Correct diagnosis and successful treatment for pericardial effusion due to toothpick injury: A case report and literature review

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INTRODUCTION
Toothpick is a common cause of foreign body ingestion. It usually resulted in perforation of gastrointestinal tract with life-threatening peritonitis. In some conditions, it may cause inflammatory mass formation while penetrating into solid organs such as liver[1-10] or pancreas[11] instead of hollow organ. Mis-swallowing of toothpick is always hard to be diagnosed and the definite diagnosis is usually made during surgery because toothpick could be demonstrated on image study in only 14% cases and the patient always did not remember this event[12].

Pericardial injury by toothpick is very rare and totally two cases have been reported in the literature[13,14]. We conducted a systemic review of the literature of injury from ingested toothpick with migration into liver and heart. To our knowledge, we reported the first case of pericardial effusion due to toothpick injury correctly diagnosed preoperatively and receiving successful treatment with uneventful postoperative course.

CASE REPORT
The 55-year-old man was quite well but suffered from chest pain and dyspnea on exertion during a 6-mo follow-up period.

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and normal bowel sound. The following laboratory data were recorded: white blood count 9900 cell/μL (5000-10 000 cell/μL), hemoglobin 12.1 (14-17) g/dL, total bilirubin 0.7 (0.0-1.3) mg/dL, BUN 21 (6-21) mg/dL, creatinine 1.2 (0.4-1.4) mg/dL, albumin 3.9 (3.5-5.5) g/dL, negative hepatitis B surface antigen and hepatitis C antibody, negative urine analysis. Subsequent chest X-ray revealed cardiomegaly and cardiac echo showed massive pericardial effusion and pleural effusion with normal left ventricular function.

Constrictive pericarditis was diagnosed based on clinical information. Tuberculosis (TB), malignancy, autoimmune disease, infection, hypothyroidism, and idiopathic could be the causes. Subsequent sputum TB smear showed negative acid-fast stain. Analysis of pleural effusion was recorded as follows: LDH 70 U/L, glucose 111 mg/dL, and WBC 1765 cell/μL (< 100 cell/μL). Cytology of pleural effusion revealed no malignant cell. Pleural effusion smear was negative for bacteria or acid-fast stain. Autoimmune antibody study showed C3: 188 (90-180) mg/dL, C4 60.5: (10-40) mg/dL, and negative antinuclear antibody (ANA) (< 1:80). Tumor marker revealed CEA 1.33 (< 5) ng/mL and AFP 3.5 (< 15) ng/mL. Thyroid function test showed TSH: 0.715 (0.35-5.5) μIU/mL and free-T4: 1.22 (0.89-1.76) ng/dL. Common causes of constrictive pericarditis were all excluded.

Because of his unusual presentation, we arranged the high-resolution lung CT scan. CT scan after reconstruction revealed a moderate amount of pericardial effusion with possible superimposed infection. Thickness of pericardium and left lobe liver abscess were found. A straight tubular structure about 6 cm in length transverses the lateral segment of liver to pericardial space and unknown foreign body was suspected (Figure 1).

Because of progression of symptom and sign, laparotomy was performed and severe adhesion was found between the liver and diaphragm and the other adhesion was localized between lesser curvature of the stomach and lateral segment of the liver. After dividing the space between the liver and diaphragm, we found a 6.5-cm toothpick through the liver into pericardium (Figures 2 and 3). The toothpick was removed and pericardium was open for drainage of pericardial effusion. Fibrin-coating material was found in pericardial space. Post-operative course was uneventful and he discharged one week later. The patient could not remember swallowing the toothpick before. He had no chest pain and dyspnea on exertion during a 6-mo follow-up period.

**DISCUSSION**

Toothpick is a common cause of foreign body ingestion, however, 80%-90% of ingested toothpick pass through
the gastrointestinal tract without any complication[13]. It may sometimes result in the perforation of gastrointestinal tract with life-threatening peritonitis. It rarely causes inflammatory mass formation while penetrating into solid organs such as liver or pancreas. Similar to this case, few patients (12%) remember swallowing a toothpick. The onset of symptoms ranged in a wide variation from less than one day to 15 years. As demonstrated in this case, toothpicks could be identified by imaging studies, but only seen in 14% of the cases. The definitive diagnosis was most commonly made at laparotomy (53%) and followed by endoscopy (19%), with an overall mortality rate of 18% [12].

Totally, 170 articles have been identified and the origin site of toothpick can be identified in 62 cases in the literature (Table 1). Among them, 21 patients had different complications due to migration of toothpicks to a solid organ or vessels[11,13-22]. Migration from gastrointestinal tract comprised 30% cases and 38.5% of those are from duodenum. If cases presenting with liver abscess or pseudotumor, gastrointestinal bleeding, sepsis, hematuria instead of the symptom of hollow organ perforation increased the difficulty of pre-operative diagnosis.

Migration of a toothpick to the liver was reported in 10 cases (Table 2) and usually occurred in old male patients with right upper quadrant pain and cholangitis[1-10]. An inflammatory mass mimicking liver abscess and pseudotumor with the picture of hepatocellular carcinoma or cholangiocarcinoma could be demonstrated in the image study. Among them, four cases had a definite diagnosis before operation with advanced image study. The origin of migration to the liver is duodenum or stomach.

Acute pericarditis is a clinical syndrome with many possible causes, including idiopathic, viral, neoplastic disease, heart surgery, myocardial infarction, autoimmune disease, infection, and foreign body. More than 90% cases resulted from idiopathic or viral cause[23]. Presentation of constrictive pericarditis due to complication of ingested toothpick is sporadically reported[3,13,14]. Different from the previous two reported cases, we had a definite and correct pre-operative diagnosis (Table 3). We also clearly revealed a straight tubular structure transversing the lateral segment of the liver to pericardial space caused by an unknown foreign body with reconstructive chest computed tomography.

In conclusion, we clearly demonstrated and successfully diagnosed and treated a case with migration of toothpick form stomach through liver into pericardium.

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