

# **Foreign bodies in the gastrointestinal tract: the role of Imagiology in accurate diagnosis and treatment management**

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# Learning Objectives

- To illustrate the spectrum of imaging findings resultant of foreign bodies (FB) in the gastrointestinal tract on the several imaging modalities, namely conventional radiology, ultrasound (US) and computed tomography (CT).
- To discuss advantages of imaging methods.

# Background

FB are uncommon findings but remain an important reason for attendance at emergency department.

FB may be ingested, inserted into a body cavity or deposited into the body by a traumatic or iatrogenic injury. Most of them pass uneventfully or represent only mild mucosa injury. Nevertheless, perforation, bowel obstruction, fistula, bleeding, abscess formation and peritonitis may occur, depending on the type and size of the object.

Accidental insertion occurs mainly in elderly, pediatric population, persons with decreased palatal sensitivity, patients with psychiatric disorders and drug addicts, whereas intentional episodes usually occur in mentally handicapped, drug traffickers and prisoners.

# Background

Because many patients who have swallowed FB without knowledge when symptoms occur, physicians must maintain a high index of suspicion.

Radiologists have a very important role in revealing the presence, dimension, nature and relationship with anatomic structures of a FB, thus enabling the best therapeutic choice.

# Imaging Findings OR Procedure Details

Using iconographic material from our department of the last 10 years, we illustrated and collected the plain abdominal radiography, US and abdominopelvic CT, showing various complications of FB.

We have made a selection of the cases according to the rarity of the diagnosis or the complications caused.

Our hospital medical records were screened retrospectively and the FB were classified according to the mode of introduction:

- Ingestion;
- Insertion (transrectal);
- Iatrogenic.

# FB ingestion

## Incidence

The reported incidence of FB causing perforation of the gastrointestinal tract is less than 1%, with the objects being elongated or sharp in most of the cases, such as toothpicks, pins, fish or chicken bones.

## Complications

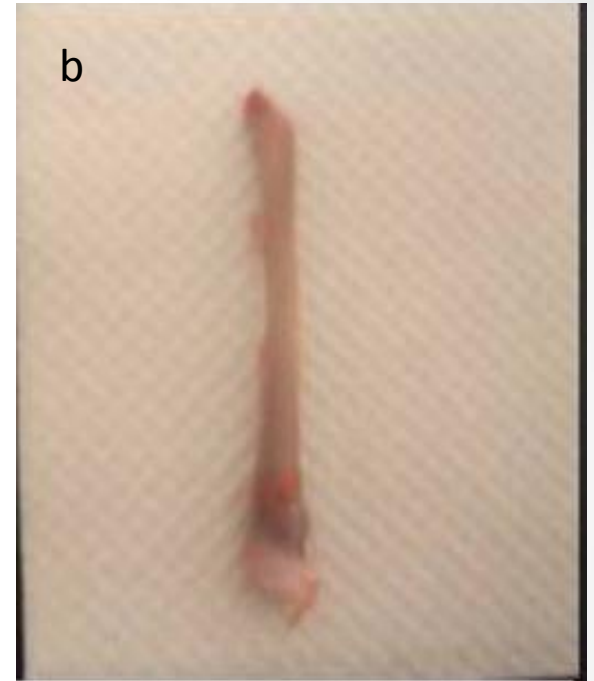
- Mechanical obstruction - FB frequently lodge at areas of anatomical narrowing, physiological angulation or areas of pathological structures. Ingested objects are usually elongated and became trapped in the duodenum, appendix or ileocecal valve. Spherical or cylindrical objects tend to be large and impact in the esophagus or pylorus.
- Perforation - The most common sites for perforation are the lower esophagus, duodenal loop, appendix, ileocecal valve and the recto-sigmoid region.
- Fistula, abscess, peritonitis or generalized septicemia – usually as a result of perforation

# FB ingestion

## Diagnosis

For the study of FB in gastrointestinal tract it is very important to select the most appropriate imaging modality.

- **Radiograph** detects as much as 80% of all FB. Objects of metal (except aluminum), most animal bones and glass are opaque on radiographs, unlike fish bones. Objects composed of plastic and most fish bones are radiolucent structures and their diagnosis may be challenging.
- **US** is the method of choice in the diagnosis of a FB that migrated from the gastrointestinal tract and retained in the soft tissues.
- **CT** scanning is helpful as it identifying a high density FB and its complications. The region of perforation may appear as a thickened local segment, associated with localized pneumoperitoneum, regional fatty infiltration and eventually associated intestinal obstruction.

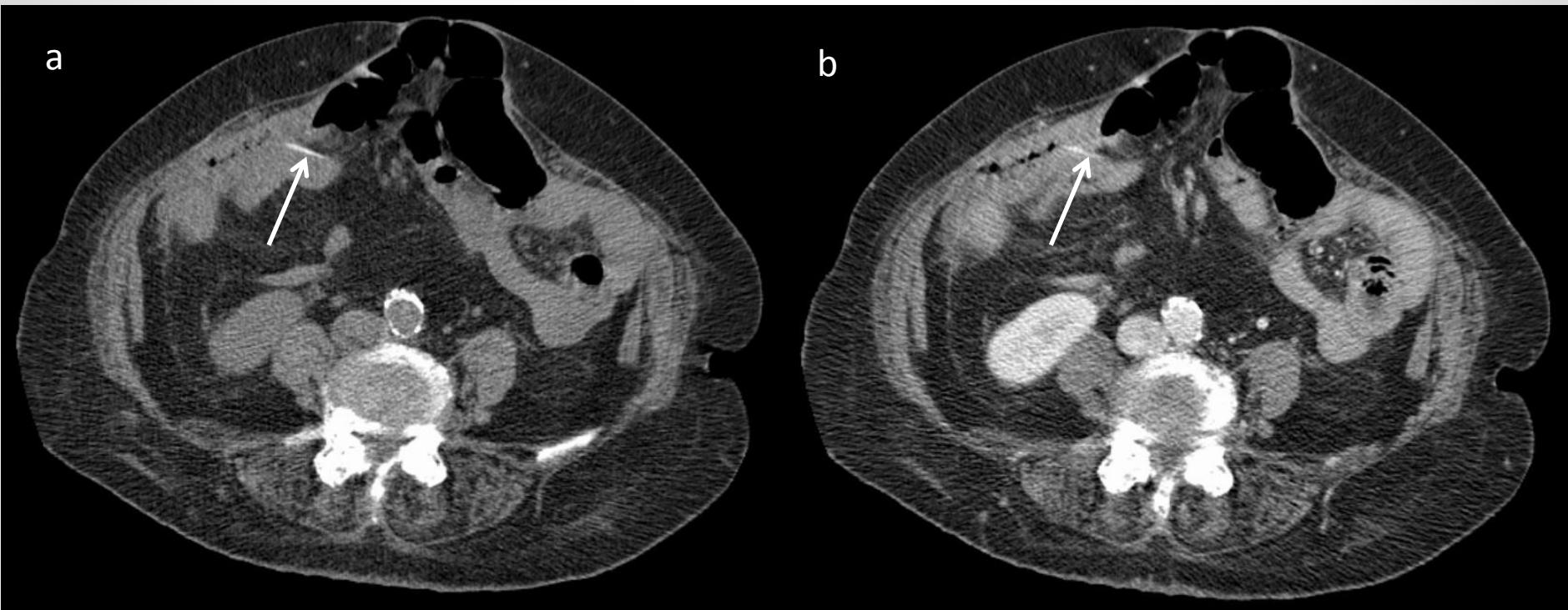


**Fig.:** 1 a) Abdominal US - Chicken bone with 5cm, perforating an intestinal loop. Laparotomy revealed incarcerated incisional hernia, perforated by bone. b) Chicken bone.

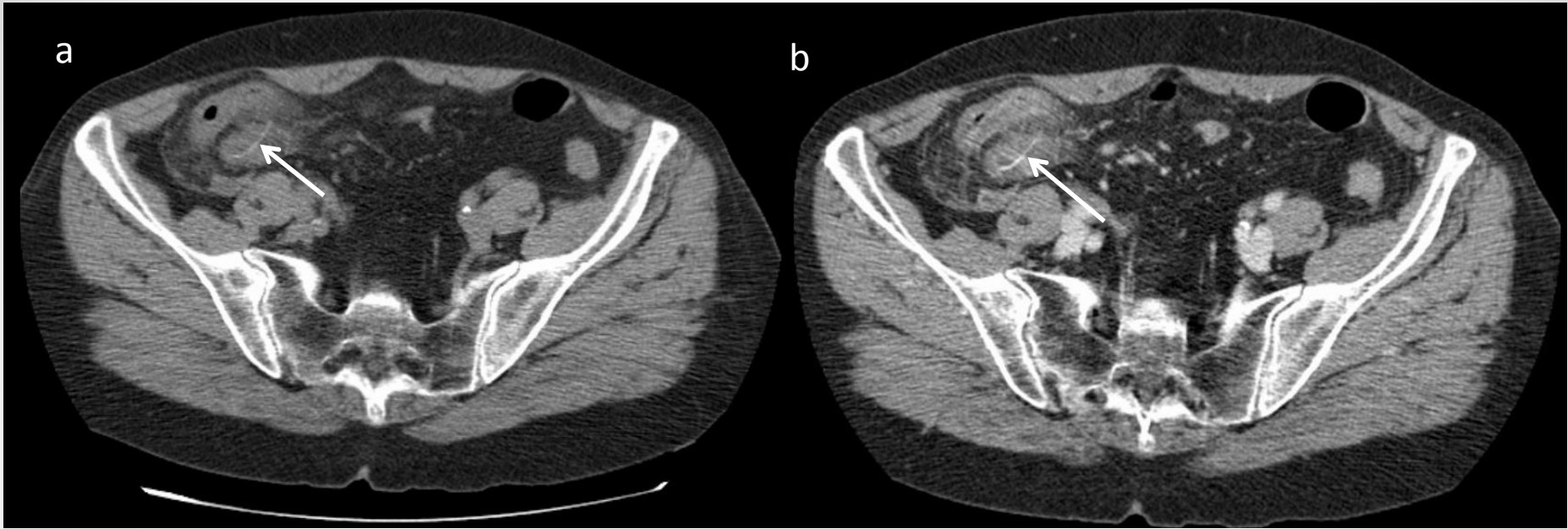




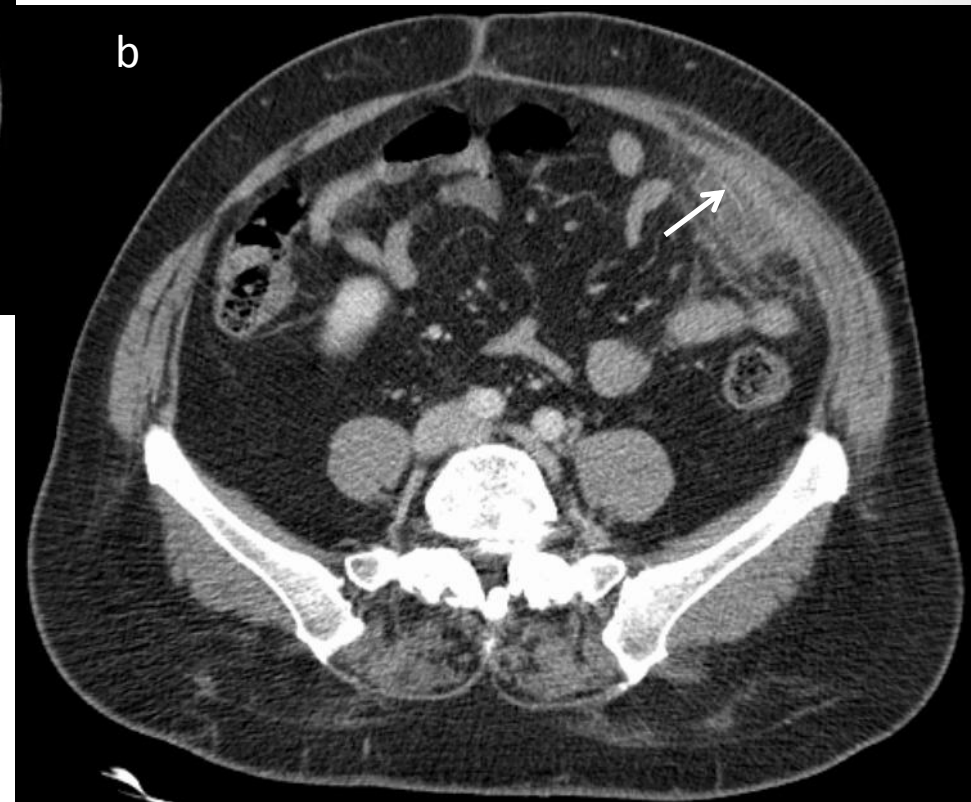
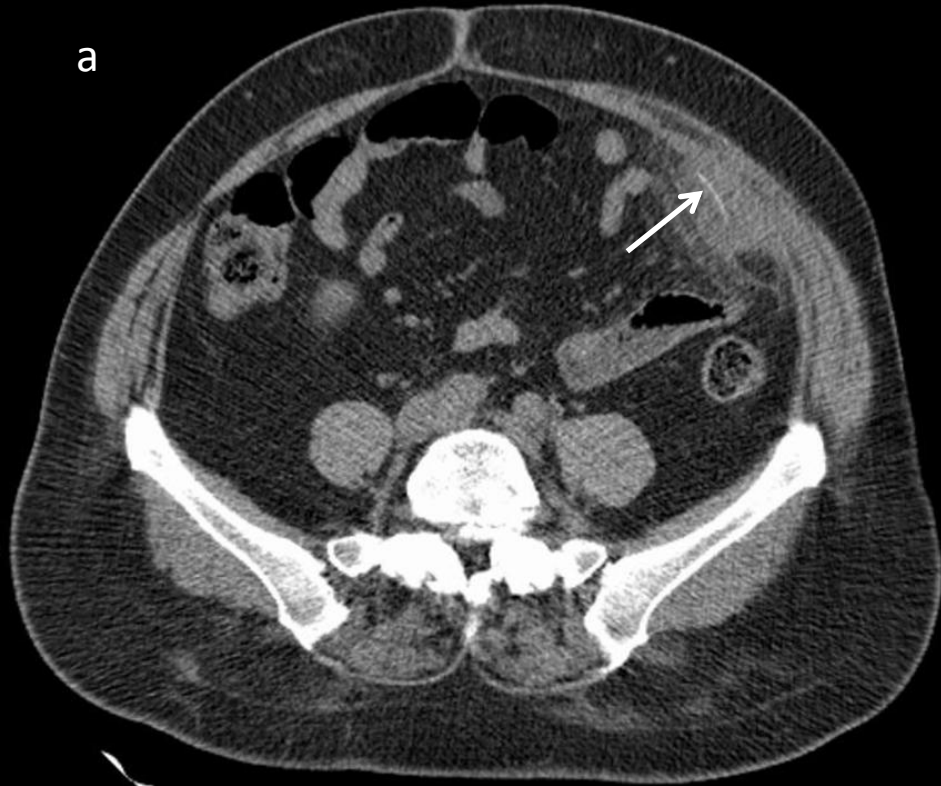
**Fig.:** 2 a, b, c) Abdominopelvic CT - Cherry pits impacted in the sigmoid colon and rectum causing intestinal occlusion. Surgical transanal remotion complicated by a scrotal-rectal fistula.



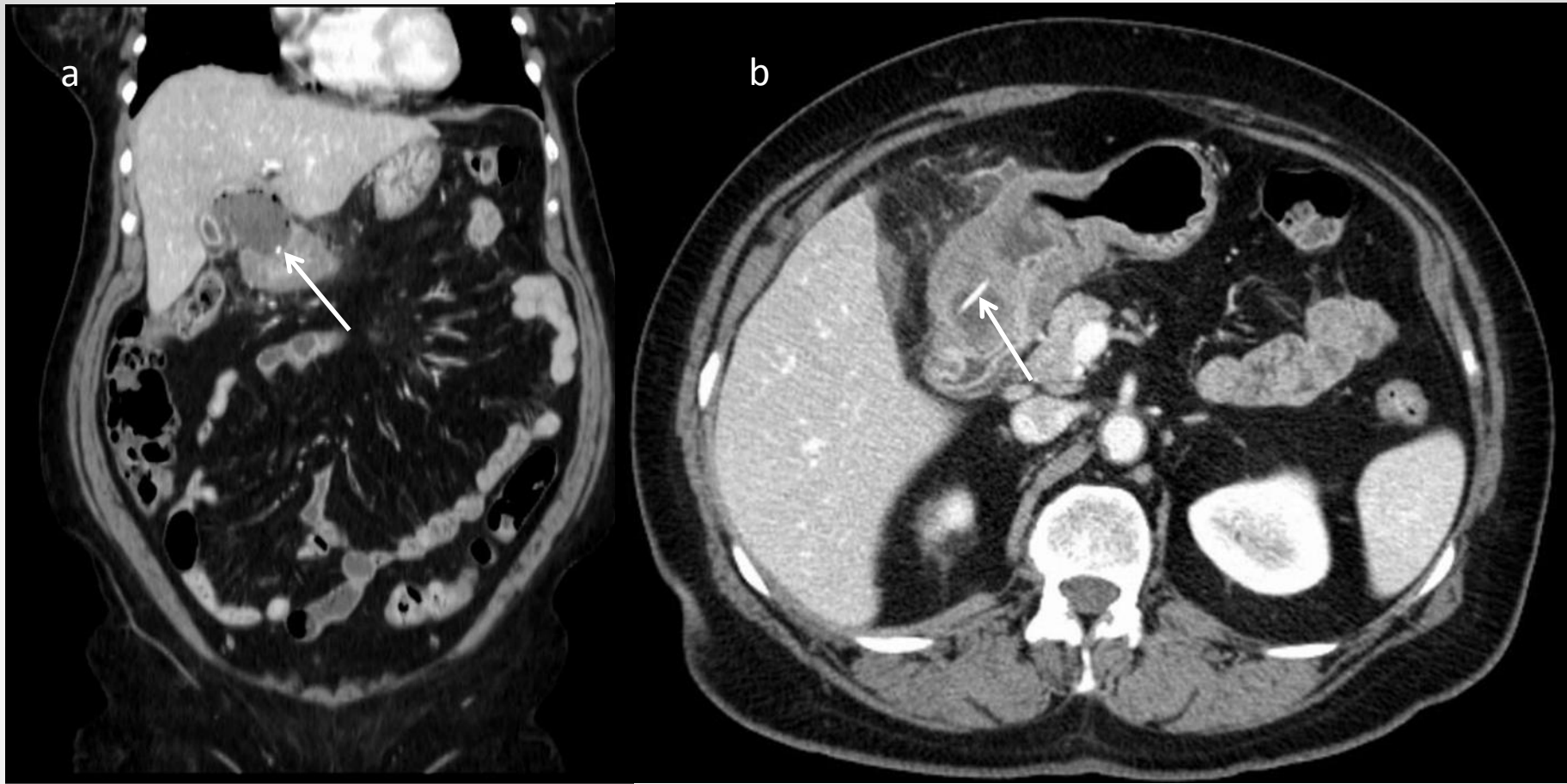
**Fig.:** 3 a, b) Axial CT images – Toothpick causing perforation of the terminal ileum. Performed enteroraphy.



**Fig.:** 4 a, b) Axial CT images – Fish bone in Meckel's diverticulum. Wall thickening associated with a marked increased density of mesenteric fat, resulting inflammatory process. Meckel's diverticulectomy.



**Fig.: 5** a, b) Axial CT images – Fish bone causing perforation of the bowel. Increase the density of fat by inflammatory process, involving the abdominal wall. Performed segmental resection of the small bowel.



**Fig.:** 6 a, b) Abdominopelvic CT images – Fish bone between D1 and the underside of the liver, without evidence of perforation. A hepatic abscess secondary to fish bone penetration of the gastric wall. Surgical drainage of abscess.

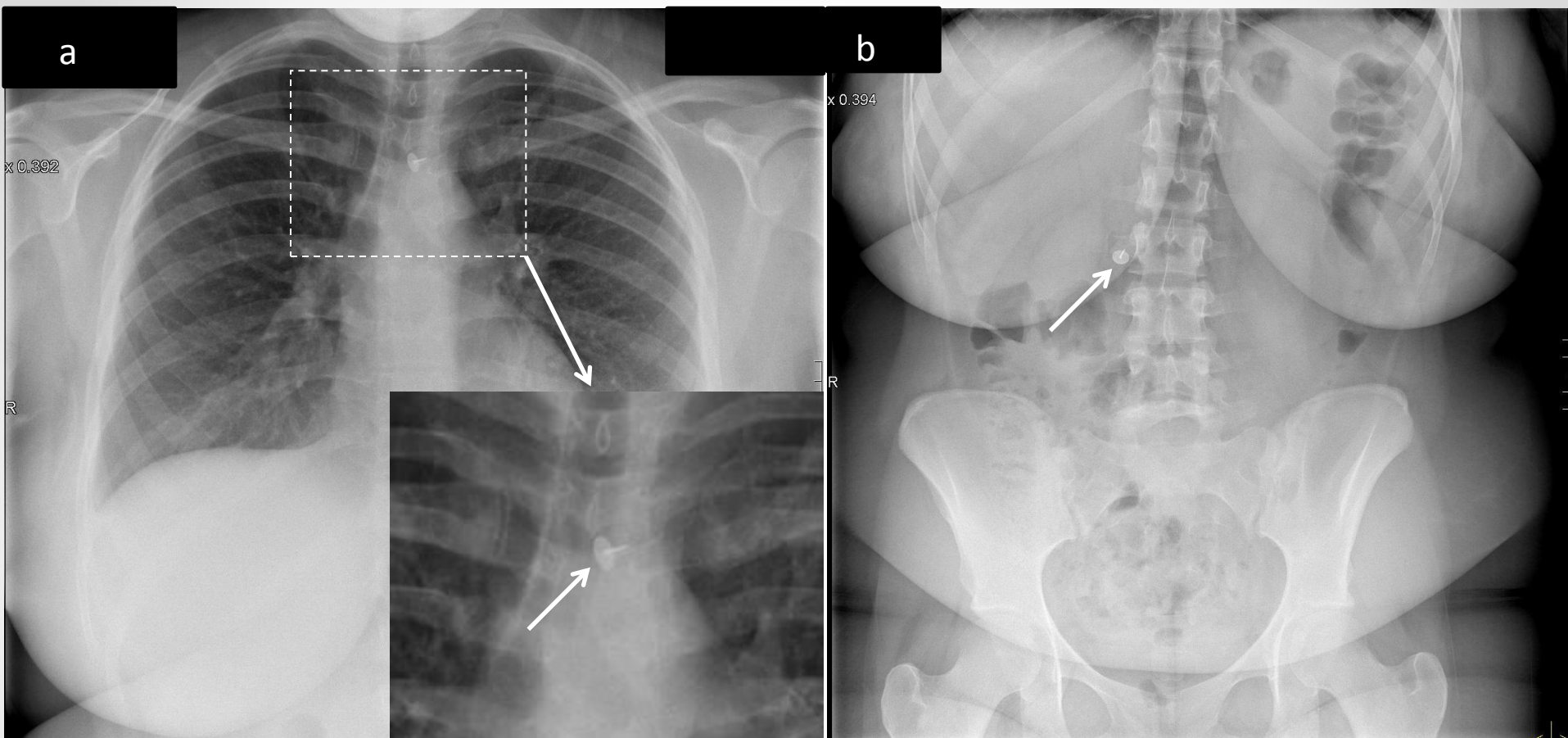




**Fig.:** 7) Axial CT image - Fish bone in cecum with wall thickening. Performed conservative medical treatment.



**Fig.: 8)** Radiograph  
Batteries and other alongated  
metallic FB in the gastrointestinal  
tract, ingested by prisoner to leave  
jail.

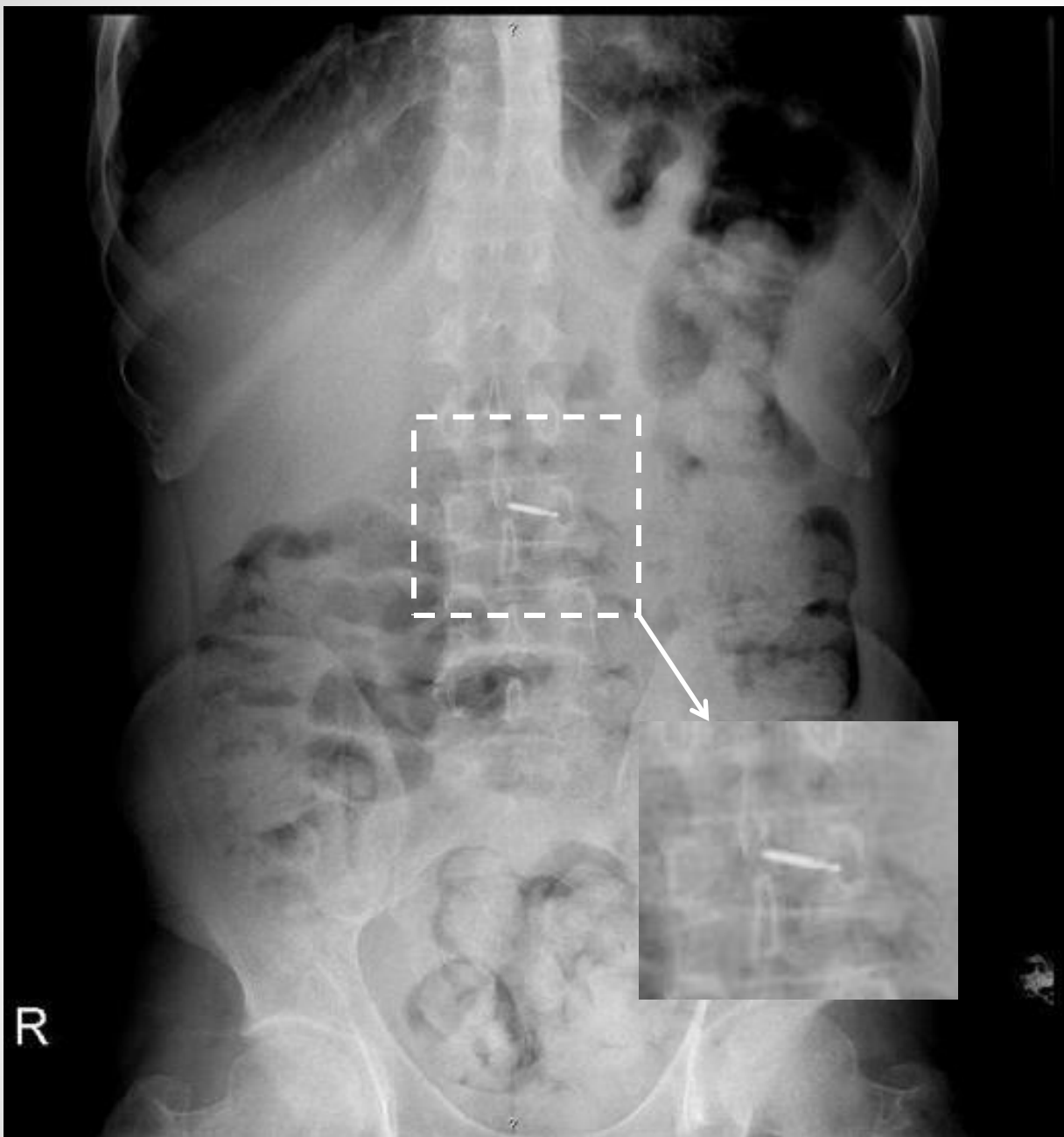


**Fig.:** 9 a, b) Radiographs – Sequential radiographs showing one pin in gastrointestinal tract, ingested by a schizophrenic woman.





**Fig.:** 10) Radiograph demonstrated multiple nails in gastrointestinal tract, ingested by prisoner to leave jail.



**Fig.: 11)** Radiograph showing dental drill in gastrointestinal tract, after dental treatment, ingested by prisoner to leave jail.

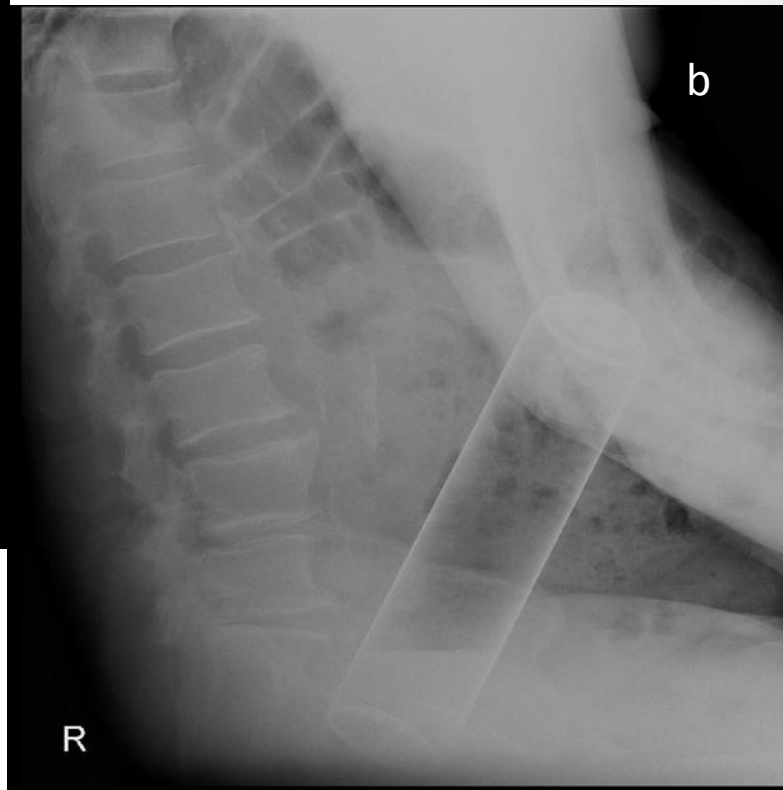
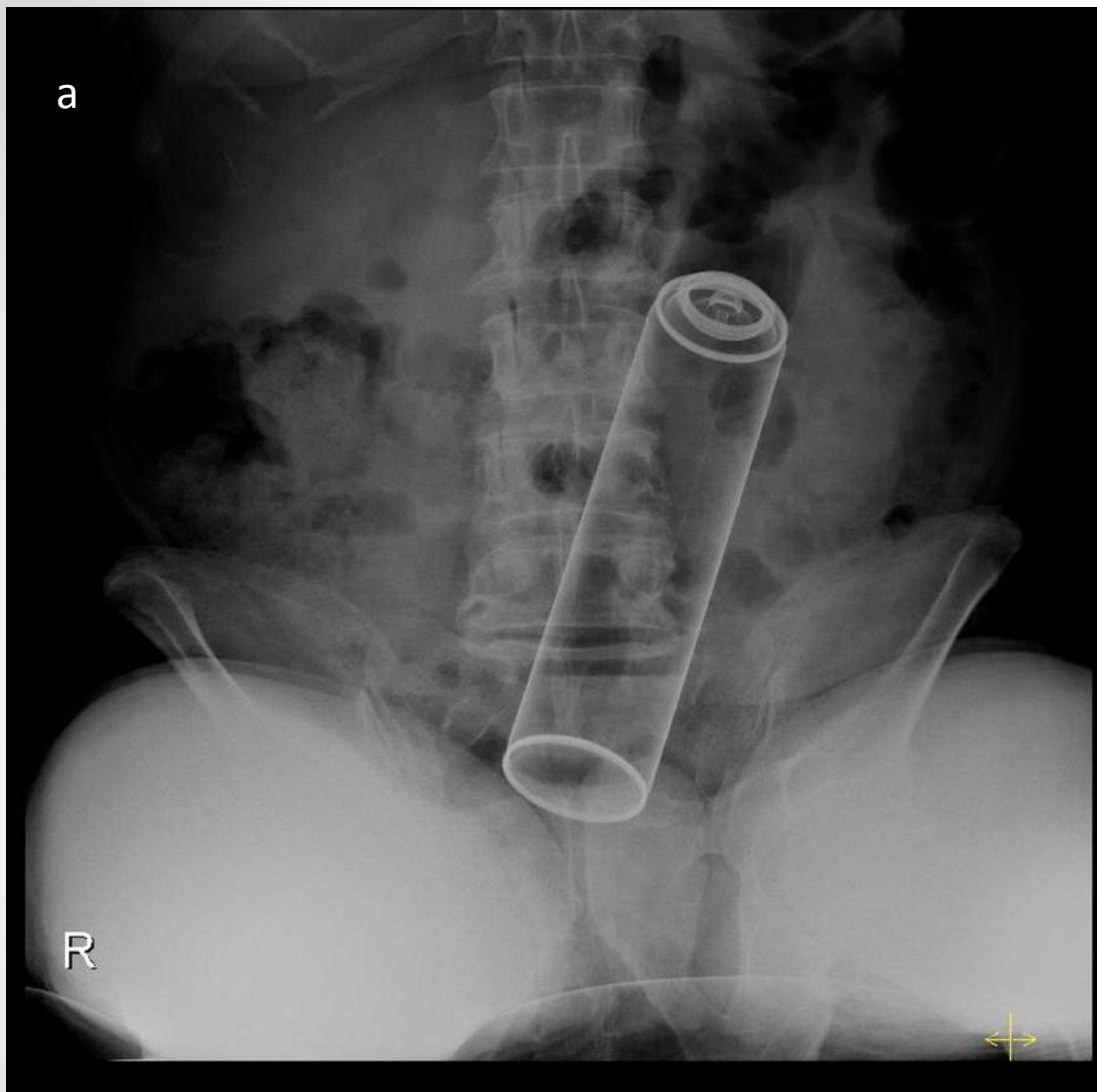
# FB insertion

Voluntarily inserted FB into the various orifices can be due to several reasons including sexual pleasure or curiosity. Typical locations include the rectum, nose, genitourinary tract and ear.

Introduction into the rectum may be through self-insertion and imaging modalities are fundamental in evaluating the location, size of the FB and possible complications. The plain pelvic radiograph is simple, accessible and easily repeatable.



**Fig.:** 12) Radiograph - glass perfume bottle in the rectum of a 48-year-old man.

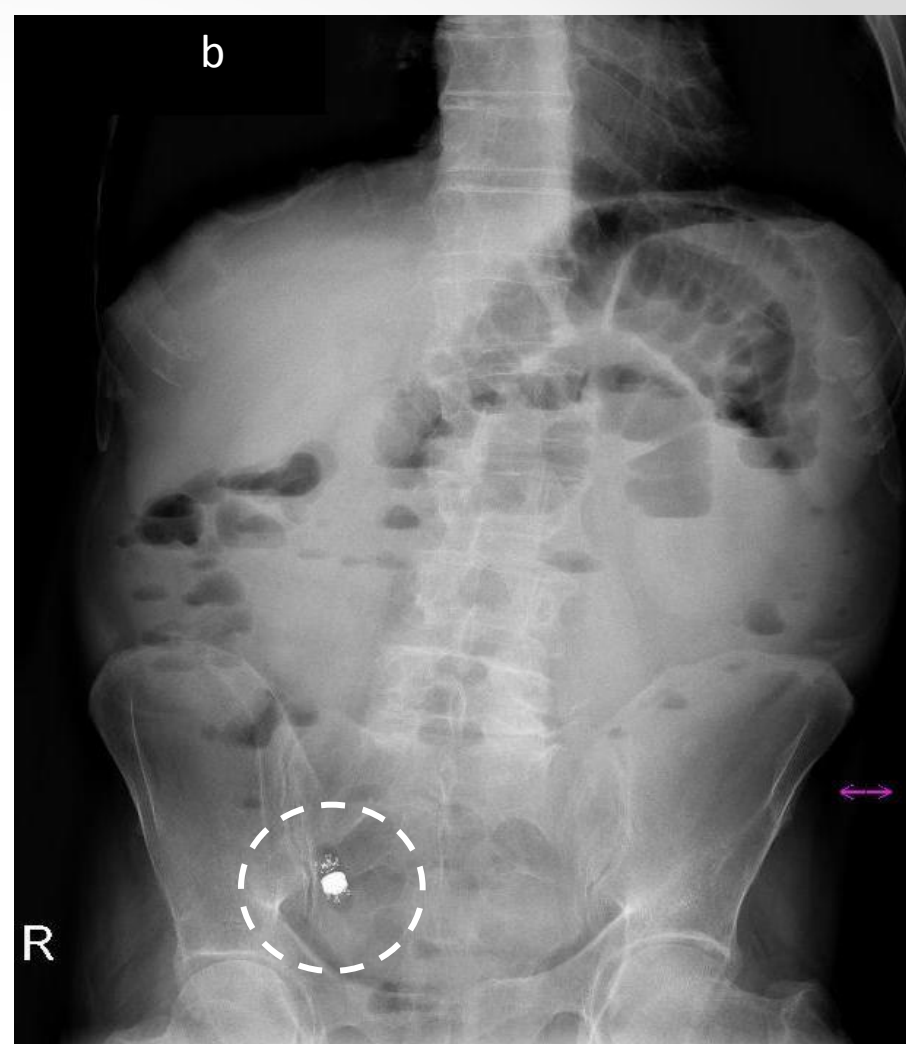
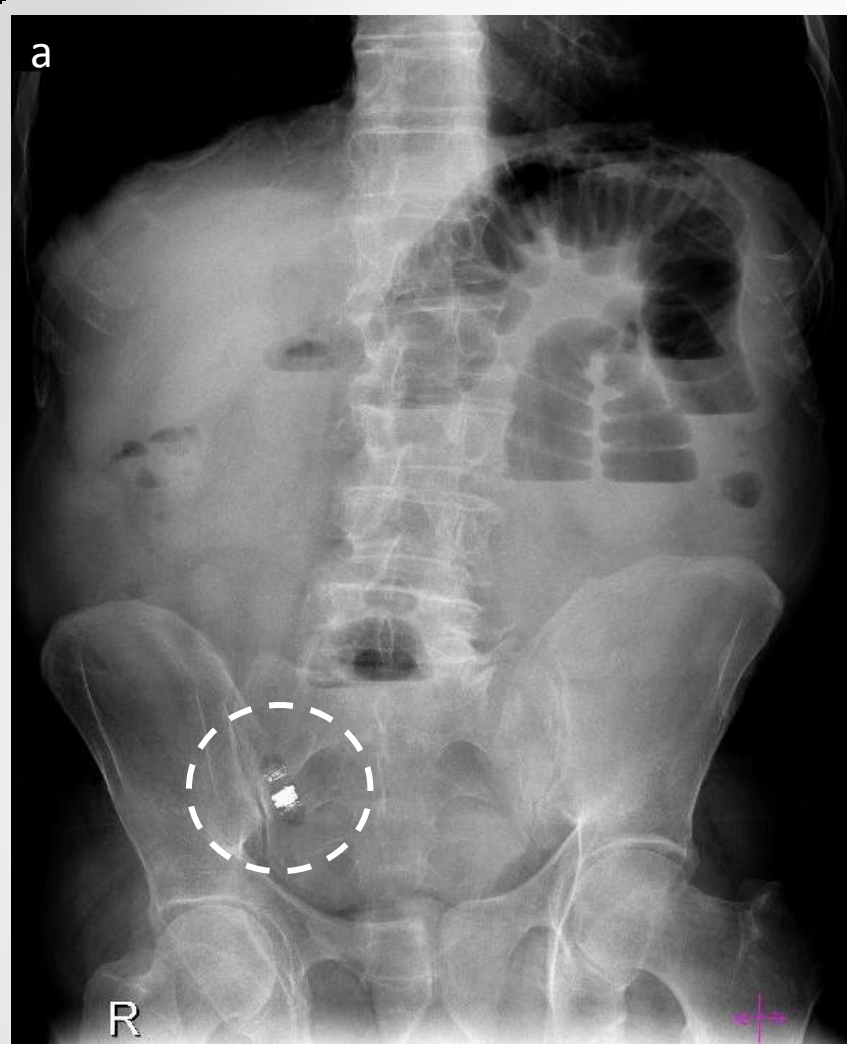


**Fig.:** 13 a, b) Radiographs of a 77-year-old man demonstrates an inserted metallic deodorant in the rectum. Removal FB under sedation.

# Iatrogenic procedures

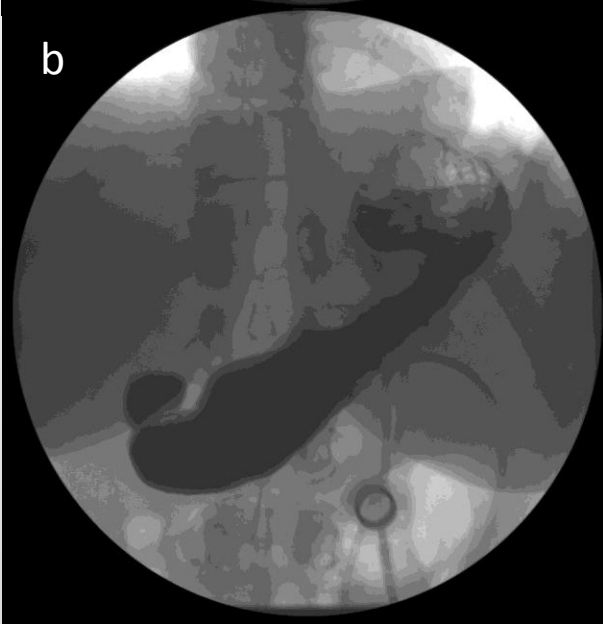
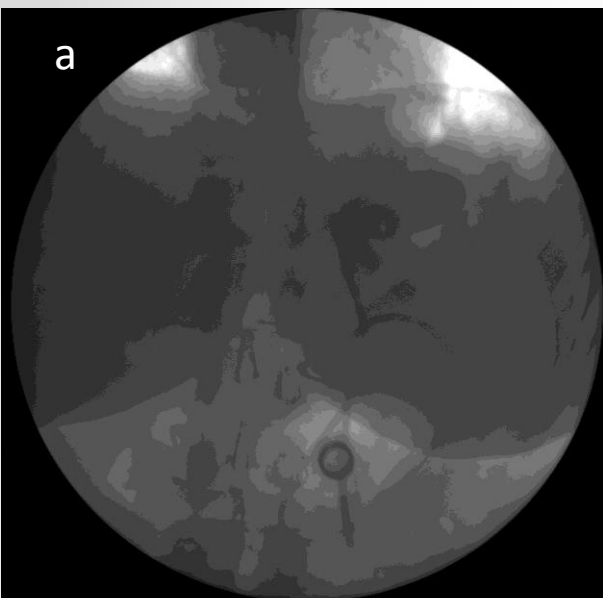
Numerous medical devices are found in everyday practice by almost all radiologists. Some, are used to monitor a patient's condition others have therapeutic uses.

The most suitable method of removing the FB depends on the size and mobility of the object applied and associated complications. When possible, endoscopic and minimal invasive techniques of removal should be used.

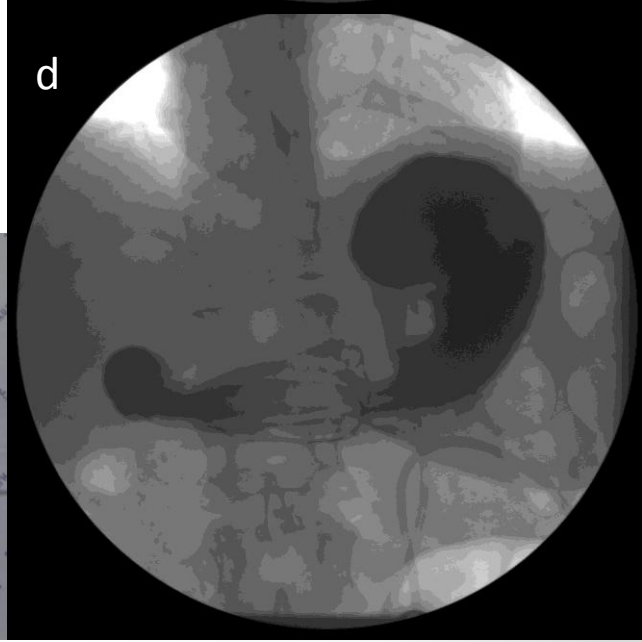
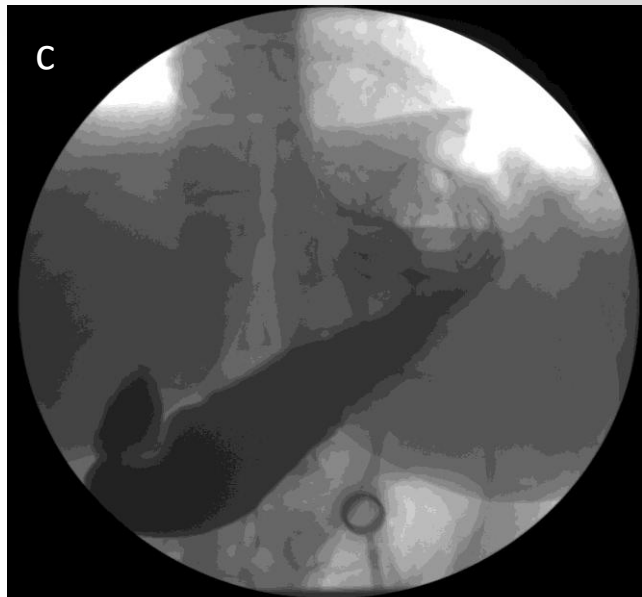


**Fig.:** 14 a, b) Initial and 3 hours later radiographs showing a video capsule stuck in the small bowel, causing intestinal obstruction. Ileocecal resection with ileocolon anastomosis.





**Fig.: 15** a, b, c, d) Esophageal and gastro-duodenal transit showing intragastric migration of the gastric-band. Cutting the band under endoscopic procedure. Removal of the band with polypectomy loop.





# Conclusion

Imaging methods are of paramount importance in identifying and locating the foreign bodies in the gastrointestinal tract, allowing selecting the best therapeutic option, namely conservative, endoscopic, laparoscopic or open surgical methodologies.

It is very important for any radiologist to be aware of the typical imaging findings of foreign bodies to select the most appropriate imaging modality for their detection, depending on their nature.

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