

# Chronic penetrating renal trauma due to iron wire ingestion

## An unusual case report

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### Abstract

Foreign body ingestion is a common presentation in the emergency room. However, the complication such as penetrating renal trauma due to sharp objects ingestion is relatively rare. We herein describe an unusual case of penetrating renal trauma in the absence of any other urinary symptoms. A 53-year-old man who had a history of iron wire ingestion went to our hospital, on examination, he only had slight abdominal tenderness due to swallowing a ball pen and 1 cap nut 1 day before, radiological imaging showed penetrating renal trauma, the blood test showed his renal function is normal. Surgical strategies were recommended to remove the pen and the iron wire simultaneously, nonetheless the patient eventually agreed to only receive surgical removal of the swallowed ball pen and cap nut, meanwhile leave the kidney untreated. During 30 months follow-up by phone and regular outpatient examination, he recovered unevenly and had no special complaint. Such cases remind us that chronic penetrating renal trauma due to foreign object ingestion may have no obvious symptoms. It is easily to be neglected. We should try to minimize the possibility of missed lesions by adhering to a meticulous examination technique.

**Abbreviation:** CT = computer tomography.

**Keywords:** foreign body ingestion, penetrating wound, renal trauma

### 1. Introduction

Foreign body ingestion is a common presentation in the emergency room, when it comes to sharp objects, the complication rate, such as perforation/obstruction could be up to 35%.<sup>[1]</sup> However, penetrating renal trauma due to foreign body ingestion is relatively rare. Up to now, totally 18 cases have been reported, while the majority of these patients were accompanied with urinary symptoms such as flank pain, proteinuria, hematuria, or perinephric abscess. Therefore, we report an unusual case of chronic penetrating renal trauma due to iron wire ingestion in the absence of any other urinary symptoms. For the present study, a formal approval from the ethical committee was obtained, and the principles of the Declaration of Helsinki followed. Written

informed consent was obtained from this patient for his data to be used for research purposes.

### 2. Case report

A 53-year-old man complaining a moderate upper abdominal pain presented to the emergency room after he swallowed a ball pen and 1 cap nut 1 day before. Besides, the patient had a history of another suicidal act by swallowing an iron wire 6 months ago which had not been taken out. The iron wire was approximately 100 mm in length and 2 mm in diameter. At that time, the X-ray showed the iron wire was in the stomach, he refused any recommended surgical or psychological treatment and walked home.

The patient had no melena, vomiting, or gross hematuria. He also denied any history of psychiatric disorders. Physical examination detected upper abdomen tenderness and percussion tenderness on right kidney region. Blood test demonstrated normal level of creatinine and urine nitrogen, and urinalysis showed no microscopic hematuria. Abdominal computer tomography (CT) scan demonstrated that a linear hyperdense foreign body was penetrating into the right renal parenchyma, closed to the renal pedicle (Fig. 1) with no sign of subdiaphragmatic air (Fig. 2). No subcapsular or perirenal hematoma was found either. After fully interpretation of the medical condition, we attempted to remove the pen by gastroscopy but failed. Surgical strategies were recommended to remove the pen and the iron wire simultaneously, nonetheless the patient eventually agreed to only receive surgical removal of the swallowed ball pen and cap nut, meanwhile leave the kidney untreated. Finally, he only underwent open gastrotomy and removed the ball pen, as the cap nut was already in the colon and may pass automatically, it was left untreated. During 30 months follow-up by phone and regular outpatient examination, he recovered unevenly and had no special complaint.

Editor: N/A.

XG and SL are the joint first authors.

The authors have no conflicts of interest to disclose.

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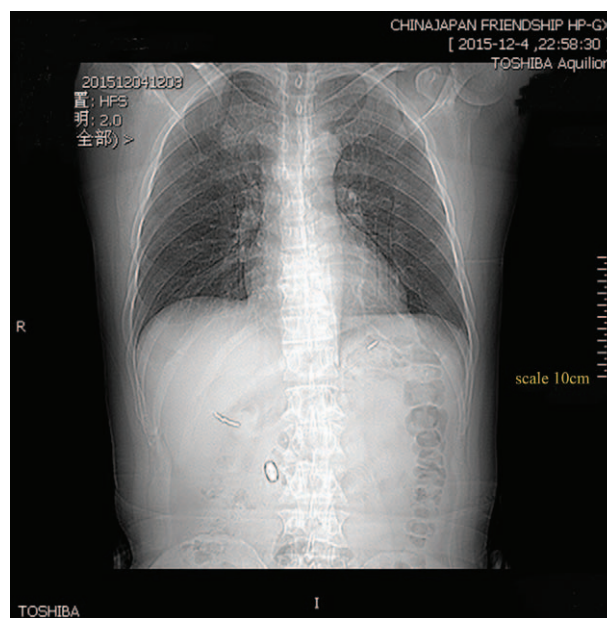
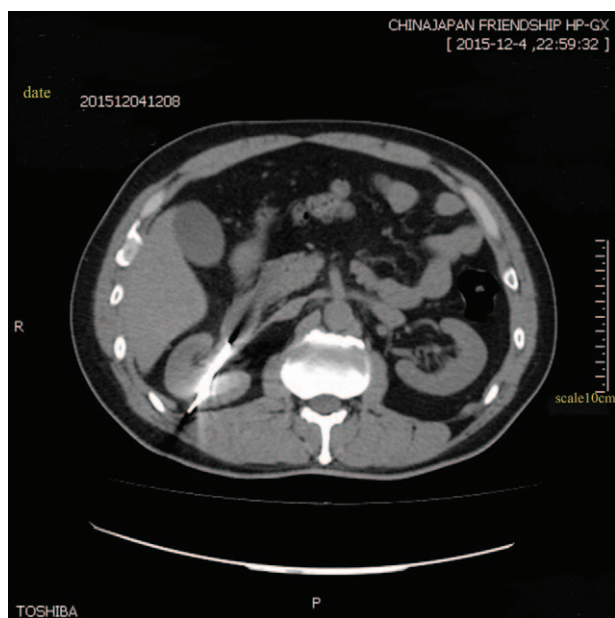
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Medicine (2017) 96:49(e8943)

Received: 21 September 2017 / Received in final form: 1 November 2017 /

Accepted: 8 November 2017

<http://dx.doi.org/10.1097/MD.0000000000008943>



**Figure 1.** Abdominal CT shows an iron wire penetrates the right kidney and duodenum which was closely related to the pedicle. CT=computer tomography.

**Figure 2.** X-ray shows there is no sign of subdiaphragmatic air.

### 3. Discussion

The patient refused our aggressive suggestion of nephrectomy and accepted the conservative recommendation. Leaving the kidney unoperated may lead to secondary damage. As the iron wire was longer than the transverse diameter of the kidney, and closed to the pedicle, plus, the kidney normally moves vertically by 39mm in 1 respiratory cycle,<sup>[2]</sup> mild transposition of the iron

wire may injure the renal collecting system, resulting in perirenal hematoma/extravasation/calculus, etc. What's worse, renal pedicle rupture may cause severe consequences.

The special concern of this case is the mechanism of how the iron wire inserted the kidney and stayed there for 6 months or even longer. A possible explanation is that when the iron wire was proceeding along the relatively fixed descending duodenum, the combined effect of intestinal peristalsis and pressure fluctuation caused duodenum perforation and penetration of the kidney. The chronic inflammation around the wound site,

**Table 1**

**Summary of the previously published literatures concerning renal foreign body.**

No.	Refs.	Year	Sex	Age	Side involved	Symptom	Type of treatment	Type of foreign body	Indwelling time
1	Middledropf <sup>[4]</sup>	1935	Female	39	Right	Right flank pain	Nephrectomy	Sewing needle	3 y
2	Capon and Wells <sup>[4]</sup>	1938	Female	4	Right	Frequency/hematuria/perforated duodenum	Nephrectomy	Bobby pin	10 mo
3	Boeminghaus <sup>[4]</sup>	1942	Male	30	Right	Frequency/dysuria/right perinephric abscess	Nephrectomy	Paper clip?	10 y
4	O Economos <sup>[4]</sup>	1945	Male	38	Right	Pain/fever	Laparotomy	Sewing needle	6 y
5	Landers <sup>[4]</sup>	1946	Male	56	Right	Backache/perforated colon?	Abscess drained	toothpick	5 mo
6	McEnery and Fox <sup>[4]</sup>	1946	Male	2	Right	Pyuria/perforated duodenum	Extraction through duodenum	Bobby pin	9 mo
7	Mackby <sup>[4]</sup>	1948	Female	3	Right	Urinary symptoms for 6 mo/persistent albuminuria	Extraction through duodenum	Bobby pin	Not sure
8	Bilger and Greiner <sup>[4]</sup>	1949	Male	5	Right	Pyuria	Nephrectomy	Hairpin	2-3 y
9	Osmond <sup>[4]</sup>	1953	Male	40	Right	Pain in the right costovertebral angle/frequency	Pyelotomy	Toothpick	Not sure
10	Macaulay and Moore <sup>[5]</sup>	1955	Female	3.5	Right	Fever and flank pain	Extraction through duodenotomy	Sewing needle	7 d
11	Mitnik et al <sup>[6]</sup>	1969	Male	2	Right	Not mentioned	Extraction through duodenotomy	Not mentioned	Not mentioned
12	Abe et al <sup>[7]</sup>	1984	Female	12	Right	Proteinuria and hemopyuria	Nephrectomy	Bobby pin	Not sure
13	Iwai et al <sup>[8]</sup>	2011	Male	75	Right	Pain in the right flank pain	Nephrectomy	Fish bone	1 d
14	Singh et al <sup>[9]</sup>	2013	Male	33	Left	Left flank pain and dysuria	Laparoscopic	Copper wire (4.5 cm)	Not sure
15	Zeng et al <sup>[10]</sup>	2014	Male	49	Right	Hematuria/upper abdominal pain	Exploratory laparotomy and duodenorrhaphy	Tooth pick (6.5 cm)	5 d
16	Upadhyay et al <sup>[11]</sup>	2015	Male	20	Right	Gross hematuria/colicky right flank pain	Retrograde percutaneous nephrostomy	Metallic object	1 y
17	Almualllem et al <sup>[12]</sup>	2015	Male	4	Right	Right upper quadrant and right flank pain/intermittent fever and chill	Laparotomy	Bobby pin	3 mo
18	Our patient	2015	Male		Right	No symptoms	Conservative management	Iron wire (about 8cm)	6 mo

plus the slow penetration of the duodenal wall and into right kidney might act as mechanism for buffering of the iron wire's sharp end. Therefore, the patient only presented with a moderate abdominal pain, with no signs of subdiaphragmatic air or gross hematuria.

Foreign body ingestion is a common presentation in the emergency room. Although, spontaneous passage may occur to more than 80% of the patients, when it comes to sharp object, the risk of perforation ranges from 15% to 35%.<sup>[1]</sup> The guideline on management of swallowed foreign bodies and food impactions released by American Society for Gastrointestinal Endoscopy recommend urgent endoscopy if the ingestion object is sharp-ended or longer than 60 mm, for it many not surpass the "C loop" of the duodenum.<sup>[3]</sup> The main reasons that foreign bodies dwelling in kidney may be iatrogenic cause, self-insertion, external injury, or migration from the gastrointestinal tract.<sup>[4]</sup> Regarding a sharp foreign body penetrating the duodenum and reaching the kidney, there are few cases reported. A literature review was performed and the results are listed in Table 1. Totally 18 cases<sup>[4-12]</sup> have been reported so far, with right kidney being the main target organ. The latent period ranged from days to years. And the most common foreign bodies were toothpick and metal wire. Clinical manifestations may vary according to severity of the damage and whether infection coexists.

Foreign object ingestion is sometimes difficult to diagnose, as many patients may forget the swallowing history, and symptoms could be vague while imaging studies may not be able to identify certain materials (wood, plastics, etc.).<sup>[3]</sup> It should be emphasized that doctors should bear in mind that diagnosis of foreign body intake should be considered when dealing with indistinct acute abdomen. In addition, chronic penetrating renal trauma due to

foreign object ingestion may have no obvious symptoms. It is easily to be neglected. We should try to minimize the possibility of missed lesions by adhering to a meticulous examination technique.

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