

# Metastatic Small Intestinal Perforation from Carcinoma of the Lung: Report of a Case

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*Lung cancer is the most common cause of cancer-related death for both men and women. However, symptomatic gastrointestinal metastasis from the primary lung cancer is relatively unusual. Gastrointestinal perforation originating from metastatic lung cancer is even more uncommon. To our knowledge, approximately 100 cases of this entity have been reported in the literature. Herein, we present a 70-year-old male with long-term smoking history with symptoms and signs of acute abdominal pain. Tracing his medical history, he had unresectable undifferentiated large cell lung carcinoma in his upper left lobe that was proved 3 months prior to this admission. Peritonitis due to perforated hollow viscous was diagnosed and laparotomy revealed a perforated tumor at the ileum together with many other varied sized tumors disseminated in the small bowel which even caused luminal stenosis. Two segmental resections in the ileum with end-to-end anastomosis were performed separately. Pathological test results disclosed metastatic undifferentiated large cell carcinomas of lung cancer origin. The patient survived only 2 weeks after the operation of the cancer.*

**Key words:** *intestinal metastasis, intestinal perforation, undifferentiated large cell lung carcinoma*

## Introduction

Primary lung cancer is a leading cause of cancer-related deaths with a 5-year survival range of 10% to 25%<sup>(1)</sup>. Approximately 50% of patients have metastatic disease at the time of presentation<sup>(2)</sup>. The preferential sites of extrapulmonary spread include lymph nodes, liver, brain, adrenal glands, and bones<sup>(3)</sup>. Gastrointestinal metastases are considered to be rare but recent reports suggest that they may be more common than previously thought, because they are rarely symptomatic<sup>(4,5)</sup>.

However, it was not until 1961 that the first case of small bowel perforation caused by

metastatic lung carcinoma was reported by Morgan et al<sup>(6)</sup>. Herein, we present one case of primary lung cancer with obstructive and perforated metastatic small intestinal lesions treated by palliative segmental resections.

## Case Report

A 70-year-old man was admitted to our ward because of the sudden onset of abdominal pain, vomiting and general weakness for 2 days. Constipation for about 1 week was noted as well. He was a heavy smoker consuming approximately 10 cigarettes a day for four decades.

He was in good health until 4 months ago

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when dry cough with hoarseness was noted and he was admitted to our medical ward for a check up. Chest x-ray revealed an ill-defined left-sided hilar mass and bronchoscopy showed a left upper lobe bronchus ( $B_{1+2}$ ) stenosis with irregular hyperemic mucosa. Biopsy and transbronchial brushing cytology diagnosed undifferentiated large cell carcinoma. Two courses of irradiation therapy (600cGY/40 fractions) were performed and then he refused any further therapy. He was discharged and remained well until 3 days before this admission when the abdominal symptoms and signs appeared. The chest x-ray showed a larger left-sided hilar density than that of the prior chest film with compression of the left main bronchus and shift of the trachea to the right side, together with bilateral subphrenic intraperitoneal free gases

(Fig. 1). His abdomen was board-like rigid with rebound tenderness. Bowel sounds were hypoactive. Multiple subcutaneous nodules measuring 0.5-1 cm in diameter were palpable on his trunk. His blood pressure was 90/60 mmHg. His heart rate was 120/minute, and respiration rate was 26/minute. Blood routine showed RBC was  $265 \times 10^4/\text{mm}^3$ . WBC was  $19200/\text{mm}^3$ , hemoglobin was 8.4 g/dl, and platelet count was  $124000/\text{mm}^3$ . Other blood chemistry test results were within reference ranges except for the albumin level which was 2.6 g/dl. Abdominal computerized tomographic (CT) scan showed an ill-defined inhomogenous mass density at the right lower quadrant measured approximately  $6 \times 4.5 \times 4 \text{ cm}^3$  (Fig. 2). Under the suggestion of hollow viscous perforation, laparotomy was conducted under general anesthesia. Several

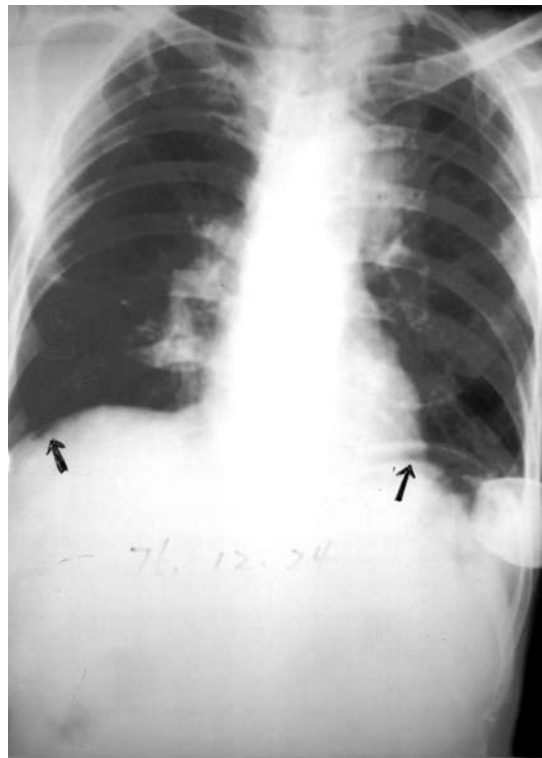


Fig. 1 Chest x-ray showed an ill-defined left-sided hilar mass about  $4.5 \times 3 \text{ cm}^2$  in size. Bilateral subphrenic free gases were noted (arrow heads)

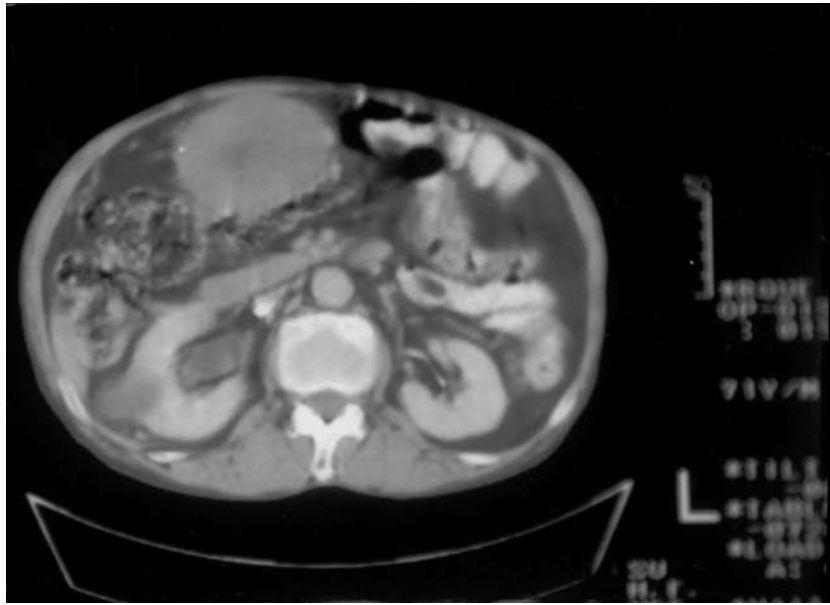


Fig. 2 Abdominal CT scan showed an inhomogenous density measured  $6 \times 4.5 \times 4 \text{ cm}^3$  in size at the right lower quadrant area. Ascites was conspicuous

indurated masses were at the jejunum and ileum with enlarged adjacent palpated mesenteric lymph nodes. A perforated mass measuring  $3.5 \times 3 \times 3 \text{ cm}^3$  on the ileum about 25 cm proximal to the ileocecal valve (Fig. 3) adhering to the surrounding loops was noted. Another tumor measuring  $3 \times 3 \times 3 \text{ cm}^3$  which had obstructed the lumen near the terminal ileum, was found also. Two segments of the ileum containing the perforated tumor and the distal stenotic tumor including the enlarged mesenteric nodes (Fig. 4) were resected separately and end-to-end anastomosis were performed. Two rubber drain tubes were left at the lower peritoneum and the abdomen was closed. Some subcutaneous nodules on his trunk were excised for biopsy. The patient died 2 week after the operation owing to post-operative respiratory failure. Pathologic test results confirmed an undifferentiated large cell carcinoma of the small intestine with transmural perforation. The tumor cells were characterized by large cells and vesicular nuclei, prominent eosinophilic nucleoli and abundant cytophasms, in addition, the

mitotic picture was conspicuous. No squamous or glandular differentiation was noted (Fig. 5). The mesenteric nodes revealed metastatic carcinoma. Biopsy from his abdominal skin nodules revealed metastatic carcinoma as well (Fig. 6).

## Discussion

Lung cancer is the most common cause of death due to cancer, and approximately 50% of such cases have distant metastasis at the time of the initial diagnosis<sup>(1)</sup>. The preferential sites of extrapulmonary metastasis of bronchogenic carcinoma are the lymph nodes, liver, adrenal gland, bone, and brain<sup>(3,7-9)</sup>. Gastrointestinal metastases are considered to be rare, but recent reports suggest that they may occur more frequently than previously thought, because they are rarely symptomatic, and most are found incidentally during the autopsy<sup>(10,11)</sup>. Occasionally, gastrointestinal metastases may occur relatively early in the course of the disease.



Fig. 3 Tumor at the ileum 25 cm proximal to the ileocecal junction with a perforated hole about  $1 \times 1 \times 1 \text{ cm}^3$  in size



Fig. 4 Resected two segments of ileum. Upper segment: perforated tumor with adjacent enlarged mesenteric nodes. Lower: tumor causing luminal stenosis, the adjacent nodes were enlarged too

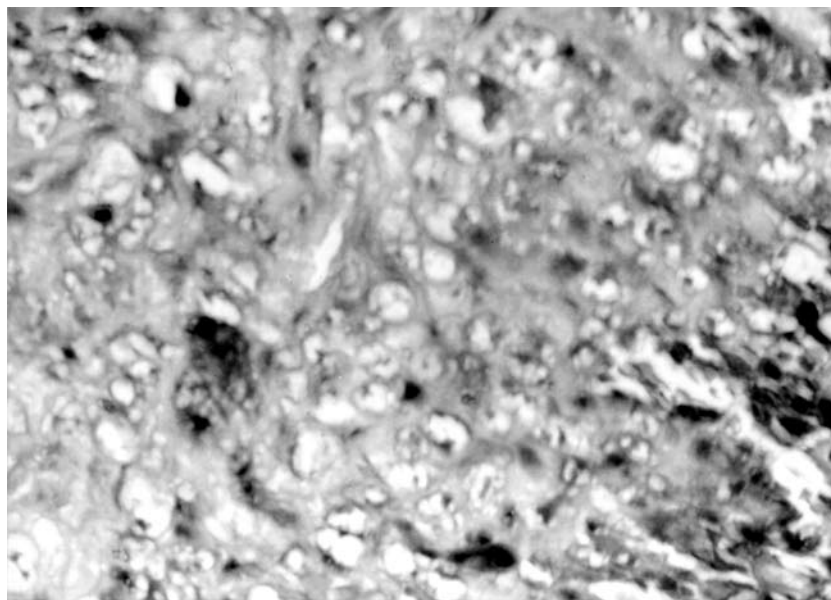


Fig. 5 Pathologic picture revealed that the tumor cells was characterized by large cell with vesicular nuclei, prominent eosinophilic nucleoli and abundant cytoplasm. No squamous or glandular differentiation was noted (H & E stain 400 $\times$ ). Mitotic picture was plenty and conspicuous

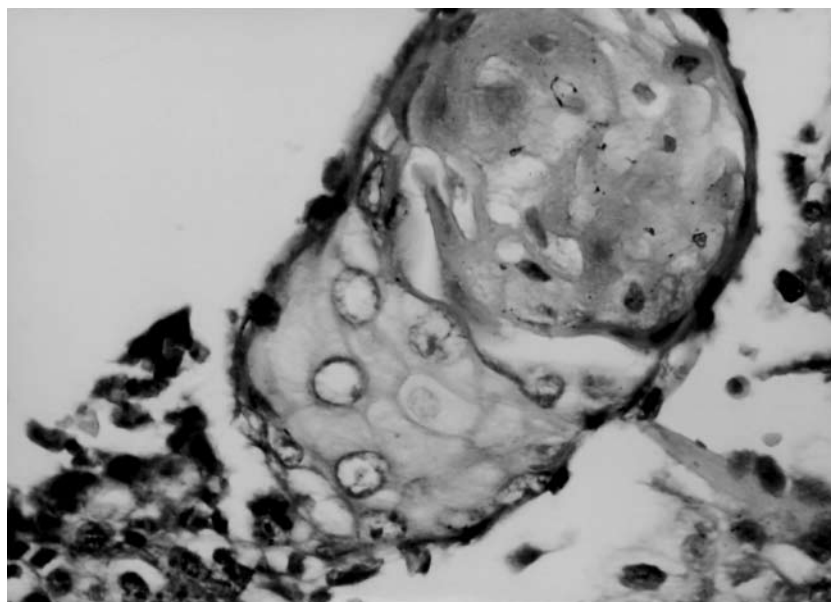


Fig. 6 Skin biopsy showed an undifferentiated large cell carcinoma favored of metastatic nature (H & E stain 400 $\times$ )

In a review of 3047 autopsy cases collected from the literature Ochsner and DeBaakey noted the involvement of the gastrointestinal system in 4.3% of the cases<sup>(12)</sup>. In 234 consecutive autopsies of patients with primary lung cancer, Engelman and McNamara found five (2.13%) with metastases in the intestines<sup>(13)</sup>. In 2005, Garwood et al reviewed the largest number of 106 cases of gastrointestinal tract perforations attributed to lung cancer metastasis, consisting of 98 cases of small bowel perforation, four cases of gastric perforations, three cases of colonic perforations, and one appendiceal perforation<sup>(14)</sup>. Of the 98 cases with perforated small intestine, the mean age at presentation was 64.5 years with a range of presentation of 32 to 85 years. Men accounted for 87 (89%) of the reported cases, and women accounted for the remaining 11 cases (11%). The overall mean survival was 66 days following small bowel perforation with 50 % of patients not surviving more than 30 days. Only two patients (2%) were reported to have survived longer than 1 year. The most common site of small bowel perforation was the jejunum (53%) followed by the ileum (28%). Combined jejunum-ileum lesions accounted for 6 % of the perforations<sup>(14)</sup>.

As described earlier, the spread of bronchogenic carcinoma may occur by direct extension, lymphatic or hematogenous dissemination, bronchial intraluminal extension or implantation secondary to aspiration biopsy or surgery.

In the reviews by Garwood et al<sup>(14)</sup>, the route by which lung cancer metastasizes to the small bowel is not well described, however, hematogenous spread is thought to be the most likely etiology. As also stated by Joffe et al<sup>(15)</sup>, metastatic lesions in the stomach, small bowel and colon may result from hematogenous dissemination of bronchogenic carcinoma. Although all histological types of bronchogenic carcinoma may spread via the blood stream, the incidence of vascular invasion appears to vary with the cell

type of the primary tumor. Leidich et al showed that there was no predilection for any particular histological cell type to perforate<sup>(16)</sup>. However, Antler et al reported that large cell carcinoma and small cell carcinoma were the most common subtypes, although squamous cell carcinoma had occurred more frequently in other studies<sup>(4)</sup>. When taking all case-series into account, we found adenocarcinoma and squamous cell carcinoma to be the most common histological subtypes, which correlated exactly with the most common histological subtypes of the lung primary tumors, however, large cell carcinoma seemed to predilect to invade the intestines when took the relative rarity was taken into account.

However, regarding to the mechanism as to why lung cancers metastasize to the gastrointestinal tract and cause perforation, Leidich et al postulated that the perforations occurred in areas of the small bowel where mural replacement by tumor cells occurred and was followed by necrosis. Thus, the tumor cells, while viable, serve to form a portion of the intact anatomic bowel wall. When tumor necrosis occurred for any reason, perforation may ensue<sup>(16)</sup>. However, as described in the series by DeCastro et al, when the mural tumor remained viable and grew into the bowel lumen, obstruction, instead of perforation, occurred<sup>(17)</sup>.

Because of the improvements in chemotherapy and supportive care for lung cancer in extending life expectancy, we may come across an increasing number of this kind of metastatic tumors in the future.

Symptomatic small bowel metastases may require a surgical approach. The procedure of choice is theoretically resection of the involved small intestine with primary enterostomy<sup>(5,7,10)</sup>. Nevertheless, the prognosis is considered to be very poor. Perioperative mortality previously reported varies from 60% to 100%<sup>(5,7)</sup>, and the mean survival was only 66 days with only half of the patients

surviving longer than 3 months. Furthermore, only 2 % of the patients survived more than 1 year. This is a clinically significant drop from the 20 % 1-year survival rate for the patients with stage IV lung cancer and no small bowel perforation<sup>(14)</sup>. We found no in the literature of patients surviving more than 16 weeks after surgery, except for one patient who was alive 5 months after the operation.

In conclusion, lung carcinoma with symptomatic gastrointestinal metastasis is unusual. Metastasis to the gastrointestinal tract is a dire prognostic sign, occurring typically in patients with advanced or widely disseminated lung cancer<sup>(18)</sup>. Early detection and early operation of this entity may be the only way to improve the dire outcome.

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# 小腸轉移性肺癌合併穿孔：病例報告

許博仁 吳志鏗 林志亮 顏郁晉

肺癌是現今人類男女癌症關聯性死亡最常見的病因；然而，肺癌轉移到胃腸道引起臨床上症狀的並不多見，因而導致胃腸道穿孔的情況更屬罕見。據文獻報告，此種病例至今少於40例。吾人提出一例七十歲男性有數十年抽煙病史，因急性腹痛就診；三個月前此病人剛被診斷為左上肺大細胞癌，已無法作根治性切除。此次在腹膜炎診斷下接受開腹手術，發現迴腸有腫瘤穿孔，另外小腸尚有多個散在性腫瘤引起腸壁阻塞，二段有腫瘤的小腸段予以切除並行端對端吻合，此病人術後二星期死於呼吸衰竭；病理切片顯示是轉移性肺大細胞癌引起小腸穿孔及阻塞。

關鍵詞：腸轉移，腸穿孔，分化不良大細胞型肺癌