

## Case Report

# Gallstone ectopia in the lungs: case report and literature review

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**Abstract:** Gallstone ectopia in the lungs is relatively rare, which accounts for its frequent misdiagnosis. This paper reports a case found in a suspicious lung cancer surgery. The patient received intrahepatic duct stone removal surgery and partial hepatectomy five months prior to the report. He started showing symptoms of cough and hemoptysis without any apparent cause one month before this report. Enhanced computed tomography showed a solid mass in the lower lobe of the right lung, which was considered as hamartoma or lung cancer. A wedge-shaped excision was then performed in the lower lobe of the right lung. After the surgery, postoperative findings and pathological examination results showed gallstone ectopia in the lung. This case reminds us that gallstones that overflow into the intraperitoneal section can enter the thoracic cavity through diaphragmatic weakness and travel to the lung, thus forming an inflammatory mass. The case also reminds us of the following points in clinical diagnosis: 1) remove gallstones to the greatest extent during cholelithiasis surgery to prevent the stones from migrating from the intraperitoneal area, which causes intraperitoneal and thoracic cavity complications; 2) conduct routine chest imaging examination after cholelithiasis surgery during the clinical follow-up period to facilitate early detection and timely treatment of intrathoracic complications; 3) inquire whether the patients suffering from a solid mass of the lower lobe of right lung, have cholelithiasis history to facilitate clinical diagnosis and avoid misdiagnosis, mistreatment, and treatment delay.

**Keywords:** Gallstone, intrathoracic complications, ectopia

## Background

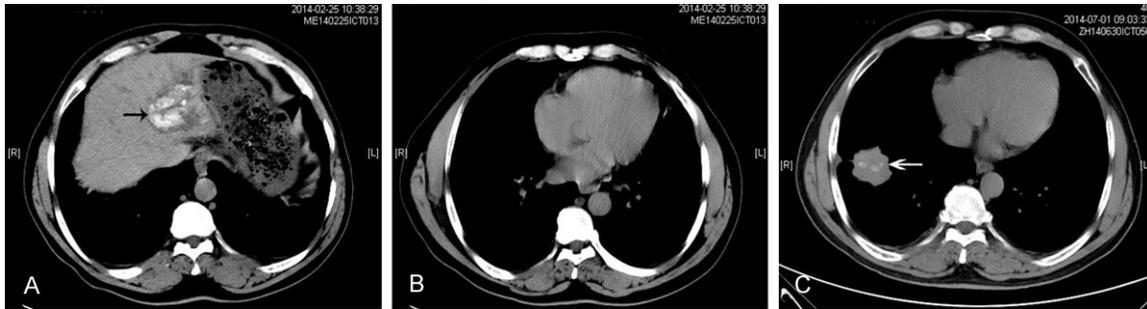
Space-occupying diseases of the lung invariably include lung malignant tumors, tuberculosis, hamartoma of the lungs, inflammatory pseudotumors, and other common diseases. However, lung mass caused by gallstone ectopia is relatively rare. This situation is mainly caused by gallstones that overflow into the intraperitoneal cavity after cholelithiasis surgery, as well as gallstones that enter the thoracic cavity through diaphragmatic weakness, and then travel to the lungs, thus forming an inflammatory mass [1].

## Case report

A male patient aged 57 years received intrahepatic duct stone removal surgery and partial hepatectomy five months before the study (**Figure 1A**). Preoperative chest X-ray and com-

puted tomography (CT) showed normal results (**Figure 1B**). One month before report, he exhibited the following symptoms without any obvious cause: cough, hemoptysis, production of a small amount of white sputum, accompanied by paroxysmal right chest pain without headache, nausea, vomiting, afternoon fever, fatigue, and night sweats. He previously underwent enhanced chest CT examination. The examination result showed that the anterior basal segment of the lower lobe of his right lung adhered to oblique segmentation. A round soft mass with uneven density, with a maximum section of 44 mm × 40 mm and CT 10-46Hu, were observed (**Figure 1C**). Scattered calcified images of small nodes were also observed. In addition, a lower-density image with CT -53Hu and spurs at the edge was seen. Pleural pull syndrome was also found. No significant lymph nodes were seen near the trachea, under the carina, in front of the vessel and behind the

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**Figure 1.** CT of liver and lung. A: Calculus of the intrahepatic bile duct (black arrow); B: No abnormality in lung five months before the report; C: Enhanced CT shows space-occupying lesions in the right lung, accompanied with calcified spots and pleural pull (white arrow).



**Figure 2.** Ectopic gallstones in lung by gross specimen (white arrow).

vena cava. Evident pleural effusion was not observed. The patient was diagnosed with a space-occupying disease of the lower lobe of the right lung, which was considered as hamartoma, with a pending investigation on lung cancer. A wedge-shape excision in the lower lobe of the right lung was conducted with the consent of the patient and his family. Intraoperative findings included the following: the tumor was located at the anterior basal segment of the lower lobe of the right lung, with dimensions of about 4.0 cm × 4.0 cm. The tumor was hard with clear boundaries (**Figure 2**). Adhesion between the diaphragmatic surface of the lung and the diaphragmatic muscle was observed, where the black stony particles was found. Intraoperative and postoperative pathology showed gallstone ectopia in the lung, accompanied by hyperplasia of the fibrous connective tissue, infiltration of inflammatory cell, and multinucleated giant cell reaction.

### Discussion

Hepatolithiasis is one of most common diseases involving hepatobiliary surgery. Treatment for this disease is very complicated. Stones are invariably distributed in the intrahepatic duct along the diseased bile duct, either regionally or segmentally. Complete cure effect is very difficult to be reached by cheledocholithotomy. However, partial hepatectomy can effectively remove the lesions covering stones, as well as the narrow and expansive bile duct, to achieve therapeutic effect. This procedure has become one of the routine surgical methods for calculus of the intrahepatic bile duct. However, this surgical method presents certain limitations for cases with more scattered stones in the liver. Residual stones, overflow of stones, subphrenic abscess, and other surgical complications can easily occur. This case involved multiple bile duct stones in the left lobe of the liver. Several stones were found in a more dispersed distribution. Stones overflowed to the subphrenic space during operation, entered the thoracic cavity through diaphragmatic weakness, and migrated to the lower lobe of the right lung, thus forming an encapsulated inflammatory mass.

Gallstone overflow mainly cause intraperitoneal complications. However, chest complications are rare. Fifteen similar cases have been reported to date; the earliest case was reported in 1975 [2]. A 64 year-old female underwent cholecystectomy in 1966. She was hospitalized three years later because of intermittent hemoptysis. A mass was found in her lower right lung. This mass did not present any significant change within two years of the follow-up. In 1972, this patient was hospitalized for emer-

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**Table 1.** The clinical data of 15 cases of gallstone ectopia in the lungs

Investigator	Presenting Symptom	Onset	Calcified Nodule on CXR	Location	Treatment
Schwegler 1975 [2]	Hemoptysis	36 m	Yes	RLL	RLL lobectomy
Lee 1993 [3]	massive hemoptysis	8 m	No	RLL	Laparotomy/bronchoscopy
Lee 1993 [3]	Cholelithoptysis	9 m	Yes	RLL	Lung wedge resection
Downie 1993 [4]	Cholelithoptysis/hemoptysis	12 m	No	RLL	Bronchoscopy/antibiotics
Thompson 1995 [5]	Cholelithoptysis/hemoptysis	NS	No	RLL	Bronchoscopy/antibiotics
Barnard 1995 [6]	Cholelithoptysis/hemoptysis	13 m	Yes	RML	Antibiotics/RML lobectomy
Breslin 1996 [7]	Cholelithoptysis/hemoptysis	2 m	No	RLL	Antibiotics
Chan 1998 [8]	Cholelithoptysis	6 m	No	RLL	Antibiotics
Baldo 1998 [9]	Cholelithoptysis/hemoptysis	60 m	No	RLL	Spontaneous resolution
Chopra 1999 [10]	Cholelithoptysis	30 m	No	RLL	Antibiotics
Werber 2003 [11]	Abscess with massive hemoptysis	6 m	Yes	RLL	RLL wedge resection
Scott 2005 [12]	Cholelithoptysis/hemoptysis	42 m	Yes	RLL	RLL wedge resection
Fontaine 2006 [1]	Hemoptysis	34 m	No	RLL	RLL wedge resection
Quail 2014 [13]	Cholelithoptysis/hemoptysis	60 m	No	RLL	RLL wedge resection
This case	Cholelithoptysis/hemoptysis	4 m	Yes	RLL	RLL wedge resection

gency treatment because of serious hemoptysis. She received lobectomy of the right lung. Postoperative pathological examination results showed a gallstone in the bronchi branch with relative lobe atelectasis. Among the 15 cases (as shown in **Table 1**), the most common symptom was hemoptysis (11/15), and one case was accompanied by lung abscess (1/15). Eight cases had hepatolithiasis or gallbladder stones surgical history. The mean interval time between gallstone surgery or gallstone discovery and lung mass discovery was 12.5 months, which ranged from a minimum of 2 months to a maximum of 60 months. Among these cases, six cases (6/15) presented calcified spots during their chest imaging examinations. All diseased were located at the right lung. 14 cases were located at the lower lobe of the right lung, and only one case was found at the middle lobe of the right lung. Surgical excision (8/15) was mainly used as the treatment for patients with recurrent hemoptysis, infection, sustained chest pain, or other evident clinical manifestations. Antibiotic drugs were mainly administered for cases with mild clinical symptoms or no obvious clinical manifestations to prevent from infection.

We can draw the following conclusions by reviewing the 15 cases. Chest complications of cholelithiasis is mainly caused by surgery or gallbladder perforation, in which stones overflow to the subphrenic, enter the thoracic cavity through diaphragmatic weakness, and migrate to the lung to form an encapsulated inflammatory mass. This review also reminds our clinicians of the following situations in the treat-

ment process: 1) to remove gallstones to the greatest extent during cholelithiasis surgery to prevent stones from leaving the intraperitoneal, which causes intraperitoneal and thoracic cavity complications; 2) to perform routine chest imaging examination after cholelithiasis surgery during the clinical follow-up period to facilitate early detection and timely treatment of intrathoracic complications; and 3) to inquire about the cholelithiasis history of patients suffering from space-occupying lesions of right lung, particularly those located at the lower lobe of the right lung, to facilitate clinical diagnosis and avoid misdiagnosis, mistreatment, and treatment delay.

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Written informed consent was obtained from the patient for publication of this case report and accompanying images.

### Disclosure of conflict of interest

None.

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