

Ultrasound Diagnosis of a Heterotopic Bronchogenic Cyst Located in the Muscularis of the Cardia

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ABSTRACT

Bronchogenic cysts in the muscularis of the cardia are very rare lesions. We report a 33-year-old woman who presented epigastric distention, pain, nausea and vomiting. MRI diagnosis of the lesion was a stromal tumor located in the liver and stomach space. Ultrasonic examination indicated that the cystic structure was closely related to the gastric wall, and cystic lesions from the gastric wall were determined. The operation confirmed that the mass started from the lower segment of the esophagus near the cardia. Histopathological examination revealed that the cyst wall was covered with pseudostratified ciliated columnar epithelium and smooth muscle, and a few mucinous glands were seen under the mucosa, which was consistent with bronchogenic cysts.

Keywords: Ultrasound Diagnosis; Heterotopic Bronchogenic Cyst; The Muscularis of the Cardia

Introduction

Bronchogenic cysts are congenital abnormalities of the tracheobronchial bud derived from the primitive foregut, and are predominantly found in the mediastinum [1,2]. Sometimes, cysts are found in cutaneous tissue [3]. Ectopic bronchogenic cysts in the muscularis of the cardia are rare and easily misdiagnosed as stromal tumors or hepatic cysts [1,2]. Bronchogenic cysts in the gastric wall usually have no clinical manifestations at first, but with the enlargement of the lesions, there will be compression symptoms or secondary rupture and infection. The clinical symptoms and signs of the disease have no obvious specificity, and imaging

diagnosis is difficult. In this report, ultrasound examination and three-dimensional imaging were used to dynamically observe the lesion's size, shape, blood-supply and the relationship between the lesion and the surrounding tissues. Compared with CT or MRI examination, ultrasound examination can improve the diagnostic accuracy of the disease.

Case Report

The female patient was 33 years old. One month prior, there was no obvious cause of her upper abdominal distention, pain, nausea

and vomiting, and the symptoms were intermittent, sometimes mild and sometimes severe. Defecation and urination were normal. Since the onset of the disease, the patient's food intake was slightly reduced. In the past month, she lost approximately 3 kg of weight. She was healthy before, denied having tuberculosis and other infectious diseases, had no history of cardiovascular disease, did not have drug or food allergies, and denied a history of surgery. CT showed benign space-occupying lesions in the back of the left lobe of the liver, and a stromal tumor was considered. Then, ultrasound examination was performed. First, a longitudinal section was used, and a cystic structure with a size of 52 mm × 30 mm × 36 mm was detected in the hepatogastric space. Further examination verified that the cystic structure was located at the site of the cardia extending to the fundus of the stomach in view of the hiatus of the esophageal diaphragm behind the left lobe of the liver. The wall was

thick, and the echo was enhanced. The liquid dark area in the cyst was not clear, and a dense punctate weak echo could be seen in the cyst (Figure 1). The cyst showed slight compression of the gastric wall from the esophagus to the cardia after the diaphragmatic hiatus, and multisection observation showed that the lower end of the cystic structure was closely related to the muscular layer of the gastric wall. The cystic wall showed a sense of hierarchy, and three-dimensional ultrasound imaging showed that the cyst had a pedicle (Figure 2). The conclusion of ultrasound examination is that the cystic structure of the hepatogastric space behind the left lobe of the liver is closely related to the gastric wall. On MRI, the abnormal signal of the hepatogastric space was not enhanced by contrast-enhanced scanning, a benign cystic space-occupying lesion was considered, and the possibility of stromal tumor was high (Figure 3).

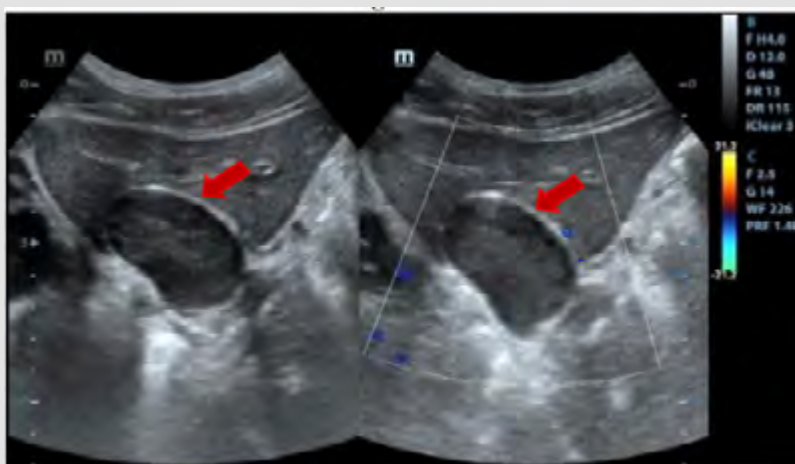


Figure 1: The lesion was observed through two-dimensional ultrasound imaging and color Doppler flow imaging. Red arrow: lesion.

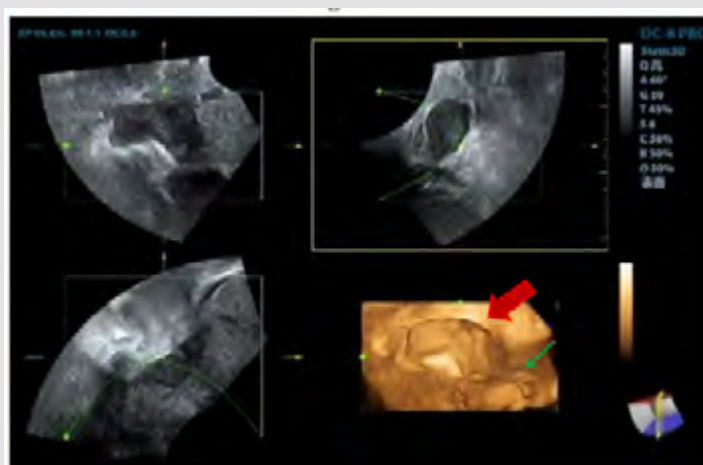


Figure 2: Three-dimensional ultrasound imaging of the lesion. Red arrow: lesion; Green arrow: the lesion originated from the muscularis of the cardia.



Figure 3: The MRI examination of the lesion, showed that the abnormal signal of the hepatogastric space was not enhanced by contrast-enhanced scanning, a benign cystic space-occupying lesion was considered, and the possibility of stromal tumor was high. Red arrow: lesion.

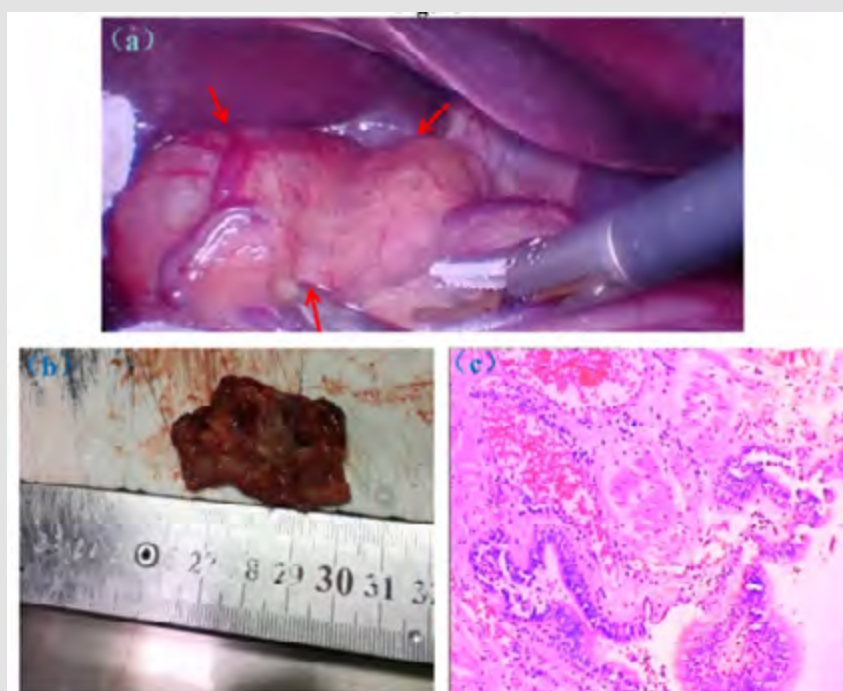


Figure 4: Surgical resection and pathological examination of the lesion.

- The appearance and location of the lesion seen during the operation. Red arrow: lesion.
- After the lesion was removed, the fluid in the cyst was drained.
- Pathological examination revealed a "stomach" benign cyst. The cyst wall was covered with pseudostratified ciliated columnar epithelium, smooth muscle and a few mucinous glands under the mucosa, which was consistent with a bronchogenic cyst.

The surgical findings were as follows: Under laparoscopy, a similar round mass with a size of 60 mm × 40 mm × 30 mm, high tension and abundant vascular branches on the surface, was found in the ligament of the esophagus and gastric fundus behind the left lobe of the liver. The boundary with the liver was clear, and the boundary with the esophageal and gastric fundus was not clear. No abnormalities were found in other abdominal organs, such as the pancreas, spleen, kidneys, duodenum, jejunum, ileum, colon and rectum. The surgical field was exposed during the operation, the left lateral lobe of the liver was pulled ventrally, and the ligaments of the liver and stomach were cut off along the right boundary of the mass with an ultrasonic scalpel, and the right and head sides of the mass were gradually dissociated. The mass was closely adhered to the fundus of the esophagus and stomach, and the blood supply of the mass originated from the left gastric vessel (Figure 4a). Then, the vascular branches of the mass were separated and clipped using the Weck operation mode. After the mass was cut off by ultrasonic scalpel and gradually separated, the pedicle of the mass was found starting from the lower segment of the esophagus near the cardia, and a repeated lower esophageal cyst was considered. The mass with part of the muscularis of the cardia was excised using the ultrasonic scalpel. The submuscular mucosa was intact, and the liquid in the capsule was a milky white thick liquid (Figure 4b). The mass was put into the specimen bag, and then the specimen was removed. Intraoperative rapid frozen pathological examination showed a benign cyst of the upper abdomen, the inner wall of the cyst was covered with pseudostratified columnar epithelium, the remaining frozen cyst was embedded with paraffin, and the pathological diagnosis was as follows: "stomach" benign cyst, the cyst wall was covered with pseudostratified ciliated columnar epithelium and smooth muscle, and a few mucinous glands were seen under the mucosa, which was consistent with bronchogenic cyst (Figure 4c).

Discussion

Histopathology is the only method for the diagnosis of ectopic bronchogenic cysts. Pathological diagnostic criteria include the type of epithelial layer and the structure of the cystic wall. Infection or malignant transformation may change these typical features [4]. Bronchogenic cysts mainly consist of pseudostratified ciliated columnar epithelial cells and contain at least one of the following components: serous or mucinous glands, smooth muscle cells or hyaline cartilage [1]. Bronchogenic cyst is a rare congenital cystic disease caused by the abnormal development of the primitive foregut during early embryonic development [5]. Its pathogenesis is still unclear. It is generally believed that it is a partial developmental disorder of the germ from the gastrula during the embryonic stage, where the distal primitive bronchus tissue is detached

from the proximal tissue, forming a blind tube, and the secretion in the lumen cannot be eliminated and is retained in the cyst [6]. This disease can occur in both children and adults, and adults are usually diagnosed on physical examination or when the symptoms of local compression appear. Adult bronchogenic cysts generally have no clinical manifestations. However, with increasing age, the lesions gradually expand and produce compression symptoms, or there are nonspecific symptoms, such as cough, expectoration and fever, when the cyst cavity is complicated with infection; thus, the disease is easy to find [3]. The most common sites are the bilateral lung and mediastinum, it is rare in the neck and retroperitoneum, and heterotopic bronchogenic cysts in the abdomen are very rare. Occasionally reported cases have no typical clinical symptoms or signs, the imaging examination and preoperative diagnosis are difficult, and there is no tumor marker for specific identification. Then, it is easy to miss or misdiagnose clinically [3]. The patient presented with clinical symptoms due to different degrees of compression of the esophagus and cardia by the cyst. After eating, the patient was prone to vomiting and nausea, which resulted in less food intake and significant weight loss, with a weight loss of 3 kg within one month. Some studies have said that the diagnosis of gastric bronchogenic cysts mainly depends on CT and MRI, but with imaging diagnosis alone, it is still difficult to differentiate from other cystic masses, and it is difficult to make correct diagnoses before operation [7]. If malignancy can be ruled out before surgery, endoscopic mucosal resection, myotomy or laparoscopic surgery can be used to reduce patient trauma [8]. In this case, benign cystic lesions were considered after MRI and ultrasound examination. However, MRI was static imaging and more inclined to the diagnosis of stromal tumor. Ultrasound examination can dynamically observe the relationship between the lesion and the surrounding tissue in real time, and provide information about the shape, boundary and even blood supply of the lesion, furthermore, three-dimensional ultrasound showed that the cyst was pedicled and connected with the cardiac muscle layer. So, in this case, ultrasound examination provided an effective imaging basis for the selection of a clinical operation plan.

Acknowledgments

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