



# Endoscopic Removal of an Embedded Foreign Body Using Fluoroscopy

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Cases of foreign body ingestion are frequently seen in gastroenterology. However, it is not common for the foreign body to be located in the submucosa, which obscures it from view, even during endoscopy. A 74-year-old woman visited the emergency room 10 days after swallowing an implant screw during an implant procedure at a dental clinic. Abdominal CT revealed a 14-mm-long radio-opaque screw in the posterior wall of the proximal body of the stomach. On endoscopy, the screw was not observed in the stomach; however, fluoroscopic examination revealed that it was located under the mucosa of the posterior wall of the proximal body of the stomach. The screw was grasped using alligator forceps and retrieved. There was no evidence of perforation on chest radiography. Herein, we present a case wherein a foreign body embedded under the mucosa was removed. (**Korean J Helicobacter Up Gastrointest Res 2022;22:231-234**)

**Key Words:** Endoscopy; Fluoroscopy; Foreign bodies

## INTRODUCTION

Foreign body ingestion are seen frequently in the field of gastroenterology.<sup>1</sup> When ingested foreign bodies do not pass through the gastrointestinal tract spontaneously, endoscopic removal is recommended within 24 hours.<sup>2,3</sup> Several grasping devices, such as the rat teeth and alligator jaw graspers, net retriever, snare, and retrieval basket, are commonly used to remove foreign bodies. However, if the foreign body is sharp or needle-like, over-the-scope devices such as foreign body hood protectors, banding device caps, friction-fit caps, or endoscopic overtubes are usually used to protect the mucosa or airway during endoscopy.<sup>4</sup> Sharp foreign bodies such as fish bones increase the risk of submucosal migration, which can lead to serious complications, including stricture formation, esophageal perforation, tracheoesophageal fistulas, and aortoesophageal fistulas. If the diagnosis is delayed, these complications can even be fatal.<sup>5</sup>

In most cases, foreign bodies remain in the visible space

of the stomach and can be removed using esophagogastroduodenoscopy (EGD). However, no prominent guidelines or solutions are established for treating foreign bodies buried within the mucosa. In this case report, we introduce fluoroscopy-guided endoscopic removal of a buried foreign body.

## CASE REPORT

A 74-year-old woman visited the emergency room 10 days after swallowing a foreign body (implant screw) during an implant procedure at a dental clinic. On arrival, the patient was asymptomatic, and her vital signs were stable: blood pressure, 140/70 mmHg; heart rate, 79 beats per minute; respiratory rate, 20 breaths per minute; and body temperature, 36.4°C. The patient was alert and well-oriented. Her bowel sounds were normal, with no abdominal tenderness. Laboratory examination results were unremarkable. Chest radiography revealed the presence of a screw in the epigastric area (Fig. 1A).

Abdominal CT revealed a 14-mm-long radiopaque screw in the posterior wall of the proximal body of the stomach (Fig. 1B, C). As there was no evidence of gastric perforation on physical and radiological examinations, emergency EGD using a single-channel endoscope (PENTAX EG29-i10c,

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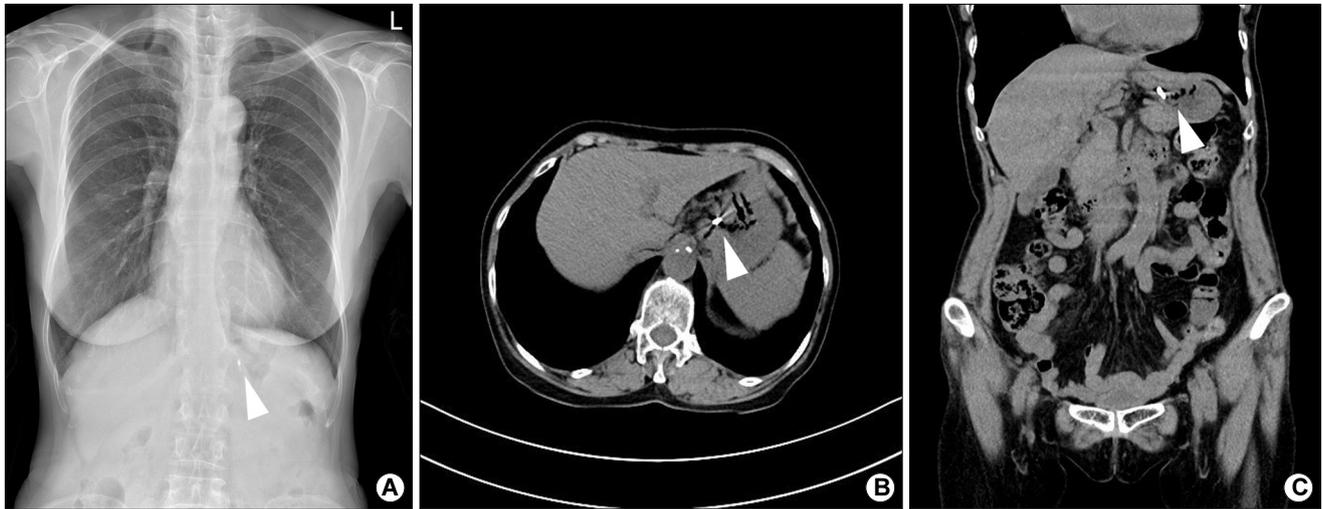
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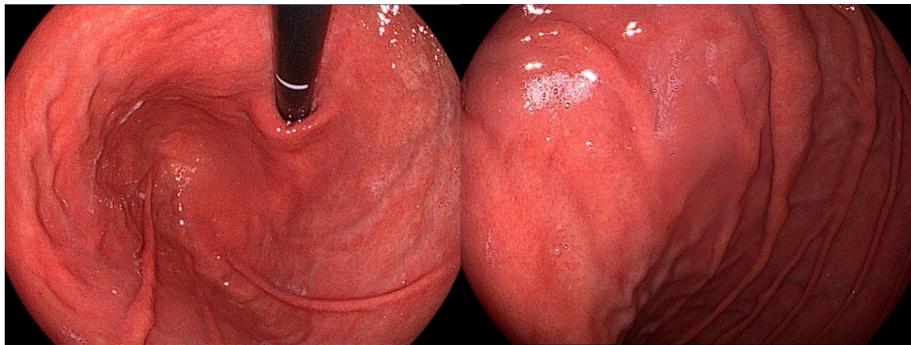
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HOYA Corporation, Tokyo, Japan) was performed 1 hour after arrival. In the endoscopic view, the screw was not observed in the stomach (Fig. 2).

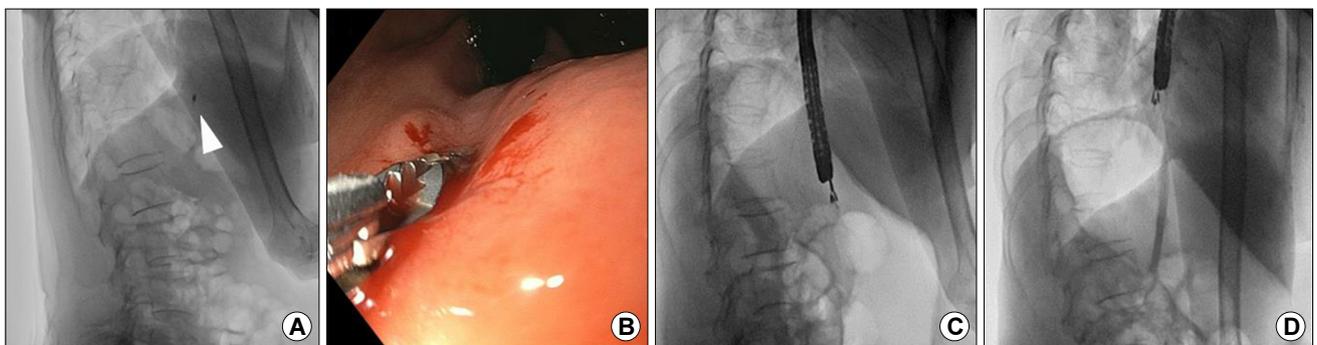
We planned an EGD under fluoroscopic guidance on the next day, to precisely identify and remove the screw, owing to the high associated risk of gastrointestinal injury



**Fig. 1.** Radiological confirmation of the location of the foreign body (arrowhead). (A) The screw is noted in the epigastric area on the chest X-ray. (B) The screw is embedded in the gastric mucosal layer at the posterior wall of the proximal body on nonenhanced abdominal CT axial view. (C) The embedded screw is observed on abdominal CT coronal view.



**Fig. 2.** The screw is not identified using esophagogastroduodenoscopy.



**Fig. 3.** (A) On fluoroscopic examination, the screw (arrowhead) is identified in the upper area of stomach. (B) The screw in the gastric mucosal layer is retracted using alligator forceps. (C, D) The screw is retrieved from the stomach using a biopsy forceps.

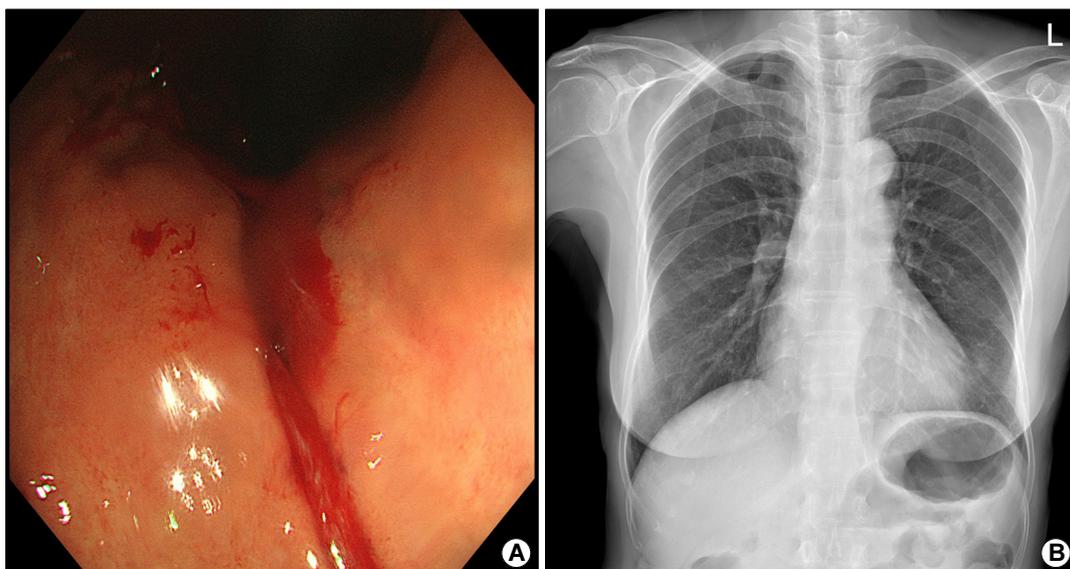
and perforation. Fluoroscopic examination revealed that the screw was located under the mucosa of the posterior wall of the proximal body of the stomach (Fig. 3A). After approaching the foreign body with forceps under fluoroscopy, the surrounding mucosa was pressed using the tip of the forceps to locate the buried foreign body. Finally, we localized the screw and grasped it under the mucosa using the forceps (Fig. 3B). Then, the mucosa over the screw was removed using forceps. Subsequently, we located the screw, grasped it using alligator forceps (Olympus Co., Tokyo, Japan), and retrieved it from the stomach using biopsy forceps (Fig. 3C, D). The screw had a sharp point on its side; minimal bleeding occurred after removing the screw (Fig. 4A). On admission, the patient underwent intensive proton pump inhibitor therapy with fasting. Chest radiography showed no evidence of perforation (Fig. 4B), and the patient's vital signs remained stable. After 2 days of therapy, the patient was discharged from the hospital. We recommended that she visit the outpatient clinic after a week; however, the patient did not show up for follow-up.

## DISCUSSION

Here, we present a case of embedded foreign body detection using fluoroscopic imaging. The foreign body

was removed successfully via endoscopy using alligator forceps under fluoroscopic guidance. No complication occurred during or after the procedure. Most ingested foreign bodies pass through the digestive tract without any complication. Usually, 10~20% of patients require non-operative intervention, and only a small proportion (<1%) require surgery.<sup>6</sup> Endoscopy-based methods are considered the treatment of choice for removing ingested foreign bodies in the upper gastrointestinal tract.<sup>7,8</sup> However, embedded foreign bodies cannot be removed via conventional endoscopic methods when the object cannot be detected by conventional EGD.<sup>9</sup> It is difficult to detect a buried foreign body with conventional EGD. Nonetheless, embedded foreign bodies should be removed as soon as possible, because early diagnosis and endoscopic intervention can reduce the incidence of potential complications.

Generally, an abdominal CT scan is the gold standard strategy to detect foreign bodies and adjacent vital blood vessels or organs.<sup>10</sup> However, even if the foreign body is detected through CT, it is difficult to access the location through endoscopy. As the stomach is constantly moving and its size changes during endoscopy, the position of the foreign body at the time of endoscopy may have changed. During endoscopy, fluoroscopic guidance can be an option for localizing and removing foreign bodies.



**Fig. 4.** (A) After removing the screw, bleeding is noted. (B) Free air is not observed in chest X-ray.

Although there is no definite treatment consensus for embedded foreign body removal, some studies have reported that foreign bodies in the esophagus can be removed by endoscopic submucosal dissection (ESD).<sup>11</sup> ESD might be useful in removing foreign bodies embedded in the deep submucosa. However, the procedure requires a wide range of mucosal incisions. A few studies have reported emergent and safe endoscopic removal of foreign bodies using fluoroscopic guidance.<sup>12</sup> This is an unusual case report of successful removal of an embedded foreign body using fluoroscopy-guided endoscopy without any complications. We strongly recommend using EGD under fluoroscopy if the X-ray impermeable material cannot be seen through the endoscope or if it cannot be localized to the site of the material.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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