



Foreign body penetrating duodenum into kidney: A case report

Yikui Zhang, Xiaofu Qiu^{*}, Bote Chen

Department of Urology, Guangdong Second Provincial Hospital, Guangzhou, China

ARTICLE INFO

Keywords:

Foreign body
Penetrating renal injury
Duodenal perforation
Endoscope

ABSTRACT

The case of penetrating injury of the kidney caused by a foreign body mistakenly swallowing through the duodenum is rare. A 22-year-old male patient found that a strip of the foreign body penetrated the descending duodenum - the lower pole of the right kidney through an abdominal CT examination. After Multi-Disciplinary treatment, the patient underwent extracorporeal ultrasound-assisted endoscopic foreign body removal and hemostatic clamp suture. Extracorporeal ultrasound monitoring and intravenous pyelography showed that there was no leakage of contrast medium around the right kidney. No hematuria and urinary tract infection were found during the follow-up.

1. Introduction

Renal foreign bodies are foreign bodies that occur in the renal parenchyma or renal pelvis, and their clinical symptoms are mostly abdominal pain or waist pain. Foreign bodies penetrated by adjacent organs are extremely rare. Penetrating foreign bodies in adjacent organs is often misdiagnosed as kidney tumors, kidney stones, etc. We report a case of duodenal foreign body with right renal parenchyma diagnosed and treated by multidisciplinary cooperation.

2. Case report

A 22-year-old male patient had got repeated right abdominal pain for 13 years and renal foreign body for 2 weeks. Urine routine examination showed that RBC2.2/ μ L, WBC13.5/ μ L. Abdominal enhanced CT scanning showed that there were strip-shaped high-density shadows in the lower pole of the right kidney and the tissue around the right kidney, extending forward to the descending segment of the duodenum, considering the possibility of foreign bodies (Fig. 1A–B). Gastroscopy showed a black strip of foreign body embedded in the intestinal cavity at the descending junction of the duodenum. What's more, the mucosa at the insertion of foreign bodies is eroded, congested, and edematous and the surrounding mucosa is swollen and uplifted. Combined with CT scanning, it is not excluded that the foreign body extends outward and embeds into the lower pole of the right kidney (Fig. 1 C). After multidisciplinary team consultation in the hospital including general surgery, endoscopy center, imaging department, and ultrasound department, the patient's diagnosis of duodenum-right renal inferior pole foreign body

was clear. On the premise that urology and general surgery are well prepared for open surgery, the patient, under general anesthesia, underwent extracorporeal ultrasound-assisted endoscopic duodenum-right renal foreign body removal and hemostatic clamp suture was performed at the perforation (Fig. 2A–F). During the operation, the foreign body was pulled out from the lower pole of the right kidney through extracorporeal ultrasound monitoring (Fig. 3 A). Finally, we confirmed that the foreign body was a 62mm long bamboo toothpick. On the first day after the operation, intravenous pyelography showed that there was no contrast medium overflow around the right kidney. The patient supplemented his medical history and complained that he had a history of swallowing toothpicks by mistake after drinking more than 10 years ago. On the 4th day after the operation, abdominal CT scanning showed that a dense shadow (hemostatic clip) was seen in the descending segment of the duodenum, showing changes after foreign body removal (Fig. 3 B).

3. Discussion

Renal foreign bodies can be divided into iatrogenic, traumatic, retrograde, and penetrating foreign bodies in adjacent organs. The last way was very rare.¹ Most foreign bodies are gastrointestinal foreign bodies, such as fish bones, needles, toothpicks, and so on. Kidney foreign bodies often occur in children, the elderly, and patients with mental diseases.² The most common position where the foreign body penetrates is the descending duodenum. Due to the long bending here, the long strip-shaped, hard foreign body is not easy to pass through. Finally, it penetrates the retroperitoneal area, resulting in peritonitis, liver abscess, appendicitis even right kidney injury, kidney sepsis,³ and other diseases.

^{*} Corresponding author.

E-mail address: xfqiu123@163.com (X. Qiu).

<https://doi.org/10.1016/j.eucr.2022.102315>

Received 27 November 2022; Received in revised form 31 December 2022; Accepted 31 December 2022

Available online 6 January 2023

2214-4420/© 2023 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

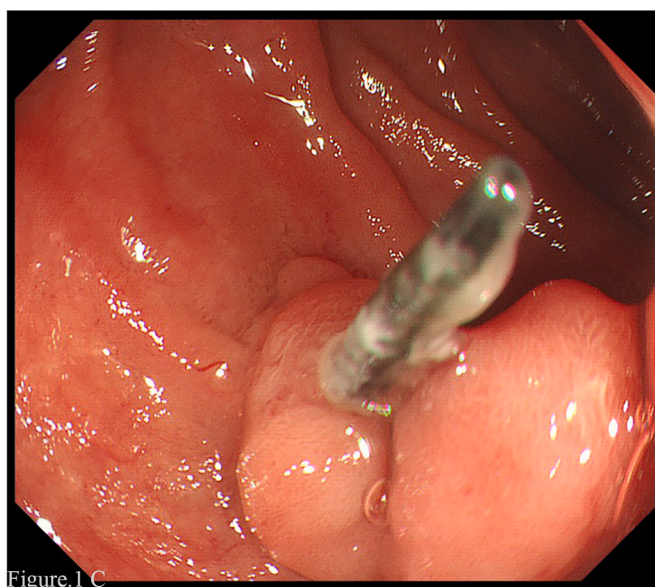
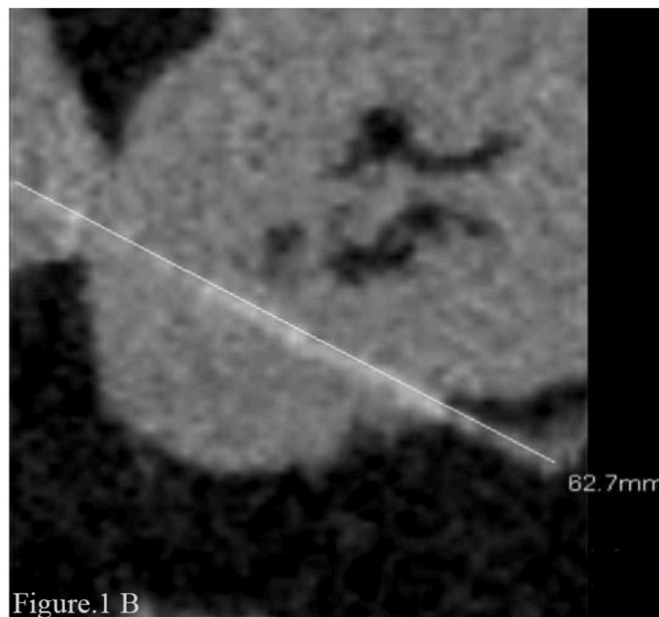


Fig. 1. A: In the sagittal plane of abdominal CT scanning images, the foreign body passes through the right lower renal pole (shown by the arrow). B: CT reconstruction image of foreign body. C: Gastroscope picture of the patient.

If the foreign body penetrates the duodenum and penetrates the right kidney, the patient's symptoms often include hematuria, waist pain,^{3,4} and other local symptoms, as well as fever, sepsis, and other systemic symptoms. But the symptoms are atypical, leading to the penetration of foreign bodies in adjacent organs that are often misdiagnosed as kidney tumors, kidney stones,⁵ etc. At present, the treatment methods for such penetrating foreign bodies are gastroscopic surgery, laparoscopic surgery, and opening surgery. If the foreign body penetrates the renal pelvis, it is feasible to remove the foreign body from the renal pelvis under an endoscope. But the above surgical treatments are easy to lead to clinical complications such as renal hemorrhage and duodenal fistula.

In this case, the toothpick pruned into the descending duodenum and completely penetrated the right kidney and causing a chronic inflammatory reaction in the duodenum, renal tissue which finally resulted in repeated pain and fever in the right upper abdomen and urinary tract infection. Combined with the results of imaging and endoscopy, the diagnosis was clear. After multidisciplinary consultation, we know that the source of the foreign body was the digestive tract. And a complete

fistula had been formed in the renal parenchyma, and the possibility of renal parenchyma bleeding and infection was low after removal. The duodenal perforation was small after removing the foreign body, and it could be repaired with hemostatic forceps. In addition, for the patient, open surgery has great trauma and a heavy economic burden on patients. After weighing the related risks, advantages, and disadvantages, we finally performed endoscopic foreign body extraction. There was no contrast medium overflow in the right kidney after the operation, no hematuria, and no pyuria. Also, the function of the right renal was normal.

We analyzed that the clear diagnosis of this patient and minimal injury operation taken may be related to the following factors: Firstly, the patient had recurrent right upper abdominal pain, fever, hematuria, and other clinical manifestations. Secondly, imaging examination found the foreign bodies: abdominal CT scanning had found that the foreign bodies penetrated the duodenum, the lower pole of the right kidney, and the right perirenal tissue, and the complete picture of the foreign bodies were reconstructed in three dimensions. The process of foreign body

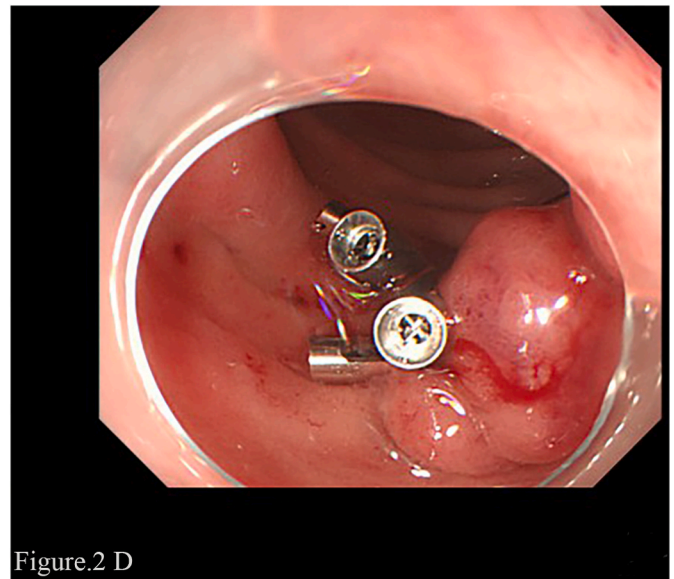
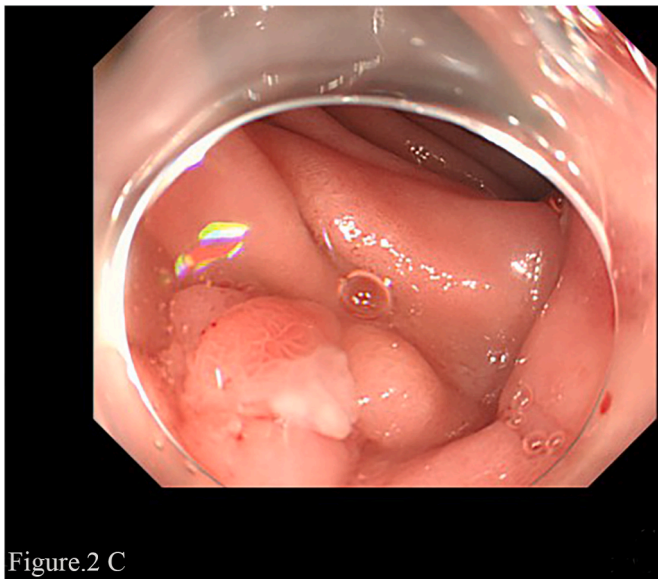
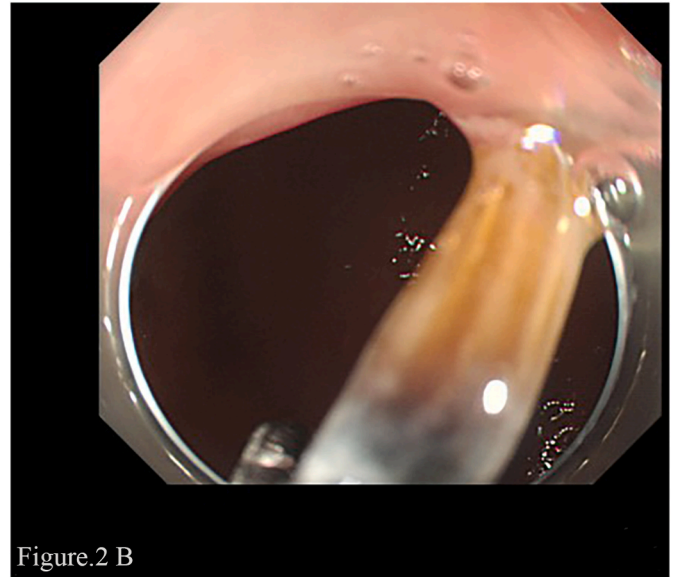
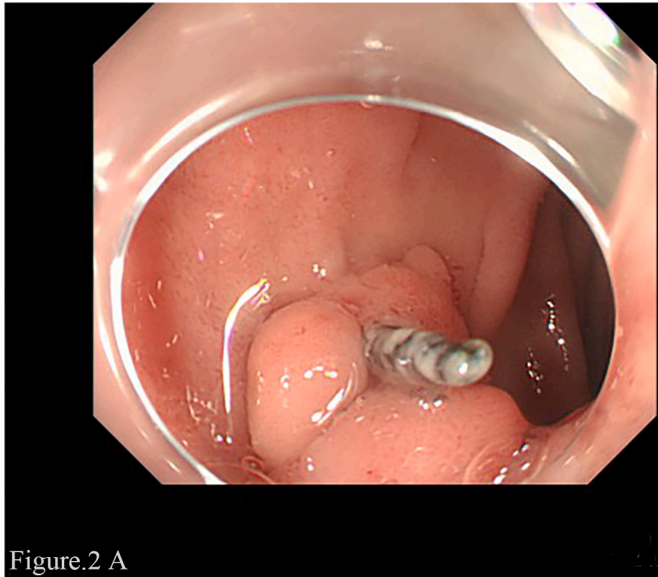


Fig. 2. A–F Surgical procedure: 2A: A foreign body penetrated into the intestinal wall under endoscopy. 2B: Remove the foreign body. 2C: Perforation of intestinal wall after removal of foreign body. 2D: Hemostatic clip sutured the perforation. 2E: The gastric tube was inserted. 2F: The foreign body is 62mm.

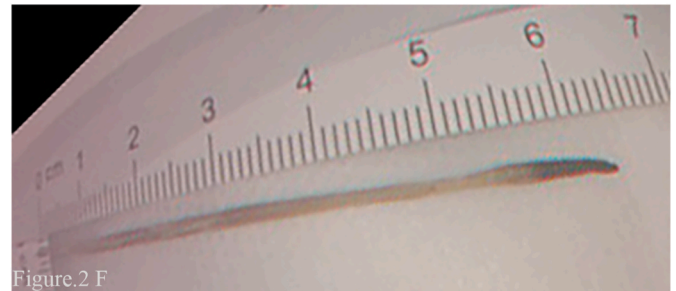
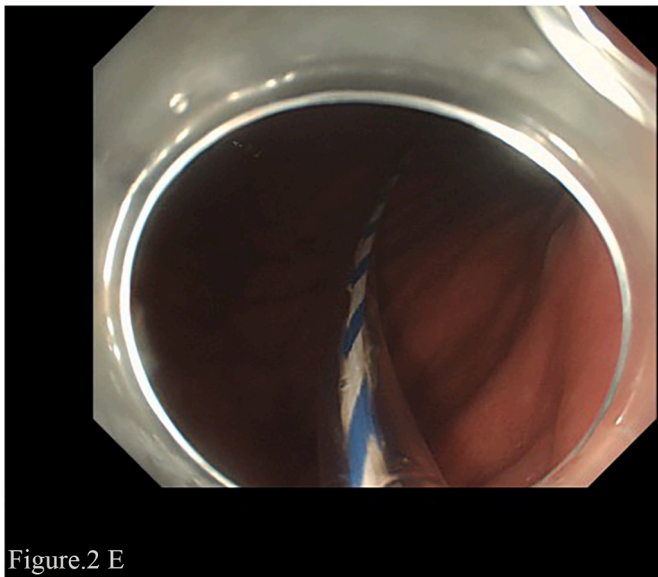


Fig. 2. (continued).

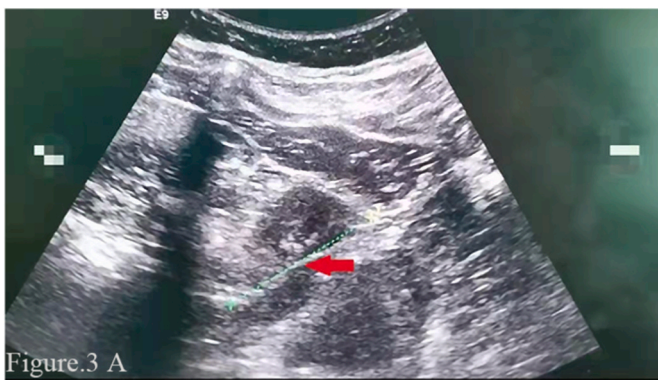


Fig. 3. A: Intraoperative ultrasound monitoring: the foreign body is located in the duodenum-right lower renal pole (shown by the arrow). B: On the 4th day after operation, recheck the abdominal CT scanning image: dense shadow (hemostatic clips) can be seen in the descending segment of duodenum, showing changes after removal of foreign body.

extraction was monitored by ultrasonography to avoid complications such as bleeding and foreign body fracture. Finally, we adopted the surgical method with the least side injury and cost on the premise of exploratory laparotomy: extracorporeal ultrasound monitoring endoscopic foreign body removal to solve the problems of the patient.

4. Conclusion

We believe that the case of a gastrointestinal foreign body penetrating the kidney through the duodenum is extremely rare. We have made a careful, serious, and standardized diagnosis and treatment for the patients, and taken the treatment measures of removing foreign bodies under endoscopy, which can not only reduce the surgical trauma of the patients, reduce the pain and economic burden of the patients, but also providing an experience for clinical diagnosis and treatment of similar diseases.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Tüdös Z, Čtvrtilík F, Kratochvíl P, et al. Wooden foreign body in the renal pelvis[J]. *Urology*. 2016;94:e7–e8.
2. Tustum F, Hudari GG, Modolo NR, et al. Unusual cause of appendicitis. A case report of acute appendicitis caused by needle ingestion[J]. *Int J Surg Case Rep*. 2020;72:499–502.
3. Qi Q, Chen L, Kou G. Sepsis due to kidney injury caused by a toothpick: a case report and literature review[J]. *BMC Infect Dis*. 2022;22(1):115.
4. Zeng HZ, Wang QM, Liu W, et al. Kidney injury and hematuria as a result of duodenal perforation by an ingested toothpick[J]. *UCTN Endoscopy*. 2014;46(1):E559–E560.
5. Jamil S, Jalbani IK, Aziz W, et al. Foreign body in kidney presenting as renal stone[J]. *Cureus*. 2020;12(12), e11923.