

Migration of a Fish Bone into the Right Renal Vein

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Abstract

We describe a patient in whom a fish bone penetrated the duodenum and migrated into the right renal vein. The bone was successfully removed with surgery. The 75-year-old man was admitted to Nippon Medical School Tama Nagayama Hospital because of right upper abdominal pain persisting for 7 days. The patient's medical history was not relevant to the current disorder. Plain radiography showed no abnormalities. Computed tomography revealed a linear object of high intensity that had penetrated the duodenum and migrated into the right renal vein with thrombus. The object was surrounded by a low-density area, suggesting severe inflammation. The patient had eaten fish 1 day before the onset of abdominal pain. We diagnosed duodenal penetration caused by an ingested fish bone. Endoscopic examination showed erosion, but no fish bone or ulceration was detected in the duodenum. The patient was treated conservatively with fasting, peripheral parental nutrition, and intravenous antibiotics. Three days after admission, non-contrast-enhanced computed tomography showed no movement of the foreign body. The patient continued to have pain, and the decision was made to surgically explore the abdomen. Intraoperative ultrasonography showed that the foreign body had migrated completely into the right renal vein with thrombus. Severe inflammation of the right renal vein was observed. Because we could not remove the foreign body without seriously injuring the right renal vein, right nephrectomy was performed. Macroscopic examination of the surgical specimen confirmed the presence of a fish bone with thrombus in the right renal vein. The patient was discharged 9 days after operation, with no complications. (J Nippon Med Sch 2011; 78: 189–193)

Key words: fish bone, migration, renal vein

Introduction

Foreign-body ingestion is often encountered clinically. An estimated 80% to 90% of foreign bodies pass uneventfully, and only less than 1% of cases

result in perforation^{1,2}. Objects with sharp, pointed ends, such as toothpicks, sewing needles, hairpins, wires, fish bones, chicken bones, and dental plates, are the foreign bodies that most often cause either perforation or penetration. Perforation can occur at any site of the gastrointestinal (GI) tract. The

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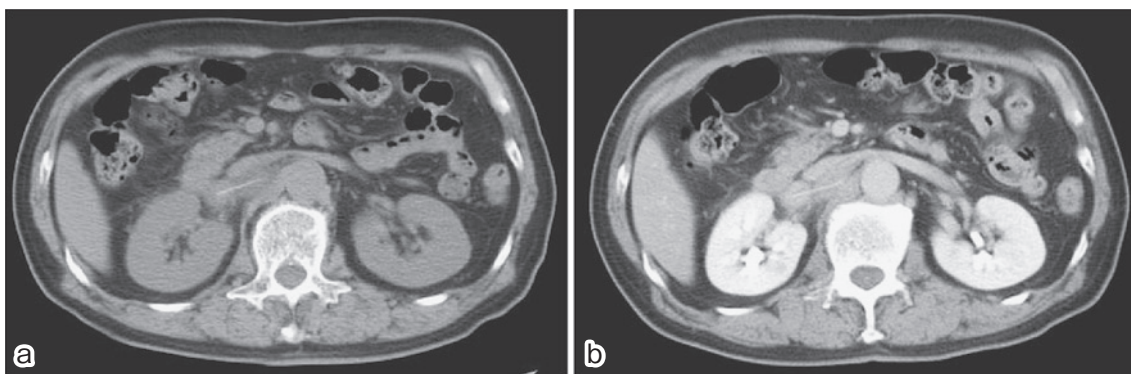


Fig. 1 A CT scan showed that a linear object of high intensity had penetrated the duodenum and extended into the right renal vein with thrombus (**a**: non-contrast-enhanced CT) (**b**: contrast-enhanced CT).

ileocecal, rectosigmoidal, and esophageal regions are the most commonly affected areas²³. Goh et al.³ have reviewed 44 cases of intra-abdominal GI perforation by ingested foreign bodies and reported that the duodenum was involved in only 5% (2 of 44) of perforations.

Nevertheless, fish bones are more commonly ingested as foreign bodies in Asia owing to the practice of serving fish whole with the bones⁴. Migration of the foreign body into a vessel is rare⁵.

We describe a patient in whom a fish bone penetrated the duodenum and migrated into the right renal vein. The bone was successfully removed with surgery.

Case Report

A 75-year-old man was admitted to Nippon Medical School Tama Nagayama Hospital because of right upper abdominal pain persisting for 7 days. The patient's medical history was not relevant to the current disorder. Initial laboratory tests revealed the following values: white blood cell count, 5,800/ μL (normal, 4,000 to 9,000/ μL); serum hemoglobin concentration, 15.4 g/dL (normal, 14 to 18 g/dL); serum platelet count, 27.4×10^4 / μL (normal, 20 to 40×10^4 / μL); serum C-reactive protein, 2.33 mg/dL (normal, <0.3 mg/dL); serum fibrinogen degradation products, 12 $\mu\text{g}/\text{mL}$ (normal, <10 $\mu\text{g}/\text{mL}$); prothrombin time, 82.8% (normal, 80 to 100%); serum fibrinogen, 141 mg/dL (normal, 200 to 400 mg/dL); D-dimer, 6.04 $\mu\text{g}/\text{mL}$ (normal, 0.1 to 1 $\mu\text{g}/\text{mL}$); and antithrombin III, 104.6% (normal, >82%).

Plain radiography showed no abnormalities. Computed tomography (CT) revealed a linear object of high intensity that had penetrated the duodenum and extended into the right renal vein with thrombus. The object was surrounded by a low-density area suggesting severe inflammation (**Fig. 1, 2**). The patient had eaten fish 1 day before the onset of abdominal pain. We diagnosed duodenal penetration caused by an ingested fish bone. Endoscopic examination showed erosion, but no fish bone or ulceration was detected in the duodenum. The patient was treated conservatively with fasting, peripheral parental nutrition, and intravenous antibiotics. Three days after admission, non-contrast-enhanced CT scan showed no movement of the foreign body (**Fig. 3**). The patient continued to have pain, and the decision was made to surgically explore the abdomen.

Intraoperative ultrasonography showed that the foreign body had migrated completely into the right renal vein with thrombus (**Fig. 4**). Severe inflammation of the duodenum and right renal vein was observed (**Fig. 5**). Because we could not remove the foreign body without seriously injuring the right renal vein, right nephrectomy was performed. Macroscopic examination of the surgical specimen confirmed the presence of a fish bone with thrombus in the right renal vein (**Fig. 6**). The patient was discharged 9 days after operation, with no complications.

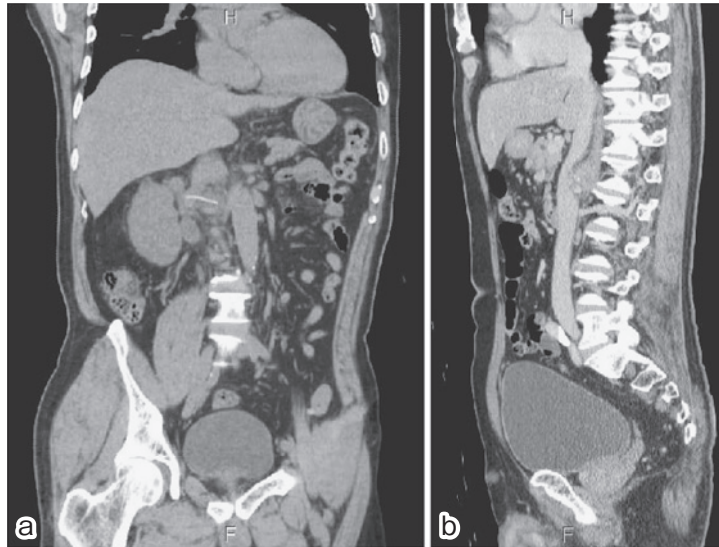


Fig. 2 A low-density area was detected around the linear object of high intensity, suggesting the presence of severe inflammation (a: coronal non-contrast-enhanced CT) (b: sagittal non-contrast-enhanced CT).

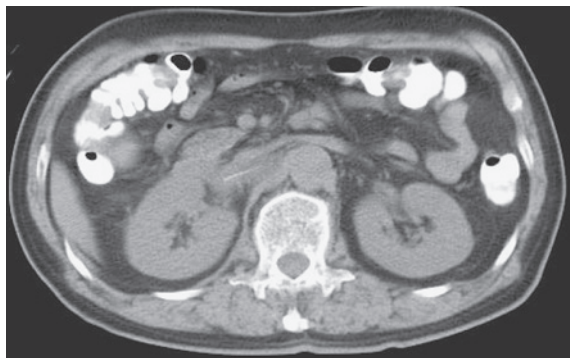


Fig. 3 Three days after admission, non-contrast-enhanced CT showed no movement of the foreign body.

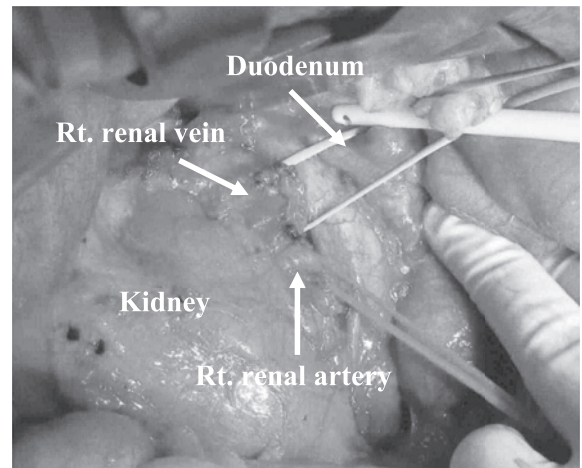


Fig. 5 Severe inflammation of the right renal vein was observed.

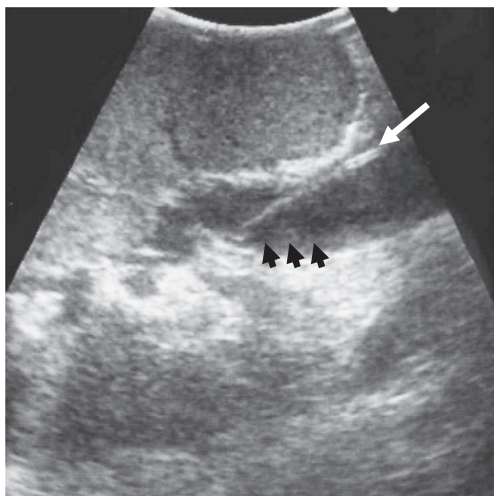


Fig. 4 Intraoperative ultrasonography showed that the foreign body (**white arrow**) had migrated completely into the right renal vein with thrombus (**black arrows**).

Discussion

The ingestion of foreign bodies is common, and most small objects pass through the GI tract uneventfully within 1 week. Perforation of the GI tract is rare, occurring in less than 1% of patients^{1,2,6}. The types of foreign bodies ingested are related to local dietary habits; for example, in East Asia, including Japan, fish bones are the most commonly ingested foreign bodies^{7,8}. Perforation by ingested foreign bodies has been reported in all segments of the GI tract^{1,9}. Of 321 cases of perforating foreign

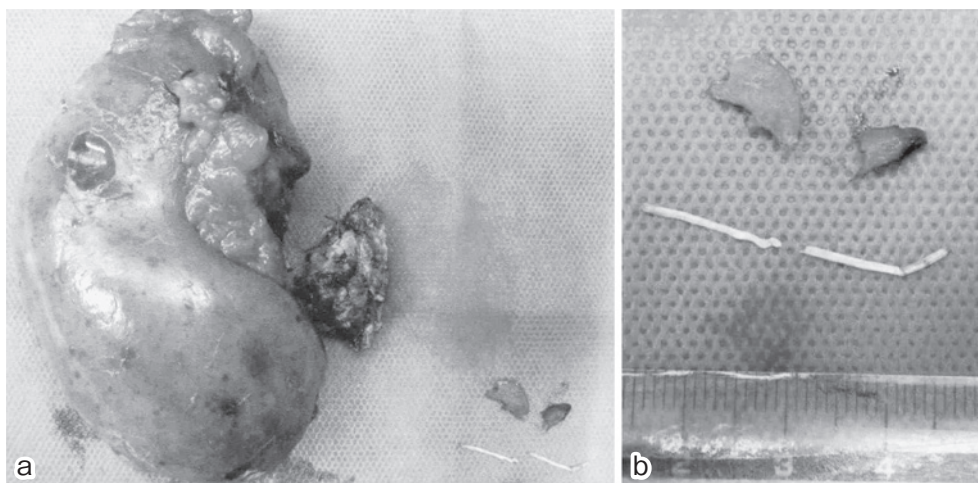


Fig. 6 Macroscopic examination of the surgical specimen confirmed the presence of a fish bone with thrombus in the right renal vein (a: right kidney) (b: fish bone with thrombus).

bodies reported by Remsen et al.¹⁰, only 43 bodies were found extraluminally. Goh et al.³ have reviewed 44 cases of intra-abdominal GI perforation by ingested foreign bodies and reported that the ileum and jejunum were involved most commonly, accounting for 66% (29 of 44) of perforations, whereas the colon accounted for only 9% (4 of 44).

The mechanism by which these foreign bodies are propelled through the soft tissues is not known, but infection, abscess formation, and tissue reactions to the foreign body might contribute to their migration.

A plain radiograph is usually used to confirm the diagnosis of an ingested fish bone. A prospective study by Ngan et al.¹¹ examined 358 patients who had ingested a fish bone and found that plain radiography had a sensitivity of only 32%, indicating that it is unreliable for diagnosis. Localization of such extraluminal foreign bodies requires a CT scan¹². On CT scans, however, determining whether the foreign body is partially or completely extraluminal is sometimes impossible. In our patient, CT suggested extraluminal migration of the foreign body. CT has proven helpful for locating ingested fish bones^{8,13}; thus, if foreign body ingestion is suspected, the first evaluation should be with CT.

A migrating foreign body can cause potentially fatal complications, such as duodenal venous fistula, depending on the direction and site of migration. Duodenal venous fistula is rare, with only 40 cases

previously reported in the English-language literature¹⁴. After the impaction of a fish bone in the duodenum as part of the alimentary chyme, the fish bone may perforate the duodenum and a vein, creating a communication between the structures and leading to the development of a fistula. The presence of thrombus and gas in the venous lumen associated with an incarcerated foreign body should lead to the diagnosis of duodenal venous fistula. When duodenal venous fistula is diagnosed antemortem, patients likely have sepsis and are in unstable condition, necessitating prompt surgery¹⁵⁻¹⁷. However, findings indicating a duodenal venous fistula are usually not present simultaneously or at all, limiting the accuracy of a CT scan. Another finding strongly suggesting a duodenal venous fistula is the presence of a periduodenal abscess¹⁵.

The procedure used to remove a foreign body depends on whether injury extends to the duodenum and the right renal vein. Subjacent mechanisms and the presence of thrombosis can also influence surgical options. In the presence of a duodenal venous fistula, most authors prefer simple suture of the duodenum and vein, usually with surgical measures to prevent recurrence of the fistula, such as an epiploic or jejunal patch^{15,16}. Guillem et al.¹⁵ have reported a 61% morbidity rate after surgery for the treatment of duodenal venous fistula. The overall mortality for duodenal venous

fistula reaches 39.5%¹⁶. In our patient, there was no fistula between the duodenum and the right renal vein. The fish bone had migrated into the vein. The presence of severe inflammation and venous thrombosis precluded preservation of the right kidney. Remsen et al.¹⁰ have reported that an intraluminal penetrating foreign body carries a higher overall mortality rate than does a foreign body that migrates extraluminally.

In summary, we have described a patient in whom a fish bone penetrated the duodenum and migrated into the right renal vein. To our knowledge, a similar case has not been reported previously.

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(Received, January 23, 2011)

(Accepted, February 10, 2011)