

CASE REPORT

Misdiagnosed gastric diverticulum as a left adrenal lesion on imaging

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Key Clinical Message

Gastric diverticulum in the posterior wall of the stomach is very rare, and it is easy to be misdiagnosed as a left adrenal mass on imaging. Therefore, we must consider the possibility of gastric diverticulum when diagnosing a left adrenal mass.

Abstract

This paper reports a case of gastric diverticulum that was misdiagnosed as a left adrenal mass on abdominal enhanced CT. The patient underwent laparoscopic adrenalectomy, but there was no mass in the left adrenal found during surgery. After the incision of the retroperitoneum, a cystic mass was found adjacent to the posterior gastric wall which turned out to be gastric diverticulum. This case suggests that gastric diverticulum, a rare disease, may be interpreted as an adrenal mass on imaging. Therefore, as a urologist, the gastric diverticulum must be excluded when CT suggests a mass in the left adrenal region.

KEYWORDS

CT imaging, gastric diverticulum, left adrenal lesion, misdiagnosis, treatment

1 | INTRODUCTION

Abdominal enhanced CT is the most important tool for the diagnosis and localization of adrenal tumors. Compared with the right adrenal gland, the left adrenal gland has complex adjacent structures, including the posterior gastric wall, the tail of the pancreas, the spleen, and the splenic flexure of the colon. It is easy to misdiagnose them as adrenal tumors, such as gastric diverticulum. By February 2023, 16 reports of adrenal mass that turned out to be gastric diverticulum were retrieved from the PUBMED database. The first case was reported by Schwartz et al.¹ Here, we report a typical and complete

case of gastric diverticulum misdiagnosed as a left adrenal mass, which will provide a clinical reference for urologists in practice to avoid similar mistakes in the future.

2 | CASE PRESENTATION

After the physical examination half a year ago, a CT scan diagnosed the patient, a 39-year-old male, with a lesion in the left adrenal region (gas shadow was seen), however, the levels of adrenal-related hormones were normal. Further enhanced CT ([Figure 1](#)) showed a mixed-density shadow (39×27mm) and a small gas shadow in the left

Jing-Yan Zhang and Chenchen Qian contributed equally to this work and shared the first authorship.

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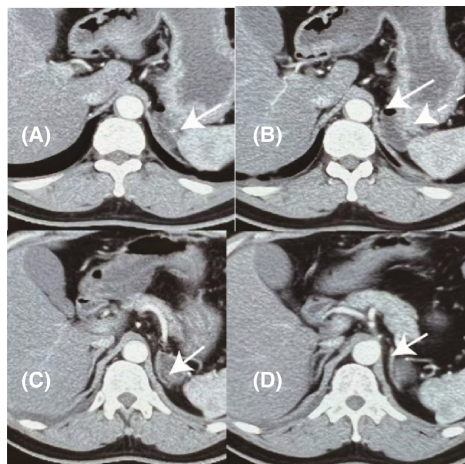


FIGURE 1 Preoperative adrenal enhanced CT (A) medium high-density adrenal mass; (B) the solid arrow points to a bubble in the adrenal occupation, and the dashed arrow indicates that the occupation appears to be continuous with the posterior gastric wall; (C) mixed-density shadow in the left adrenal region; (D) space occupation is closely related to the adrenal glands.

adrenal space-occupying lesions (Figure 1B), which CT value was about $-15\sim 28\text{HU}$. It was reported to be considered as gastric diverticulum and was recommended in combination with gastroscopy. Therefore, a capsule gastroscopy was performed, but no abnormalities were found at that time. Finally, he was diagnosed to have nonfunctional adrenal adenoma. As a result, a follow-up CT scan was recommended. Half a year later, a repeat CT (Figure 2) showed a slightly low-density mass ($43 \times 31\text{ mm}$) in the left adrenal area, with a CT value of about 9HU , radiolucent shadow and small patches of slightly high-density shadow (Figure 2A) seen within it, which was diagnosed as a left adrenal mass with gas and a small amount of hemorrhage. Considering that the size of the adrenal mass was significantly enlarged in a short period, we performed laparoscopic adrenalectomy via a retroperitoneal approach. After dissociating the left adrenal region and exposing the tail of the pancreas during the operation, no tumor-like lesions were found besides nodular changes in the left adrenal gland. We suspected that the lesion seen by imaging was an intra-abdominal lesion. Subsequently, the posterior peritoneum was cut open after consultation with the general surgeon, and then, a cystic lesion ($40 \times 30 \times 20\text{ mm}$) was found (Figure 3), which was proved to be contiguous with the posterior gastric wall after being dissociated and gastric diverticulum was highly suspected. The general surgeon considered that the lesion did not require surgical treatment, so the operation was completed and part of the nodular adrenal tissue sample was obtained for pathology. CT scan of the abdomen 3 days post the surgery (Figure 4) showed that the cystic lesion had become flattened but still had air bubbles (Figure 4A). The postoperative pathology

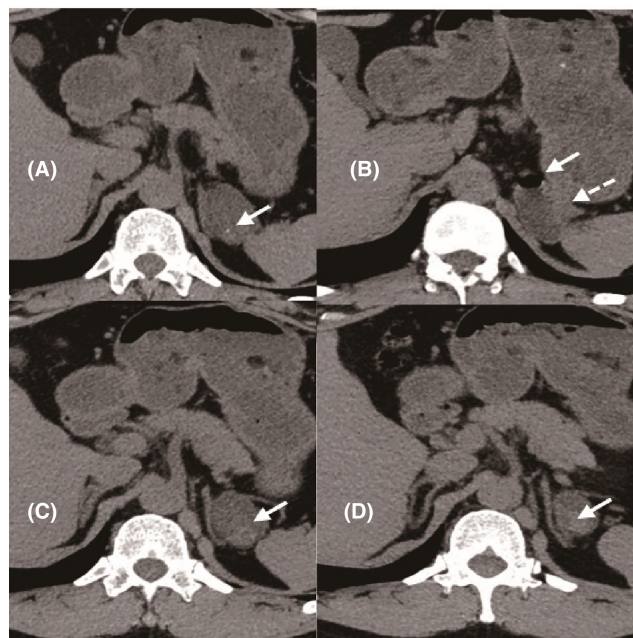


FIGURE 2 Preoperative repeat CT scan (A) medium high-density adrenal mass that became larger than Fig. 1A; (B) the solid arrow represents a bubble in the adrenal occupation and the dashed arrow indicates that the occupying position seems to be continuous with the posterior gastric wall; (C, D) mixed-density shadow in the left adrenal region that the shape and location of which had changed.

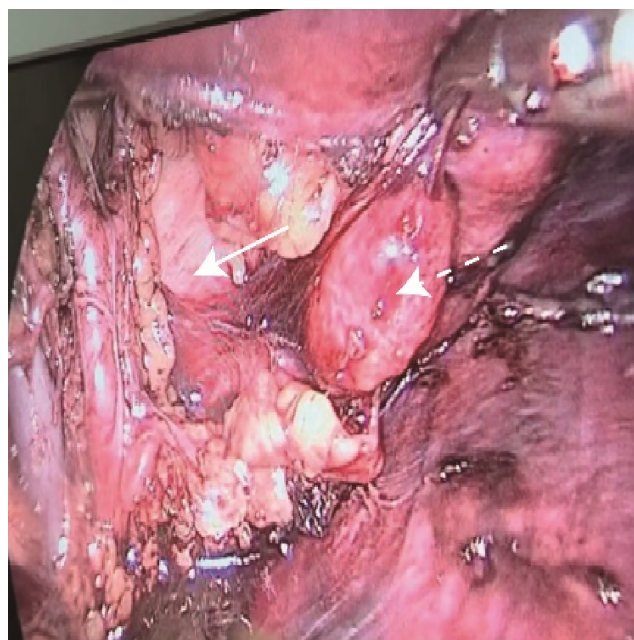


FIGURE 3 Intraoperative imaging. The solid arrow represents the gastric wall, and the dashed arrow represents the gastric diverticulum.

of the resected left adrenal tissue turned out to be adrenocortical adenoma. The patient is now recovering well and

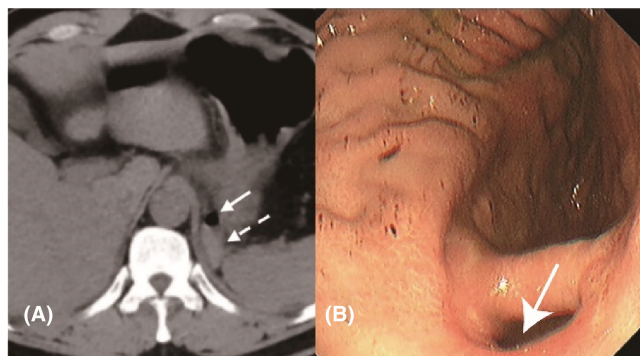


FIGURE 4 Postoperative examination. (A) Adrenal CT scan 3 days after operation: the solid arrow points to the bubble, and the dashed arrow points to a flattened cystic lesion; (B) gastroscopy performed after operation: the arrow points to the gastric diverticulum.

regular gastroscopy which was performed 3 weeks post the procedure revealed gastric diverticulum (Figure 4B).

3 | DISCUSSION

Gastric diverticulum refers to a benign lesion of localized pouch or cystic dilatation of the gastric wall due to congenital or acquired factors. It often occurs in the posterior wall of the stomach near gastric cardia. The endoscopic detection rate is only 0.01% to 0.11%.² Most often, there are no associated clinical symptoms.

In this case, all preoperative CT scans indicated a left adrenal tumor and no gastric diverticulum was found in the capsule gastroscopy. Therefore, gastric diverticulum was ruled out before the surgery.

The imaging examination is one of the most important methods to diagnose adrenal tumors. Reviewing this case, we found that the patient always had an adrenal mass with gas in all CT manifestations. Thus, it should be highly suspected that the lesion is communicating with the cavity organs. We must carefully identify the continuity of the lesion and the adjacent cavity organs. To compare the two preoperative CT scans of the patient (Figure 1A,C vs. Figure 2A,C), the locations of the high-density lesions in the adrenal gland in Figures 1A and 2A have significantly changed. Meanwhile, the locations and morphology of the mixed-density lesion in Figures 1C and 2C changed too.

As one of the smallest organs in the human body, the adrenal gland has a high misdiagnosis rate on imaging. According to the literature and the experience of surgeons, the main misdiagnosed adrenal masses include the ectopic pancreas, pancreatic tail tumors, pancreatic cysts, accessory spleen, gastric diverticulum, retro-abdominal gastric hernia, neurilemmoma, and retroperitoneal

bronchial cysts.^{3–9} It is difficult to make an accurate preoperative diagnosis due to the proximity of the anatomic structures, especially on the left side.

In conclusion, to avoid misdiagnosis of gastric diverticulum as a left adrenal mass, the following needs to be taken into consideration: (1) a bubble shadow in the area of the left adrenal on CT; (2) the morphology of the lesions was irregular, and there are some morphological changes on imaging taken at different times; (3) abdominal enhanced CT showed continuity between lesions and cavitary organs.

When the left adrenal tumor cannot be confirmed by imaging and gastric diverticulum is suspected, further barium gastrointestinal radiography, CT scan with oral iodine, or gastroscopy should be performed. Notably, capsule gastroscopy may not be an ideal method to detect small gastric diverticulum.

When no lesions are found during adrenal surgery consistent with the imaging reports, we should thoroughly clean up the adipose tissue in the adrenal region, fully expose the adrenal tissue, and even expose the tail of the pancreas to ensure that we have not missed an adrenal tumor or a lesion originating from the tail of the pancreas. Since adrenal surgery is usually performed via a retroperitoneal approach, after excluding the extraperitoneal lesions, the possibility of intraperitoneal lesions should be fully considered. A general surgeon should be consulted at this point. If gastric diverticulum is eventually diagnosed, it usually does not require surgical treatment. In case gastric diverticulum warrants surgical treatments, trans-abdominal surgery should be performed instead. Partial resection can be considered to treat small adrenal gland lesions.

AUTHOR CONTRIBUTIONS

Zhang JY gathered and analyzed the patient data and wrote the manuscript. Qian C analyzed the patient data and polished the writing of the manuscript. Pan CW summarized and supervised the entire work.

FUNDING INFORMATION

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data reported in this case report were obtained from the patient's medical records and imaging materials. In order to safeguard patient privacy, we will not disclose any personally identifiable information. Requests for access to the original data may be made to the relevant institutions

or through the corresponding author, subject to reasonable requirements.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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REFERENCES

1. Schwartz AN, Goiney RC, Graney DO. Gastric diverticulum simulating an adrenal mass: CT appearance and embryogenesis. *AJR Am J Roentgenol*. 1986;146:553-554.
2. Gockel I, Thomschke D, Lorenz D. Gastrointestinal: gastric diverticula. *J Gastroenterol Hepatol*. 2004;19:227.
3. Lin J, Yu Y, Chen Y, Zheng M, Zhou D. Heterotopic pancreatic cyst in the adrenal gland: a case report and review of literature. *Medicine (Baltimore)*. 2018;97:e9414.
4. Zhang T, Yin SF, Wang QW, Feng WB, Ke CX. Case report: the ectopic pancreas in the adrenal glands: it was found due to elevated blood pressure and initially diagnosed as adrenal adenoma. *Front Surg*. 2022;9:1040711.
5. Noguera JJ, Benito A, Hernandez-Sastre C, Cano D, Vivas I, Gonzalez-Crespo I. Gastric diverticulum mimicking cystic lesion in left adrenal gland. *Urology*. 2009;73:997-998.
6. Zhu J, Shi Z, Ni J, Lin Q. Retroperitoneal gastric hernia misdiagnosed as the adrenal tumor: a rare case report. *Asian J Surg*. 2022;45:1575-1576.
7. AlMalki MH, Alotaibi M, Ahmad MM, Rahman MAU, Alharthi T. Schwannoma misdiagnosed as adrenal adenoma: a case report and review of the literature. *Case Rep Endocrinol*. 2020;2020:8020761.
8. Cowan S, Gunawardene A, Davenport E. Retroperitoneal bronchogenic cyst mistaken as an adrenal adenoma. *ANZ J Surg*. 2021;91:E526-E527.
9. Zou Y, Xie X, Yan S, Wu G, Liu Q. Case report: misdiagnosis of accessory spleen in the left adrenal region as an adrenal tumour after splenectomy. *Front Surg*. 2022;9:1017603.

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