gallbladder carcinoma with Pulmonary cavitary lesions

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INTRODUCTION

As a subtype of biliary tumors, gallbladder cancer is rare yet highly malignant[1]. Characterized by its ease of metastasis and poor prognosis, its common sites of metastasis include lymph nodes and the liver. However, it can also spread to other organs and tissues such as the lungs, bones, and peritoneum[2]. It's critical to note that the incidence of lung metastasis in gallbladder carcinoma hovers around 10-30%, with a dismal 5-year survival rate of around 5-10%[3-4]. Unusually, when gallbladder carcinoma metastasizes to the lungs, it can sometimes present as pulmonary cavitary lesions, although this manifestation is not commonly observed. In this light, we present a case of gallbladder carcinoma with pulmonary manifestations of cavitary lesions.

CASE PRESENTATION

A male patient in his twilight years presented with a cough and white sputum, symptoms which were more noticeable during the night. He also developed edema in his lower limbs, although there were no signs of fever, chest pain, or significant weight loss. The patient's past medical record was unremarkable, and he was generally in good health.

Enhanced CT scans of the chest and abdomen revealed multiple pulmonary cavitary lesions, mediastinal and supraclavicular lymph nodes enlargement, and a liver mass (figure 1). The laboratory tests showed a spike in the white blood cell and neutrophil count (table 1), while sputum culture showed no presence of pathogens (table 2). However, a surge in tumor markers such as neuron-specific enolase, calcitonin, and non-small cell carcinoma antigen index was observed (table 1). Electron bronchoscopy and ultrasound-guided supraclavicular lymph node biopsy confirmed the presence of metastatic adenocarcinoma (figure 4). An MR scan displayed heterogeneous signals in the gallbladder, and the PET-CT scan suggested increased FDG metabolism in the gallbladder, indicating a potential primary lesion originating from the gallbladder. After a multidisciplinary case discussion in our hospital, and considering the metastatic characteristics of gallbladder carcinoma, the final diagnosis was gallbladder carcinoma with multiple metastases to the lungs, lymph nodes, and liver, along with a concurrent pulmonary infection. The patient received treatment with levofloxacin for infection, promethazine hydrochloride for suppressing the cough, and spironolactone, furosemide, and other diuretics to alleviate his symptoms.

INVESTIGATIONS

Radiology

The enhanced CT scan of the patient's chest and abdomen revealed multiple cavity-like lesions in both lungs, with bilateral infectious lesions that were more prominent in the right lung. Additionally, enlarged lymph nodes were detected in the left supraclavicular fossa, right hilum, and mediastinum. A lesion was also found at the porta hepatis, which had an indistinct border with the pancreas and resulted in the narrowing of the portal vein. Hypodense lesions were also spotted in the liver (figure 1).

The enhanced MR scan of the upper abdomen revealed several abnormalities. There were partial ring-enhancing lesions in the liver, a lesion in the porta hepatis with unclear borders between it and the pancreas and liver, and involvement of the portal vein. Concurrent liver cysts were also present. The gallbladder displayed a heterogeneous signal, and enlarged lymph nodes were detected in the retroperitoneum (figure 2).

The whole-body PET-CT examination revealed localized thickening of the gallbladder neck with increased FDG metabolism and a cystic lesion in segment S3 of the liver that also showed increased FDG metabolism (figure 3). Multiple cavity-like lesions were detected in both lungs, with the consolidative cavity lesion in the right lung exhibiting increased FDG metabolism as well. There were multiple lymph nodes with increased FDG metabolism in the bilateral supraclavicular areas, mediastinum, right hilum region, retroperitoneum adjacent to the abdominal aorta, and bilateral skeletal vascular areas (figure 4). It is necessary to differentiate between potential tumors in the liver and the gallbladder.

Histology

Electron bronchoscopy and ultrasound-guided fine-needle aspiration biopsy of the left supraclavicular lymph node were conducted to obtain tissue samples from the lung and left supraclavicular area, respectively. In the tissue from the posterior segment of the right upper lobe of the lung, a few clusters of atypical cells arranged in a glandular pattern were visible, with observable mitotic figures. This finding suggests the presence of adenocarcinoma (figure 5).

The needle biopsy specimen from the fibrous connective tissue of the left supraclavicular region revealed metastatic adenocarcinoma (figure 6). Immunohistochemistry displayed a CK7+ and CK20-, TTF-1-, and NapsinA- profile, with a Ki-67 positive rate of approximately 10%.

These findings are consistent with a diagnosis of metastatic lung cancer.

DIFFERENTIAL DIAGNOSIS

The patient's initial symptoms of coughing, sputum production, and the presence of cavitary lesions in the lungs as seen on imaging could indeed be indicative of several conditions, including infections, connective tissue diseases, or primary lung tumors. Therefore, it's crucial that we differentiate this diagnosis from these potential diseases.

TREATMENT

Given the patient's severe lung infection and poor general condition, it is indeed appropriate to give levofloxacin to control the infection and promethazine hydrochloride to suppress the cough. Adding spironolactone and furosemide as diuretic treatments for symptom relief is also a suitable approach. This combined treatment strategy should contribute to improving the patient's overall comfort and condition. It is important to monitor the patient closely for any changes or potential side effects from these medications.

OUTCOME AND FOLLOW-UP

It's promising that the patient's infection markers were improving and a switch to piperacillin-tazobactam was initiated for antimicrobial treatment. However, the subsequent episodes of hemoptysis, loss of consciousness, unresponsiveness, speech inability, and urinary and bowel incontinence are concerning. It's reassuring that emergency treatment was successful in helping the patient regain consciousness. Unfortunately, the patient's family decided against further treatment and opted for discharge. It's essential to ensure they understand the potential consequences and risks associated with their decision. It's also important to provide guidance and resources for home-care if necessary, and encourage them to seek immediate medical help if the patient's condition deteriorates.

DISCUSSION

Gallbladder cancer, although rare, has a high degree of malignancy and generally a poor prognosis, making it a significant health concern. The case you reported, where gallbladder cancer metastasized to the lungs and formed cavitary lesions, is certainly an unusual and complex one[5-6]. This case can contribute to the medical

body of knowledge regarding the potential pathways and implications of gallbladder cancer metastasis. It also demonstrates the importance of thorough monitoring and aggressive management in patients diagnosed with this type of cancer.

Indeed, the development of cavitary lung lesions can be attributed to various conditions such as infections, vascular disorders, autoimmune diseases, and malignant tumors[2]. In the specific context of gallbladder cancer, these cavitary lesions may be a result of necrosis and liquefaction of metastatic tumors. Early detection and appropriate management of these lesions are essential as they can significantly affect the patient's prognosis. This underlines the importance of a thorough clinical evaluation and follow-up in patients with gallbladder cancer, especially when metastasis is suspected[7]. Understanding the potential for this type of complication can help guide treatment decisions and possibly improve patient outcomes.

We propose utilizing a clinical-radiological algorithm approach for the differential diagnosis of cavitary lung lesions. This entails evaluating their imaging characteristics via CT and PET-CT, and then combining these results with the patient's clinical symptoms and case features for diagnosis[2,8]. In the case we are discussing, the patient also had metastatic lesions in the liver and lymph nodes, a pattern that is consistent with the typical progression of gallbladder cancer metastasis[5,9]. Additionally, to confirm the nature and extent of these lesions, we performed a series of imaging examinations and biopsies[10-11]. However, though our findings align with previous studies, the exact mechanism of cavitary lung lesions caused by gallbladder cancer metastasis still remains unclear. Future studies are needed to further explore the mechanisms of gallbladder cancer metastasis and the formation of cavitary lesions[12].

CONCLUSION

Overall, this case underscores that cavitary lung lesions may serve as a significant clinical manifestation in gallbladder cancer, potentially indicating the presence of pulmonary metastasis. These manifestations, although their mechanisms are not yet fully understood, may provide valuable insights for the early diagnosis and treatment of gallbladder cancer. Moreover, the criticality of a multidisciplinary team in the diagnosis and management of such diseases cannot be overstated. Experts from diverse disciplines such as radiology, pathology, and internal medicine can collaboratively work to accurately determine the disease's nature and extent, thereby formulating the most effective treatment plan. Ultimately, our case report demonstrates the complexity and diversity of gallbladder cancer, thereby providing crucial insights into the disease process and potential therapeutic approaches.

AUTHOR CONTRIBUTIONS

Hongbo Li : Conceptualization; investigation; methodology; supervision. **Yingying wang** : writing-original draft; Data curation; resources; writing-review and editing. **Tingwei Zhang** : Validation; visualization. **Di Kang** : Validation; visualization.**Xuesong Wang** : Validation; visualization. **Ye Shao** : Validation; visualization.

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CONFLICT OF INTEREST STATEMENT

The authors affirm that they do not have any conflicts of interest.

ETHICS STATEMENT

This study has obtained ethical approval from the Mashhad University of Medical Sciences ethical committee and conforms to the principles outlined in the Declaration of Helsinki.

CONSENT

The patient provided written informed consent to publish this report, adhering to the journal's policy on patient consent. There is no need for permission to reproduce material from other sources in this case.

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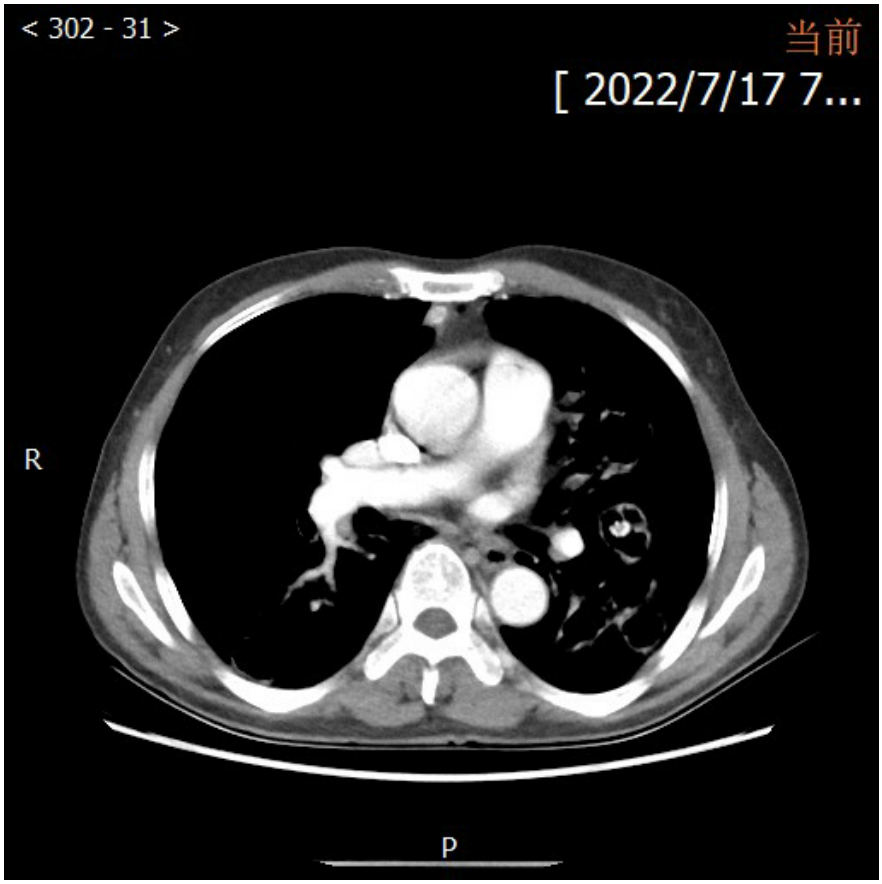

Figure 1 This image depicts multiple cavitary lesions in both lungs, enlarged mediastinal lymph nodes, low-enhancing lesions in the liver, and a mass located in the porta hepatis.

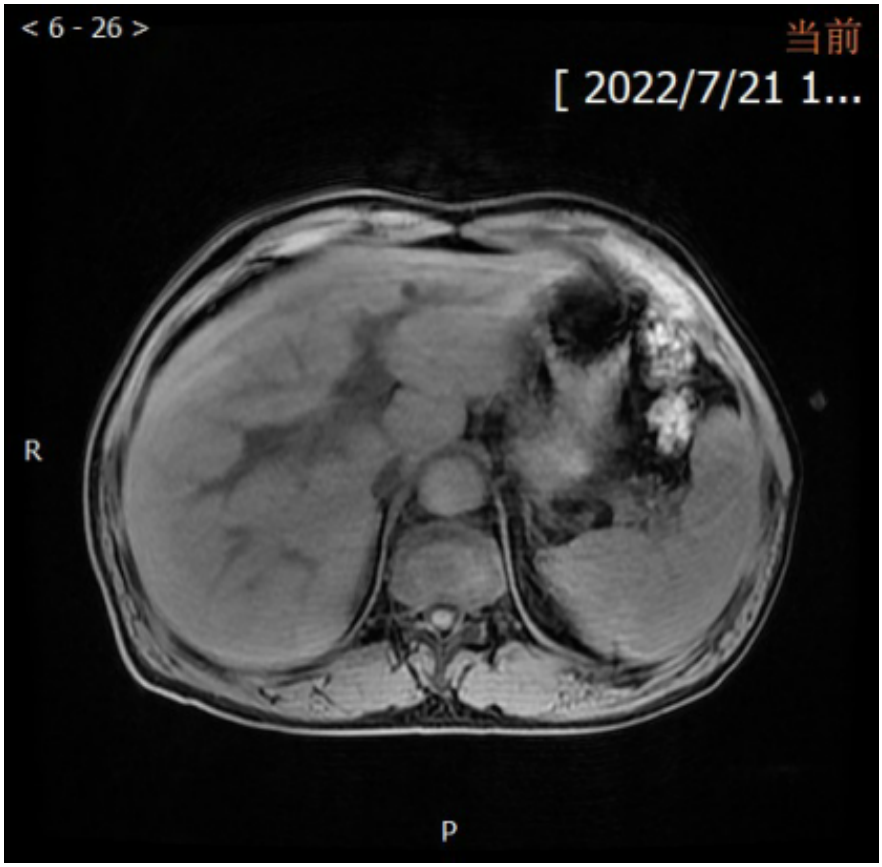

Figure 2 This illustration shows enhanced lesions in the liver, a mass in the porta hepatis, and a heterogeneous signal in the gallbladder.

Table 1 Relevant blood investigations	Table 1 Relevant blood investigations	Table 1 Relevant blood investigations
Parameter	Result	Normal range
White blood cell count	11.1 X 10^9/L	4-10 X 10^9/L
Absolute neutrophil count	9.3 X 10^9/L	3-5 X 10^9/L
Erythrocyte sedimentation rate	120 mm/h	0-15 mm/h
C-reactive protein	161.60 mg/L	0-6 mg/L
Total bilirubin	16.47 μmol/L	5-23 μmol/L
Direct bilirubin	3.39 μmol/L	0-4 μmol/L
Indirect bilirubin	13.08 mol/L	0-13 μmol/L
Total complement	72.20 U/mL	23-56 U/mL
Neuron-specific enolase	41.47 ng/mL	0-15.3 ng/mL
Calcitonin	0.88 ng/mL	<=0.046 ng/mL
Non-small cell carcinoma antigen	43.91 ng/mL	0.1-3.3 ng/mL
Activated partial thromboplastin time	36.7 S	28-44S
Fibrinogen	5.6 g/L	2-4 g/L
D-dimer	2.35 mg / L	0-0.5 mg / L
Anti-SSA-60 antibody	160 U/mL	0 U/mL
(xMAP) Anti-SSA-52 antibody	114 U/mL	0 U/mL

Table 2 discriminatory diagnostic indicators	Table 2 discriminatory diagnostic indicators
Name	Result
Cryptococcal antigen test	Negative
G-test	Negative
GM-test	Negative
Gram stain	Abundant positive cocci, abundant negative rods
Anti-nuclear antibody test	Negative
ANCA (Anti-neutrophil cytoplasmic antibody)	Negative

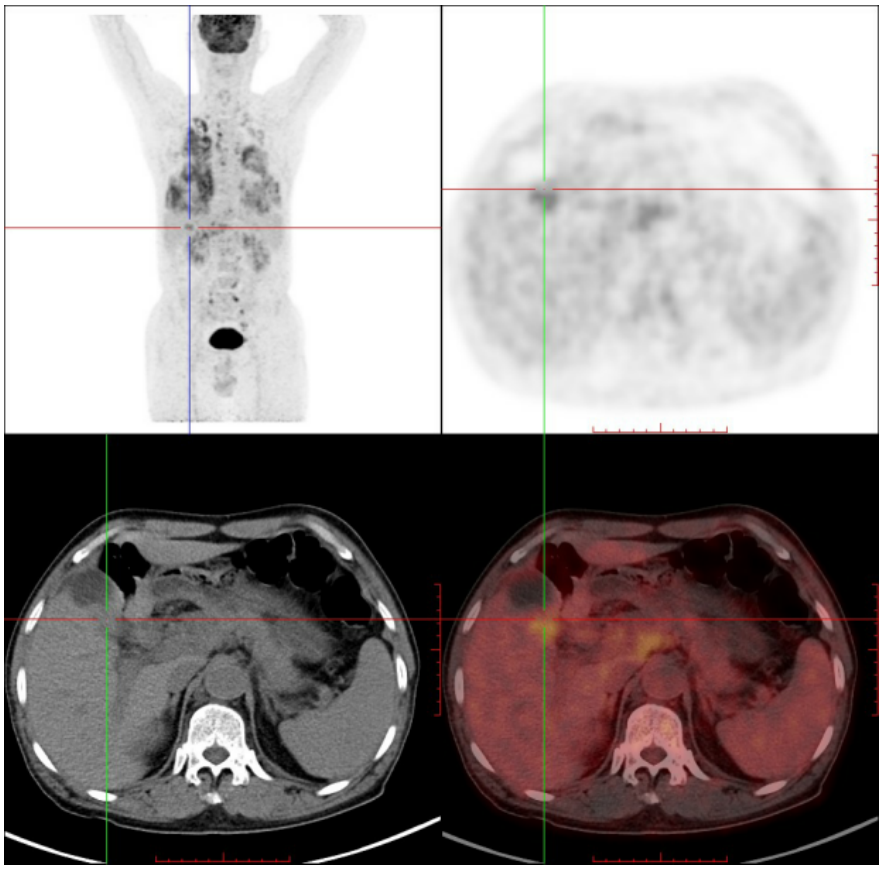

Figure 3 This image displays increased FDG metabolism occurring in the neck of the gallbladder and segment S3 of the liver.

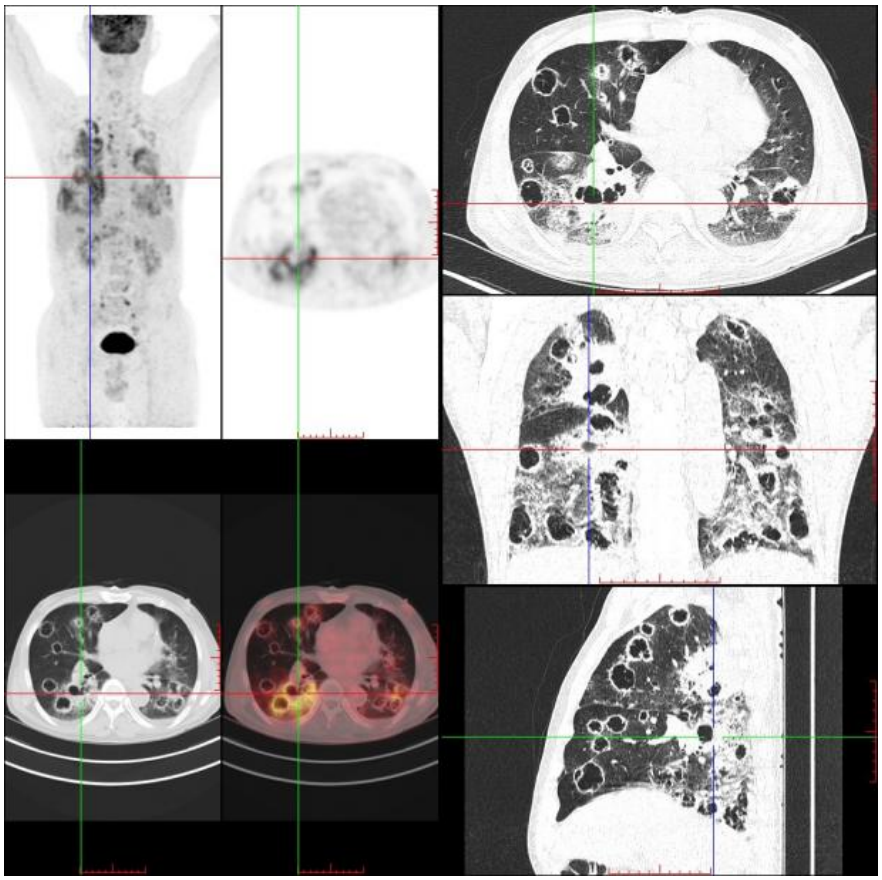

Figure 4 This illustration demonstrates increased FDG metabolism in several areas: the lungs, both supraclavicular regions, mediastinum, right pulmonary hilum region, para-aortic region behind the peritoneum, and bilateral skeletal vascular regions.

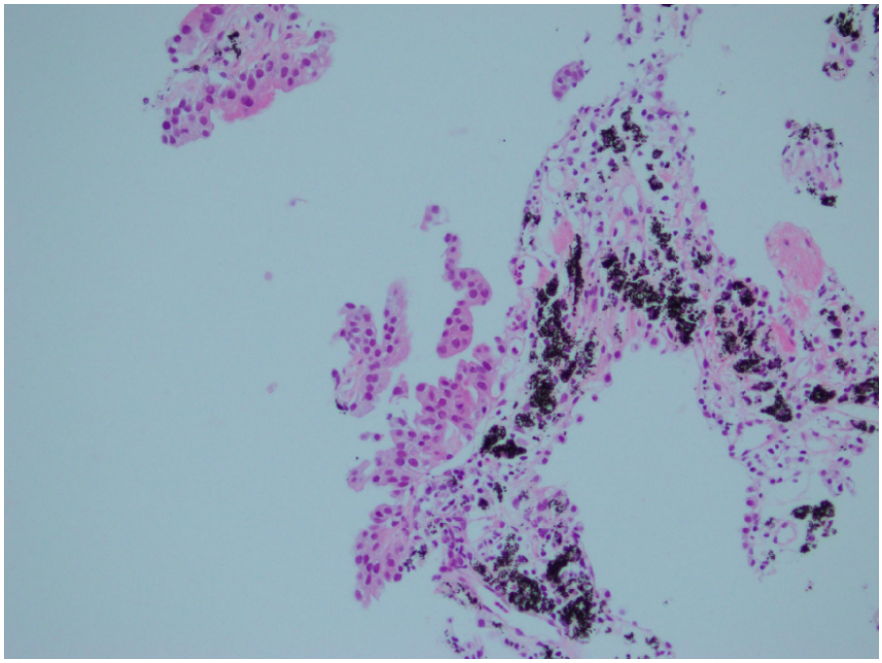

Figure 5 This image shows a few clusters of atypical cells with a glandular arrangement in the posterior segment of the right upper lobe of the lung. Notably, nuclear mitotic figures, which are indicative of cell division, are also observed.

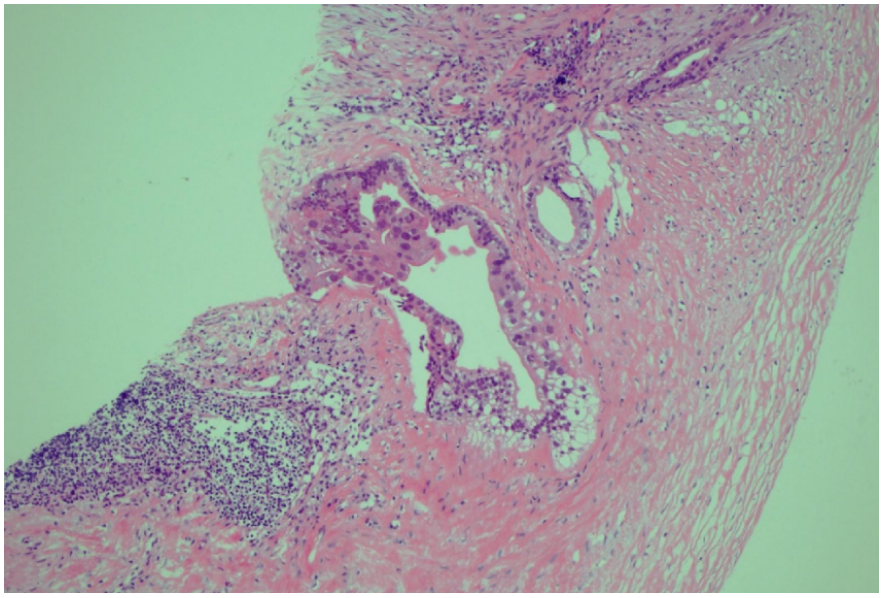

Figure 6 This image illustrates the presence of metastatic adenocarcinoma, a type of cancer, within the connective tissue of the left supraclavicular region.