Radiology Case Reports 19 (2024) 2969–2972

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case Report

Pleural small cell lung cancer masquerading as malignant mesothelioma: A case report☆,☆☆,★

*Adele Hwee Hong Lee, MBBS**, *Samuel Jackson Macalister, MD, Kelvin K. Yap, FRANZCR*

Department of Radiology, St Vincent's Hospital Melbourne, 41 Victoria Parade, Fitzroy, VIC 3065, Australia

ARTICLE INFO

Article history:
Received 29 March 2024
Accepted 1 April 2024

Keywords:
Malignant mesothelioma
Lung neoplasms
Small cell lung carcinoma
Positron-emission tomography
Tomography
Pleural effusion

ABSTRACT

Nodular soft tissue pleural thickening on imaging is highly suggestive of malignancy, of which pleural malignant mesothelioma and metastatic disease are differentials. We present the case of a 71-year-old male who presented with acute worsening of shortness of breath associated with a recurrent left pleural effusion post-pleurocentesis. He was an ex-smoker with previous asbestos exposure. Computed tomography performed demonstrated left-sided pleural thickening in the hemithorax and hemidiaphragm with complex pleural effusion. ^{18}F-2-deoxy-d-glucose whole body PET scan revealed extensive uptake throughout the left hemithorax in multiple pleural masses. The imaging findings and clinical case were typical of malignant mesothelioma. However, histopathology results revealed small cell lung cancer. We need to be cognisant of this atypical presentation of a common disease entity. Even when all clinical and imaging findings point towards a certain diagnosis, histopathological assessment cannot be ignored.

Introduction

Small cell lung cancer is a common disease, with 250,000 people diagnosed globally every year [1]. With the increase in uptake in computed tomography and PET scans, it is important to explore both typical and atypical radiological presentations of this disease. Although most commonly presenting with a hilar mass, it can present rarely as predominantly pleural disease. Correlating clinical and radiological findings with histopathological results would be vital to reaching a diagnosis and guiding the correct management of the patient.

Case report

A 71-year-old male was transferred to a tertiary hospital for assessment and management of a recurrent large left pleural effusion after pleurocentesis one month prior. He presented

☆ Author contributions: Adele HH Lee and Samuel J Macalister drafted and revised the manuscript; Kelvin K Yap conceptualized the research project, provided advice and guidance and revised the manuscript; all authors read and approved the final version of the manuscript.

☆☆ Funding: None.

★ Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

* Corresponding author.
E-mail address: adelelee396@gmail.com (A.H. Hong Lee).

https://doi.org/10.1016/j.radcr.2024.04.011

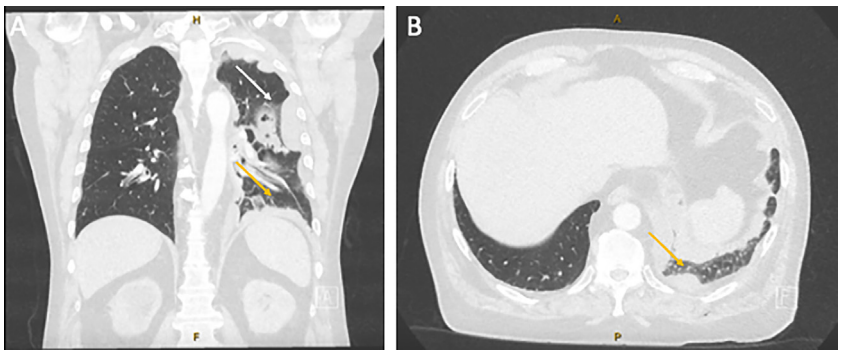

Fig. 1 – A CT chest abdomen and pelvis in lung window demonstrating left-sided pleural thickening in the hemithorax (white arrow) and hemidiaphragm (yellow arrows) characteristic of mesothelioma. (A) Coronal view. (B) Axial view. CT: computed tomography.

acutely with worsening shortness of breath over one week. This is on the background of a nine-month history of shortness of breath on exertion, associated with a dry cough. He also experienced unintentional weight loss of 11 kg, nausea and alteration to his taste. He denied any chest wall pain or hemoptysis. He is an ex-smoker with a 12 pack-year history and has a past history of hypertension, diverticular disease, high cholesterol and gout. Additionally, he is an ex-factory worker with previous asbestos exposure for 27 years.

On presentation he was afebrile, normotensive with a heart rate of 80 beats per minute and oxygen saturation of 98% on room air. He appeared cachectic and chest auscultation revealed diminished breath sounds on the left lower zone. Complete blood count was insignificant. Biochemistry revealed acute kidney injury with a creatinine of 116 micromoles/L and egfr of 54 ml/min/1.73m^2.

A computed tomography (CT) chest, abdomen, and pelvis scan performed prior to surgery showed a nodule and left-sided pleural thickening in the hemithorax and hemidiaphragm with complex pleural effusion and a 5 mm right anterior segment upper lobe nodule (Fig. 1). MRI brain was negative for intracranial metastases. The main differential diagnosis was malignant mesothelioma due to the nodular appearance of the tumor along the pleural surface. A ^{18}F-2-deoxy-d-glucose (FDG) whole body PET scan performed revealed extensive uptake throughout the left hemithorax in multiple pleural masses, more prominent inferiorly but extensively to the apex (Fig. 2). Abnormal soft tissue was seen to be invading the mediastinum and extending into the inferior costophrenic recesses. There was also focally increased uptake in right lower lobe pleural plaque and adjacent subpleural lung. No FDG avid lymph nodes were demonstrated. As an inpatient under the Thoracic Surgery team, he underwent video-assisted thoracoscopic surgical pleurodesis where samples of the left pleura were taken for histological assessment.

Histopathology revealed solid neoplastic cells with hyperchromatic cells with neuroendocrine differentiation and focal geographic type necrosis consistent with small cell (neuroendocrine) carcinoma. Tumor cells were positive for CD56 and Synaptophysin and negative for TTF-1. It was not positive for mesothelioma markers. Based on this diagnosis of extensive small cell lung cancer (SCLC), the patient was suggested for chemotherapy with palliative intent.

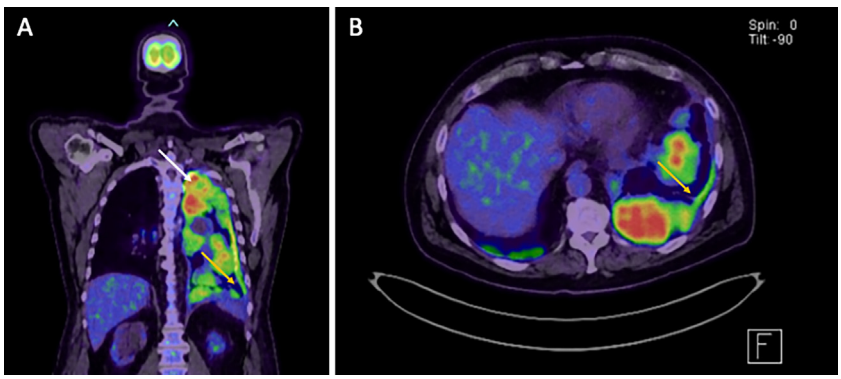

Fig. 2 – ^{18}FDG whole body PET scan performed revealed extensive uptake throughout the left hemithorax in multiple pleural masses extending from the apex (white arrow) to the inferior costophrenic recess (yellow arrow). (A) Coronal view. (B) Axial view.

Table 1 – Cases of pleural small cell lung cancer described in the literature.

Author, year	Type of study	How tissue was obtained	No. of patients	Age (gender)	Follow-up duration (months)
Bouvier, 1989 [6]	Case report	Thoracotomy	1	67M	10
Schinkewitch, 1996 [7]	Case report	Needle biopsy of pleural mass	1	62M	26
Maeda, 1998 [3]	Case report	Autopsy	2	74M, 69F	7;3
Van der Heijden, 2002 [8]	Case report	Needle biopsy of pleural mass	1	66M	11 days
Masuko, 2006 [9]	Case report	Needle biopsy of pleural mass	1	69M	NR
Yangui, 2009 [10]	Case report	Needle biopsy of pleural mass	1	36M	NR
Adejorin, 2015 [11]	Case report	Thoracocentesis of pleural fluid	1	77M	NR
Ul Haq, 2018 [5]	Case report	Needle biopsy of pleural mass	1	71M	NR
Jang, 2019 [4]	Case report	Needle biopsy of pleural mass	1	85M	NR

F: Female; M: Male; NR: not reported.

Discussion

SCLC of the lung is a highly aggressive cancer which represents about 15% of all lung cancers [2]. They are mostly centrally located and rarely involve the pleura. We present a biopsy-proven case of SCLC with predominantly pleural involvement, which mimicked mesothelioma in appearance on CT and ^{18}FDG whole body PET. There was no evidence of pulmonary localization or distant metastases. This highlights the importance of thinking broadly while evaluating malignancy based on imaging, especially when a tissue diagnosis cannot or has not been obtained. Accurate diagnosis is critical as SCLC is highly responsive to chemotherapy and can prolong survival compared to mesothelioma. Our patient was fit enough for intervention, which made histological assessment possible to confirm the diagnosis.

A type of neuroendocrine lung neoplasm, SCLC is often associated with smoking and asbestos exposure. It has a higher predilection in males compared to females [2]. Patients often present with small intrapulmonary lesions and bulky mediastinal lymphadenopathy. The disease often occurs in the center of the lung rather than the periphery as neuroendocrine cells are thought to originate more often from the central bronchi [3]. Pleural effusion is an infrequent finding, occurring only 3% of the time [4]. Pleural involvement in SCLC is extremely rare and has only been described in case reports previously (Table 1) [3–11]. This could be explained by hematogenous spread of tumor cells from pulmonary and/or bronchial arteries to the visceral pleura and then along the pleural space [3]. Distant metastases are frequently seen in the bone, liver, brain and adrenal glands [2].

CT scan represents the gold standard to the imaging diagnosis for thoracic malignancy. Radiological features of SCLC have been well described in the literature. A non-contiguous mass can be identified in up to 41% of cases. A mass can be identified in or adjacent to the hilum showing signs of internal necrosis, and may invade into the mediastinum [12,13]. In a retrospective study by Lee et al, the most common CT finding was a hilar mass with ipsilateral mediastinal extension (40.8%) followed by bilateral mediastinal extension (38.8%). They suggest that a mediastinal conglomerate mass (i.e., cannot be distinguishable from lymph nodes as a single mass) from a hilar tumor to be a recognizable SCLC CT finding [14]. ^{18}F-FDG PET can help guide staging and management by unmasking the existence of occult metastatic foci in the mediastinal lymph nodes and distant organs [15]. Our patient did not display a discrete mass but instead diffuse involvement of the pleura.

Malignant mesothelioma is an important differential to consider when pleural involvement is observed, especially if there is no parenchymal involvement in a patient with known asbestos exposure [4]. Unlike SCLC, mesothelioma often shows a pleural-based mass with or without parenchymal lung lesion on CT. Findings include circumferential pleural thickening, thickened mediastinal pleura, nodular or lobular borders within the internal profile; irregular borders of the external profile; mediastinal and pericardial infiltration, lymph nodes in extra pleural fat tissues. Pleural effusion is a non-specific sign [16]. The top differential for our case was malignant mesothelioma due to the multiple pleural masses extending throughout the left hemithorax in a patient with known smoking and asbestos exposure. Other differentials include non-small cell lung cancer which are typically peripherally located [12].

Differentiating SCLC from other causes is often difficult based on CT alone. A diagnosis of SCLC requires histological confirmation of neuroendocrine cells. In our patient, microscopic features and immunohistochemistry confirmed the diagnosis of SCLC. Expression of TTF-1 is controversial. However, positivity for synaptophysin and CD56 is in favor for SCLC [4]. In our case, the tumor cells were negative for mesothelial markers which also supports this diagnosis. Once a diagnosis has been made, systemic chemotherapy without radiotherapy is the cornerstone of management. Treatment remains challenging due to SCLC's aggressive growth rate. The prognosis and response rate of SCC of the pleura is unknown due to extremely low prevalence [4,9].

In this case report, we describe a case of pleural SCLC mimicking malignant mesothelioma on CT and ^{18}FDG whole body PET. Although this patient had the classical history and imaging findings of mesothelioma, histology is always required for confirmation of diagnosis. An atypical presentation of common disease entity such as SCLC should be considered. This case highlights that there are always exceptions to the rule; that radiological assessment cannot replace histological assessment in reaching a diagnosis, no matter how straightforward the case appears to be.

Patient consent

The authors declare that written, informed consent for publication of the patient's case was obtained from the patient.

REFERENCES

[1] Megyesfalvi Z, Gay CM, Popper H, Pirker R, Ostoros G, Heeke S, Lang C, Hoetzenecker K, Schwendenwein A, Boettiger K, Bunn PA Jr, Renyi-Vamos F, Schelch K, Prosch H, Byers LA, Hirsch FR, Dome B. Clinical insights into small cell lung cancer: Tumor heterogeneity, diagnosis, therapy, and future directions. CA Cancer J Clin 2023;73(6):620–52.

[2] Dumoulin DW, Bironzo P, Passiglia F, Scagliotti GV, Aerts J. Rare thoracic cancers: a comprehensive overview of diagnosis and management of small cell lung cancer, malignant pleural mesothelioma and thymic epithelial tumours. Eur Respir Rev 2023;32(167):1–16.

[3] Maeda Y, Segawa Y, Takigawa N, Takata I, Fujimoto N, Hotta K, et al. Two cases of small cell lung cancer presenting an unusual pattern of progression mimicking pleural mesothelioma. Int J Clin Oncol 1998;3(2):121–4.

[4] Jang JG, Jang MH, Ahn JH. Pleural small cell carcinoma with massive pleural effusion: a case report. Medicine (Baltimore) 2019;98(48):e18251.

[5] Ul Haq A, Kha V, Bhardwaj H. A rare case of SCLC presenting as mesothelioma. Chest 2018;154(4):646A.

[6] Bouvier DP, Bell B. Small cell carcinoma of the pleura. South Med J 1989;82(11):1437–8.

[7] Schinkewitch P, Gasser B, Wihlm JM, Pauli G, Quoix E. Small cell carcinoma of the pleura. A case report. Lung Cancer 1996;16(1):87–94.

[8] van der Heijden HF, Heijdra YF, Bulten J, Festen J. Pleural small cell carcinoma in pre-existent asbestos related pleural disease. Lung Cancer 2002;35(1):91–4.

[9] Masuko H, Satoh H, Ohara G, Anami Y, Noguchi M, Ohtsuka M. Pleural small cell carcinoma. Lung Cancer 2006;53(3):391–2.

[10] Yangui I, Msaad S, Ketata W, Ayedi L, Sellami T, Ayoub A. A new case of pleural small cell carcinoma. Rev Pneumol Clin 2009;65(6):350–2.

[11] Adejorin OD, Sodhi A, Hare FA, Headley AS, Murillo LC, Kadaria D. Pleural small cell lung carcinoma: an unusual culprit in pleural effusion. Am J Case Rep 2015;16:912–15.

[12] Hollings N, Shaw P. Diagnostic imaging of lung cancer. Eur Respir J 2002;19(4):722–42.

[13] Gharraf HS, Mehana SM, ElNagar MA. Role of CT in differentiation between subtypes of lung cancer; is it possible? Egypt J Bronchol 2020;14(1):28.

[14] Lee D, Rho JY, Kang S, Yoo KJ, Choi HJ. CT findings of small cell lung carcinoma: can recognizable features be found? Medicine (Baltimore) 2016;95(47):e5426.

[15] Kamel EM, Zwahlen D, Wyss MT, Stumpe KD, von Schulthess GK, Steinert HC. Whole-body (18)F-FDG PET improves the management of patients with small cell lung cancer. J Nucl Med 2003;44(12):1911–17.

[16] Falaschi F, Romei C, Fiorini S, Lucchi M. Imaging of malignant pleural mesothelioma: it is possible a screening or early diagnosis program?—a systematic review about the use of screening programs in a population of asbestos exposed workers. J Thorac Dis 2018;10(Suppl. 2):S262–8.