most frequent during infancy and early childhood, particularly between 6 months and 3 years of age, and also in patients with psychiatric disease. But also inmates may ingest foreign bodies, mainly in order to obtain permission from prison [5, 6].

About 80–90% of the ingested bodies pass through the intestinal tract without problems and are later expelled in the feces. Of the remaining 10–20%, the majority can be handled by endoscopic extraction from the upper digestive tract, and less than 1% of the patients ultimately need surgery. Perforation of the gastrointestinal tract and the subsequent migration of the foreign body to abdominal organs is possible but extremely rare [2].

Bowel perforations have been described in all segments of the gastrointestinal (GI) tract but predominate in areas of angulation or narrowing, such as the duodenum, the ileocecal valve, the appendix or the recto-sigmoid segment. The majority of patients ingesting foreign bodies have no symptoms at all, but when presenting clinically, the most common symptoms are hemorrhage, bowel obstruction or

peritonitis. Other occult presentations include X-ray findings such as the presence of a foreign body, thickening of GI wall areas or free intraperitoneal air. Other foreign bodies are identified en passant during laparotomy or laparoscopic procedures [7].

Before conducting surgery to remove a foreign body, it is fundamental to have a high-quality radiological work-up to gain knowledge about the exact location of the foreign body. For this aim, a CT scan with three-dimensional reconstructions can be very helpful. The decision to administer enteral contrast must be carefully considered. If the foreign body is made of metal, enteral contrast may be counterproductive, but for non-metal foreign bodies, enteral contrast may facilitate and help visualize a filling defect within the GI tract [7].

This is the second case report in the literature about the removal of an ingested foreign body using SILS. In 2011, Hara *et al.* published a case report where an incidentally discovered needle was extracted from the abdominal cavity [8]. Even though the traditional surgical management of bowel perforations due to foreign bodies entails the execution of an explorative laparotomy, the laparoscopic technique is nowadays an important alternative approach. Without doubt, laparoscopic procedures benefit from reduced morbidity and postoperative pain, earlier return to daily activities, lower incidence of postoperative hernias as well as improved cosmetics [8, 9]. Single-incision laparoscopic surgical (SILS) technique is widely applied in the surgical treatment of adrenal lesions and for appendectomies, cholecystectomies and also in bariatric procedures such as gastric banding and sleeve gastrectomies [1, 10, 11].

Conclusions

Even if a high grade of surgical skill is required to safely perform SILS surgery, this technique can be very useful and perfectly suitable for the removal of intra-abdominal foreign bodies.

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Conflict of interest

The authors declare no conflict of interest.

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