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Case report

Metastatic spread of primary lung adenocarcinoma to the small intestine: A case report

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ABSTRACT

Introduction and importance: Metastasis of primary lung cancer to the small intestine is rare, and the prognosis is poor. Early diagnosis of small intestinal metastasis is difficult because the incidence of clinically obvious symptoms is low.

Case presentation: This report described a rare case of small intestine metastasis of lung adenocarcinoma. It is worth noting that the patient was diagnosed with lung adenocarcinoma (T2aN0M0, stage IB) over a year ago. However, he complained of fever, black stools, and abdominal pain for about a year after the surgery. Enhanced CT scans showed thickening of the intestinal wall and dilatation of the lumen in the right iliac area and adjacent pelvic cavity. Capsule endoscopy identified a space-occupying lesion with hemorrhaging in the ileum. A laparotomy was subsequently performed, and the histopathological confirmation revealed a metastatic lung adenocarcinoma and immunohistochemistry further showed positive results for TTF-1 and CK7.

Clinical discussion: When patients with a history of primary lung cancer experience gastrointestinal symptoms, the possibility of distant metastasis of lung cancer to the digestive tract should be considered.

Conclusion: Due to the rarity of primary lung cancer metastasis to the small intestine, we report the case of a 64-year-old male who presented with symptoms of gastrointestinal bleeding and was ultimately diagnosed with metastasis of primary lung cancer to the small intestine. When patients with lung cancer present with gastrointestinal symptoms, we cannot rule out the possibility of distant metastasis from primary lung cancer, although this possibility is unlikely.

1. Introduction

Lung cancer is a highly lethal form of cancer. It is alarming that nearly half of lung cancer patients already have metastasis at the time of diagnosis, commonly affecting the adrenal gland, bone, liver and brain [1]. However, it is uncommon for primary lung cancer to metastasize to the gastrointestinal tract [2]. Detecting small intestinal metastasis early on poses a significant challenge due to the low occurrence of noticeable symptoms. When an obstruction, perforation, bleeding, or intestinal volvulus occurs, it may pose a life-threatening situation [3]. Research has indicated that the prognosis for patients with small intestinal metastasis is extremely poor. However, timely diagnosis and appropriate treatment may prolong the survival time of patients [4]. Here, we present a rare case of small intestinal metastasis in patients with primary lung adenocarcinoma. This work has been reported in line with the SCARE criteria [5].

2. Case presentation

A 64-year-old male presented with a history of fever, dark stool, and abdominal pain lasting for three days. He has no family history of tumors, but he has a smoking history of over 40 years. He had previously undergone a right upper lobectomy and hilar mediastinal lymphadenectomy a year ago due to Computed Tomography (CT) findings of the cavity in the eccentric posterior wall of the upper lobe of the right lung (Fig. 1), with preoperative Emission Computed Tomography (ECT) and

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enhanced CT showing no evidence of distant metastasis. The post-operative pathology report revealed invasive adenocarcinoma with tumor invasion of the visceral pleura, with approximately 80 % of the tumors being solid and approximately 20 % being acinar (The acinar portion is accompanied by a sieve-like portion). It is worth noting that another small invasive adenocarcinoma with a diameter of approximately 1 mm was found in the surrounding lung tissue under a microscope. However, no metastatic cancer was found in the lymph nodes (T2N0M0, IB stage). Fig. 4 a and 4 b showed the HE stained microscopic images of primary lung tumors. Immunohistochemistry showed that tumor cells were positive for Thyroid Transcription Factor-1(TTF-1), Cytokeratin 7(CK7) (Fig. 4 e: TTF-1(+) f: CK7(+)). Genetic testing shows that the missense mutation rate of ERBB2 P1106L exon is 44.4 %, and the missense mutation rate of KRAS G12C exon is 23.6 %. The patient also underwent four cycles of standard chemotherapy using pemetrexed and carboplatin within 5 months following the surgery. No significant abnormalities were found in the enhanced CT examination of the patient during chemotherapy. However, he complained of fever, black stools, and abdominal pain for about a year after the surgery, and went to the digestive department of our hospital. A blood routine examination showed moderate anemia (hemoglobin 84 g/L), positive fecal occult blood, and no obvious abnormality in the male tumor series. The patient received acid suppression, hemostasis, blood transfusion, and intravenous nutrition treatment. In addition, enhanced CT was performed on the chest, abdomen, and pelvis, revealing thickening and dilation of the right iliac fossa and adjacent pelvic intestinal wall (Fig. 2). Subsequently, the patient underwent a colonoscopy and showed the villous structure at the end of the ileum is regular, with no ulcers or masses observed. The mucosa of the ileocecal region is smooth, with no ulcers or masses observed. A polyp was found in both the ascending and descending colons, with no significant abnormalities in the other colons. During the patient's hospitalization, gastrointestinal bleeding persisted. To further investigate the cause of the bleeding, capsule endoscopy was performed and the results showed that the ileum was occupied by bleeding (Fig. 3). After consulting with a multidisciplinary team of experts, laparoscopic examination and surgical treatment were performed (Fig. 5). The patient and his relatives agreed to this course of action. The tumor was found to be an 8 × 7 cm mass located in the small intestine, approximately 80 cm from the ileocecal region, with serous membrane saturation and tortuous adhesion with the surrounding intestinal canal. Fig. 4 c and 4 d showed the HE stained microscopic images of metastatic small intestinal tumors. Histopathological confirmation revealed a metastatic lung adenocarcinoma, and immunohistochemistry showed positive results for TTF-1 and CK7 (Fig. 4 g: TTF-1(+) h: CK7(+)), which further indicated that it was a metastasis of primary lung adenocarcinoma. And the positive rate of the Ki-67 hotspot was about 80 %. The peri-intestinal lymph nodes were also found to have metastasized. The patient had no complications after the surgery and was discharged six days later. After discharge, we conducted follow-up on the patient. Due to the patient's sensitivity to their own illness, we consulted their relatives. The family members expressed that the patient was feeling low and, combined with poor physical condition after the surgery, had some reservations about further invasive procedures such as surgery and high-demand treatments like chemotherapy. Therefore, they chose traditional Chinese medicine for treatment. The patient did not come back to our hospital for further examination, so we cannot understand the specific progression of their condition.

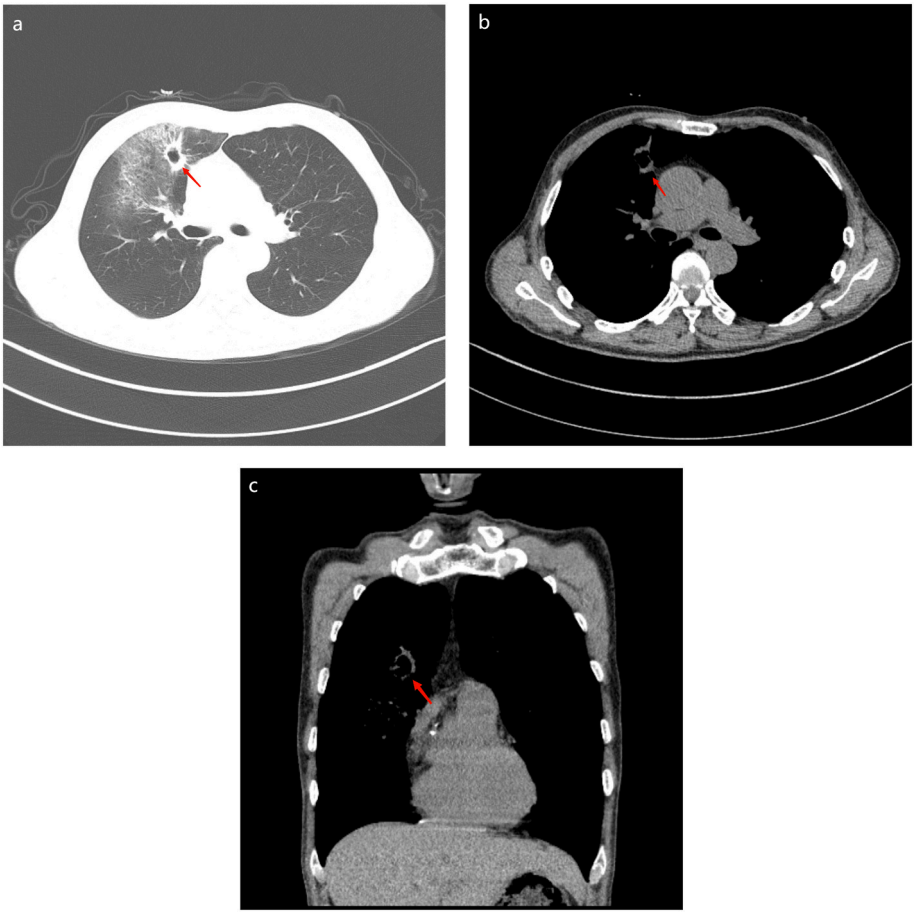

Fig. 1. Thoracic computed tomography (CT) revealed an Eccentric posterior wall cavity of the upper lobe of the right lung.

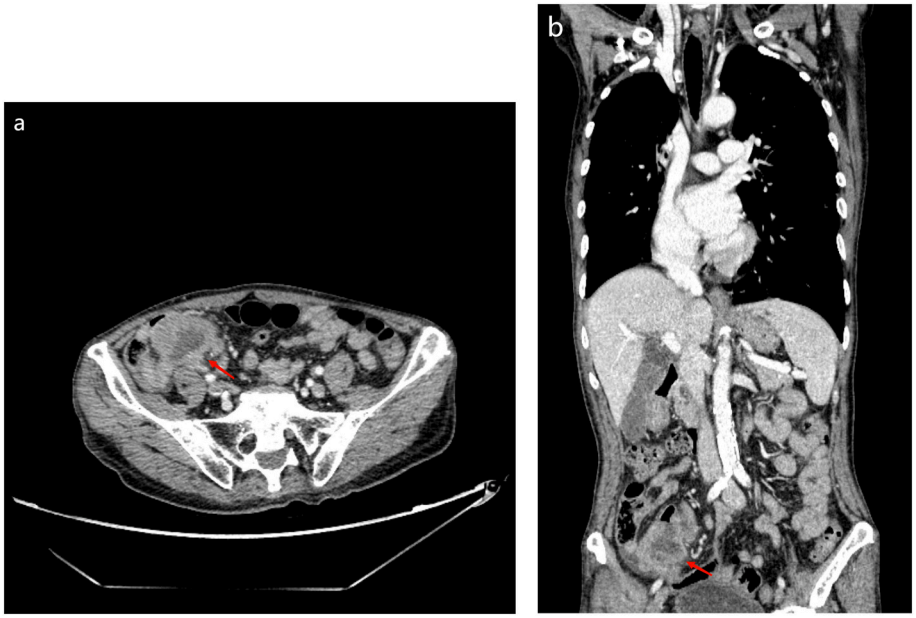

Fig. 2. Abdominal computed tomography (CT) revealed a small intestine mass in the abdomen.

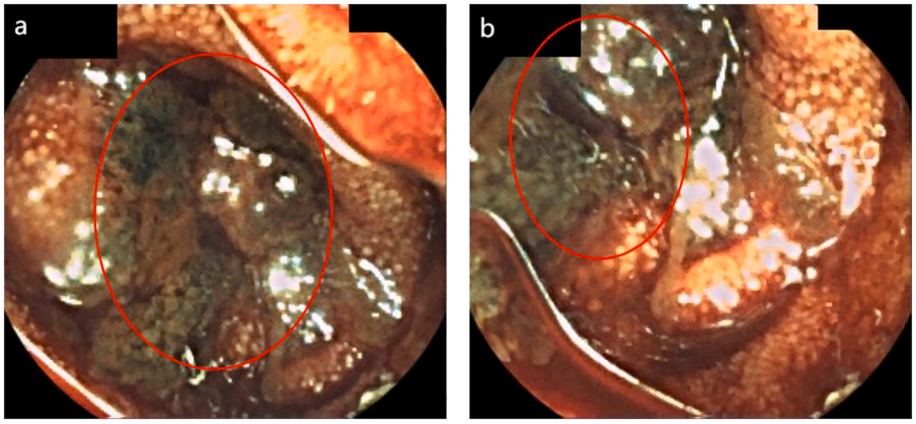

Fig. 3. Capsule endoscopy showed that the ileum was occupied with hemorrhage.

3. Discussion

Here, we present a rare case of small intestinal metastasis in patients with primary lung adenocarcinoma. To better understand the metastatic spread of lung adenocarcinoma to the small intestine, we analyzed cases of patients diagnosed initially with lung adenocarcinoma, who experienced small intestine metastasis after undergoing conventional surgery and other treatments, that have been reported between 2007 to the present (Supplementary Table 1) [6–10]. These cases classified the patients' primary lung cancer. In most instances, patients with lung adenocarcinoma who have received effective treatment have a significantly reduced risk of metastasis [11]. Our speculation regarding subsequent small intestinal metastasis is that it could either be residual cancer tissue from the initial lesions or that the patient might have experienced distant metastasis before the surgical intervention. It is noteworthy that the evaluation of primary lung cancer in these cases did not specifically mention the use of Positron Emission Tomography-Computed Tomography (PET-CT) for tumor staging. In some cases, PET-CT scanning has been proven to be a highly effective method for detecting hidden distant metastasis in patients [12]. Relying solely on CT scans may overlook the presence of hidden residual cancer tissue associated with distant metastasis, potentially impacting subsequent treatment options. Our case was initially diagnosed as stage IB (T2N0M0) lung adenocarcinoma. However, the postoperative pathology of the patient shows infiltrating adenocarcinoma, with about 80 % being solid-type. This indicates that the solid-type occupies a higher proportion. Other literature suggests that in the pathology of lung adenocarcinoma, solid-type has a poorer prognosis and higher risk of recurrence [13,14]. This suggests that the postoperative pathology of our patient's lung cancer indicates that the prognosis will not be too good. The invasion of the visceral pleura in this patient further suggests an unfavorable prognosis. And the patient's gene detection indicates a lack of obvious mutation targets and a poor prognosis, putting the patient at a disadvantage. These findings emphasize that if preoperative imaging, postoperative pathology, and genotype suggest poor prognosis in patients with primary lung cancer, special attention should be paid to the patient's subsequent clinical symptoms, imaging changes, and laboratory indicators. Furthermore, the significance of conducting a PET-CT examination during the initial diagnosis of lung cancer cannot be overstated, as it has been proven to be a highly effective method for detecting hidden distant metastasis in patients and allows for accurate staging, and can guide future treatment decisions [15]. However, the high cost associated with PET-CT examinations poses a challenge, as some patients may choose to forego the procedure due to financial

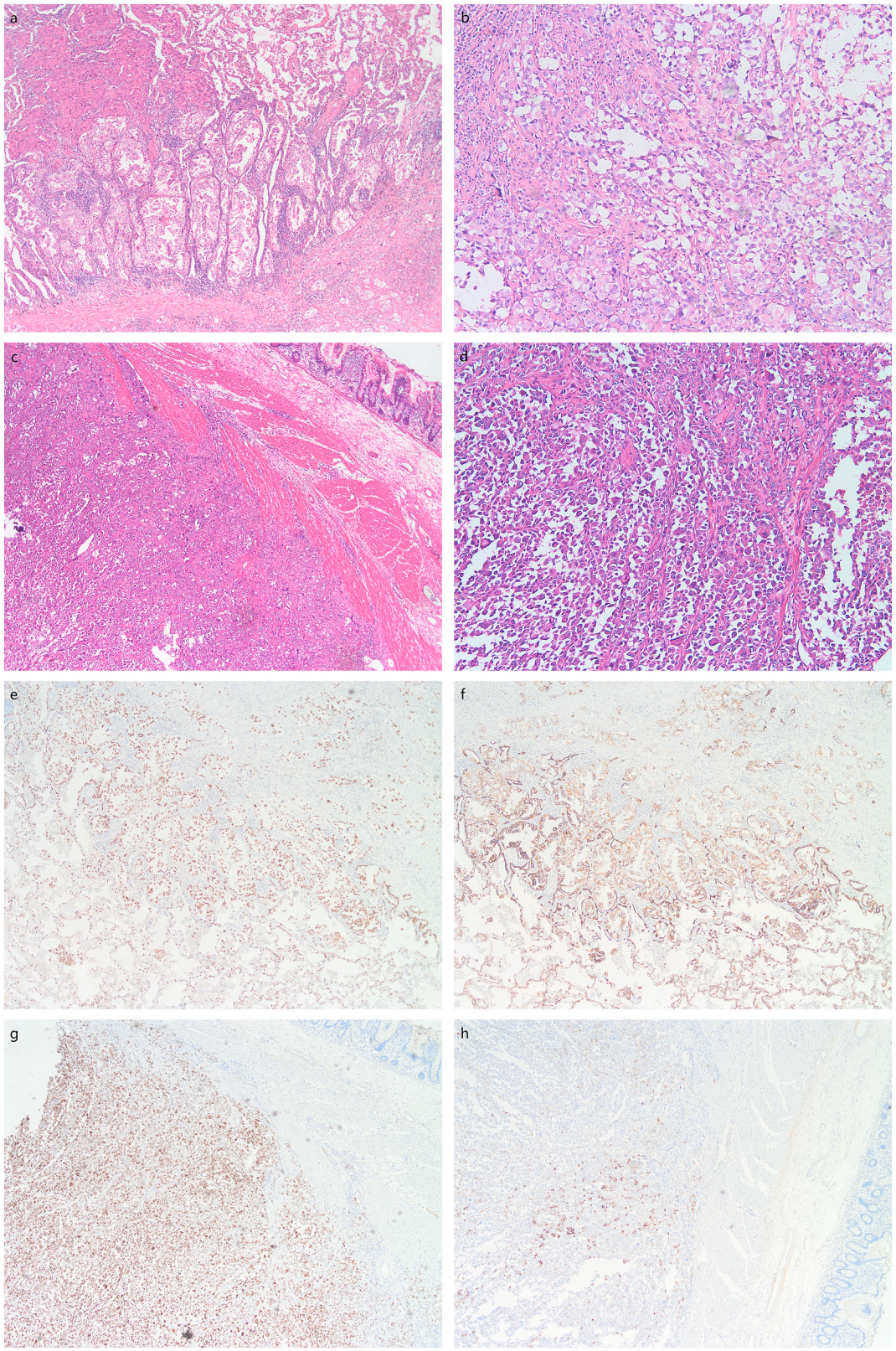

Fig. 4. a,b. HE stained microscopic images of primary lung tumors. c,d. HE stained microscopic images of metastatic small intestinal tumors. e. Immunohistochemistry showed that lung cancer cells were positive for TTF-1. f. Immunohistochemistry showed that lung cancer cells were positive for CK7. g. Immunohistochemistry showed that small intestinal metastatic cancer cells were positive for TTF-1. h. Immunohistochemistry showed that small intestinal metastatic cancer cells were positive for CK7.

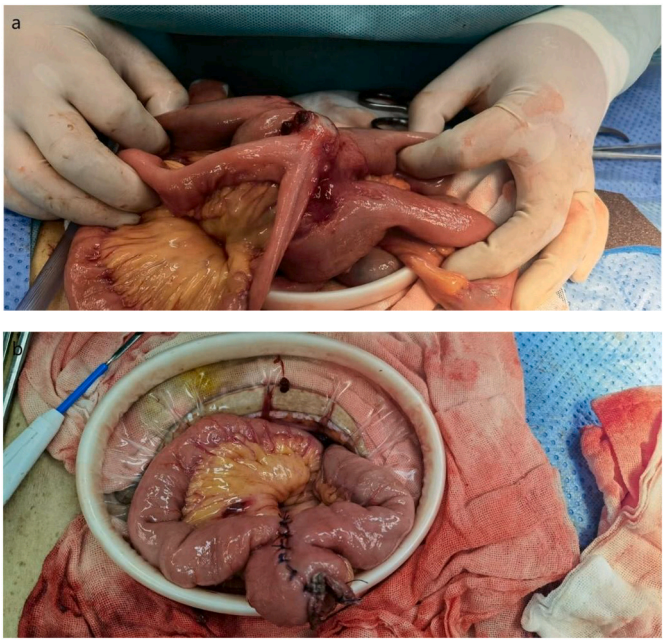

Fig. 5. a. Surgical specimen showing the metastatic tumor located in the small intestine with tortuous adhesion to the surrounding intestine. b. Postoperative specimen image of the small intestine.

constraints, resulting in a conflicting situation. Capsule endoscopy is mainly used for diagnostic purposes, especially for detecting lesions within the gastrointestinal tract where it can showcase its unique advantages. It is capable of providing non-invasive visible images of the intestines, making it particularly helpful in identifying small intestine metastases in lung cancer patients exhibiting signs of gastrointestinal bleeding. However, its effectiveness is limited when it comes to individuals with intestinal perforation or obstruction [16].

4. Conclusion

To summarize, when a patient who has been diagnosed with primary lung cancer starts experiencing symptoms of gastrointestinal bleeding after undergoing surgery, it is important to consider the possibility of distant metastasis of the lung cancer to the digestive tract.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijscr.2023.109111.

Patient consent

Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

Ethical approval is not applicable. The case report is not containing any personal information and is reporting a single case that emerged during normal practice.

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Author contribution

J.Y.L reviewed the literature and wrote the manuscript; Y.Z collected the data; Y.B.Y revised and edited the manuscript.

Guarantor

Yanbo Yu.

Declaration of competing interest

The authors declare that there is no conflict of interest.

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