A rare cause of an 18F-FDG positron emission tomography-positive lung lesion: look for what was lost…

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CASE PRESENTATION

A 64-year-old former smoker presented with right flank pain of 1-month duration, minor haemoptysis and weight loss (10% over the past 12 months). His medical history was remarkable for atrial fibrillation, type 2 diabetes and laparoscopic cholecystectomy (CCE) with peroperative cholangiography for acute calculous cholecystitis 10 months earlier. CT of the chest demonstrated a 56×38 mm spiculated mass in the right costodiaphragmatic recess with transdiaphragmatic infiltration and possible invasion of liver segment 7 (figure 1A,B). Positron emission tomography (PET) revealed increased 18F-fludeoxyglucose uptake in the lesion (figure 1C), without evidence of locoregional or distant metastases, raising concern for malignancy. An ultrasound-guided transthoracic needle biopsy was performed. Pathological examination showed chronic inflammation and fibrosis but no malignant cells. The case was discussed at the multidisciplinary tumour board during which radiological imaging was reviewed. The radiologist now described the presence of multiple calcifications posterior to the right liver lobe, just below the diaphragm and adjacent to the presumed lung mass (figure 2A). MRI of the upper abdomen was proposed to better evaluate diaphragmatic extension and liver invasion. MRI confirmed the presence of multiple encapsulated calcifications (figure 2B), surrounded by a soft-tissue infiltrate extending through the diaphragm but without invading the liver. Imaging was compatible with 'lost' gallstones with extensive peridiaphragmatic inflammation. The patient underwent a right thoracotomy revealing dense adhesions of the right lower lobe to the right diaphragm. After freeing the lung, an opening was found in the posterior part of the right diaphragm. Exploration of the abdominal cavity through this opening was performed. The gallstones could not be visualised nor palpated. No collections were present and the diaphragmatic defect could be closed primarily. Three months postoperatively, the patient was seen at the outpatient clinic. He still experienced minor right upper abdominal discomfort and sporadic haemoptysis. On repeat CT of the chest and upper abdomen, the gallstones could still be visualised in the same location, but partial regression of the surrounding inflammatory reaction was noticed. Therefore, a further watchful waiting approach was adopted.

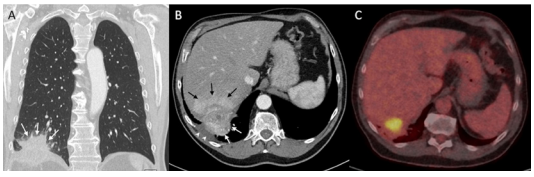

Figure 1 (A) Coronal contrast-enhanced CT image (lung window) showing a spiculated mass in the right lower lobe (white arrows) with transdiaphragmatic infiltration. (B) Axial contrast-enhanced CT image of the upper abdomen (arterial phase) showing the lung mass (white arrows), a small pleural effusion (arrowheads) and perfusion defect surrounding the mass (due to inflammation) (black arrows). (C) Fused axial positron emission tomography/CT image showing increased 18F-fludeoxyglucose uptake in the lung lesion.

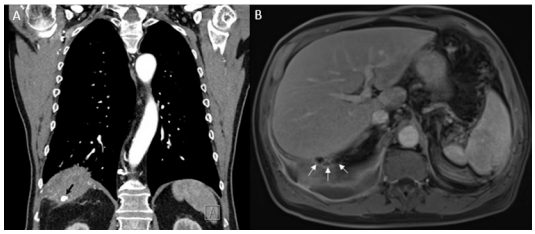

Figure 2 (A) Coronal contrast-enhanced CT image (mediastinal window) showing an infradiaphragmatic calcification (black arrow) adjacent to the lung mass. (B) Axial, gadolinium-enhanced T1-weighted fat-saturated volumetric interpolated breath-hold examination image showing multiple calcifications (white arrows) posterior to the liver.

DISCUSSION

Laparoscopic CCE is one of the most commonly performed procedures in general surgery. It has replaced open CCE as the gold standard for symptomatic gallstones.

An underappreciated complication of laparoscopic CCE is spillage of gallstones, which can occur as a result of gallbladder perforation. Spilled gallstones that are not retrieved intraoperatively are called lost gallstones. In a review by Zehetner *et al*,[1] analysing studies with more than 500 laparoscopic CCEs reporting spilled and/or lost gallstones, gallstone spillage rate was 6.8% across 15 741 procedures. Lost gallstones were reported in 66 out of 4813 procedures, resulting in a lost gallstone rate of 1.3%.

Approximately 8.5% of lost gallstones lead to complications, most often abdominal wall or intra-abdominal abscesses or fistula formation. Although rare, several thoracic complications have been

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described, including empyema, lung abscess, haemoptysis and cholelithoptysis. The underlying pathophysiological process is presumably an excessive inflammatory reaction secondary to the presence of retained stones, which may then erode through the diaphragm and cause bronchopleural fistula formation or septic complications. The time interval between clinical presentation and CCE is between 2 and 60 months with a mean of 12 months. The most common thoracic site involved is the right lower lobe.[2] Most thoracic complications of lost gallstones will require surgical treatment, although cholelithoptysis can be managed conservatively. However, the diagnosis of a retained gallstone should only be made once malignancy has been formally excluded with tissue histology, as a case of a synchronous invasive adenocarcinoma in the vicinity of an intrathoracic gallstone has been described.[3]

We report the case of lost gallstones remaining within the peritoneal cavity but causing an excessive inflammatory reaction resulting in erosion of the diaphragm and an intrathoracic PET-positive mass mimicking lung cancer. Pulmonologists should be aware of the existence of lost gallstones after CCE and their ability to cause thoracic complications.

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