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Primary pulmonary diffuse large B cell lymphoma presenting as a left lower lobe mass: A case report and literature review

Ghada Araji, Sah Sajan, Zaid Khamis, Michel Al Achkar, Salman Khan, Ibrahim Al Saidi

ABSTRACT

Introduction: Primary pulmonary diffuse large B cell lymphoma (PPDLBCL) is extremely rare neoplasm representing only 0.5–1% of primary pulmonary malignancies. Patients usually have non-specific clinical presentation and radiologic findings which makes it a challenging diagnosis.

Case Report: We report the case of an 82-year-old man presenting with cough and unintentional weight loss. Chest computed tomography (CT) showed an infra-hilar left lower lobe mass with a mediastinal subcarinal lymph node. Tissue sampling by endobronchial ultrasound (EBUS) resulted in the diagnosis of primary pulmonary diffuse large B cell lymphoma. He was started on R-CHOP chemotherapy regimen (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone) and attained complete remission after 2 cycles.

Conclusion: The findings from this case indicate that primary pulmonary diffuse large B cell lymphoma should be considered in the differential diagnosis of primary pulmonary masses.

Keywords: Diffuse large B cell lymphoma, Lung mass, Non-Hodgkin lymphoma, Primary pulmonary lymphoma, R-CHOP chemotherapy

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INTRODUCTION

Primary pulmonary lymphoma (PPL) is a rare and heterogeneous disease defined as a clonal lymphoid proliferation confined to the lung (parenchyma and/or bronchi), with or without hilar lymph node involvement and no detectable extrapulmonary disease at the time of diagnosis and up to three months afterward [1, 2]. It accounts for only 0.5–1% of all primary lung malignancies, less than 1% of all non-Hodgkin lymphoma (NHL) cases, and 3–4% of extranodal NHL [3, 4]. The most common subtype of PPL is mucosa-associated lymphoid tissue (MALT) lymphoma, referred to as bronchus-associated lymphoid tissue lymphoma (BALTOMA), which represents 70–80% of all PPLs. In contrast, primary pulmonary diffuse large B cell lymphoma (PPDLBCL) constitutes only around 11–19% of PPL, and thus is extremely rare [1]. Here, we present the case of an 82-year-old man presenting with cough and an abnormal chest CT scan showing a lung mass suggestive of primary lung cancer, who was found to have PPDLBCL. We further discuss the clinical presentation, radiologic findings, pathogenesis, and therapeutic options of PPDLBCL.

CASE REPORT

An 82-year-old man, ex-smoker, presented to our clinic with a one-month history of productive cough, associated with decreased appetite and significant 10-kg weight loss. He denied dyspnea, hemoptysis, fever, or night sweats. The physical examination did not show any significant findings. Laboratory investigation was normal except for a platelet count of 525 × 10^3/μL, creatinine of 1.49 mg/dL, and thyroid-stimulating hormone (TSH) of 18.3 mIU/mL. He underwent radiological evaluation with a CT scan of the lungs showing an infra-hilar, left lower lobe mass, extending into the left hilum and invading the mediastinum, highly suspicious of a primary lung malignancy with a sub-carinal enlarged lymph node (Figure 1). This was followed by a positron emission tomography (PET) scan that showed a 12.1 × 7.3 × 8.4 cm highly avid central, infra-hilar left lower lobe mass, obliterating the left lower lobar bronchus with an SUV_{max} of 20.6, with a 15 × 12 mm fluorodeoxyglucose (FDG) avid (SUV_{max} 11.1) subcarinal lymph node and a moderate left sided pleural effusion demonstrating low activity with an SUV_{max} of 1.7. A brain magnetic resonance imaging (MRI) was also performed and was negative for any metastatic disease (Figure 2).

Considering the patient's age, smoking history, and presentation, a primary lung cancer was high on the differential diagnosis. To confirm our diagnosis, the patient underwent a bronchoscopy and endobronchial ultrasound (EBUS) for tissue sampling. Morphological and immunophenotypic features of the specimen revealed numerous large cells positive extensively for CD20, PAX5, and multifocally for CD30 and P63. CD3 and CD5 were positive in scattered small stromal T cells. The cells were negative for CKAE1/AE3, CK7, CK5/6, and TTF1, which is not in favor for the diagnosis of carcinoma. Moreover, the proliferation index, Ki67, was highly positive (≥65%), indicating a high-grade neoplasm. These findings were consistent with a PPDLBCL.

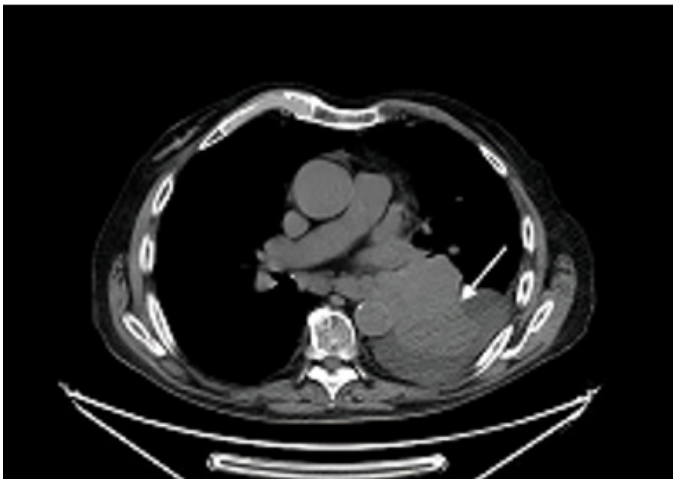

Figure 1: CT scan of the chest showing an infra-hilar, left lower lobe mass, extending into the left hilum and invading the mediastinum, highly suspicious of a primary lung malignancy with a sub-carinal enlarged lymph node (LN).

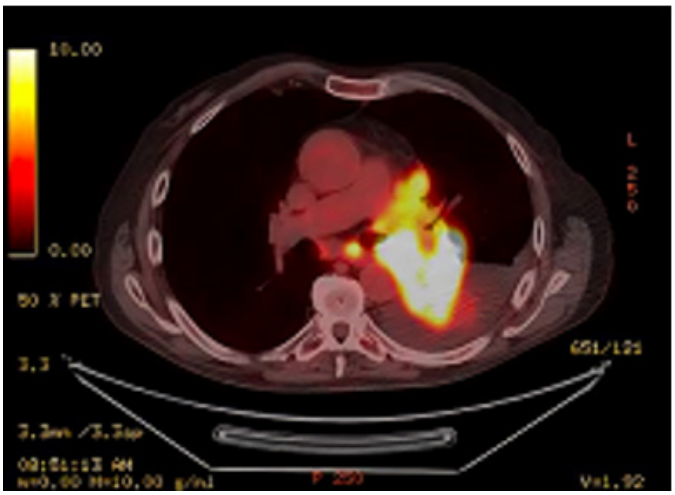

Figure 2: PET scan showing a 12.1 × 7.3 × 8.4 cm highly avid central, infra-hilar left lower lobe mass, obliterating the left lower lobar bronchus with an SUV_{max} of 20.6, with a 15 × 12 mm FDG avid (SUV_{max} 11.1) subcarinal lymph node and a moderate left sided pleural effusion demonstrating low activity with a SUV_{max} of 1.7.

The patient also underwent a pleural tap where the pleural fluid analysis showed T lymphocytes but no malignant cells suggestive of a reactive pleural effusion rather than a malignant one. Further workup to complete the staging of the lymphoma included a bone marrow biopsy which revealed no lymphoma involvement. Thus, the patient was diagnosed with Stage II 2E pulmonary DLBCL with a Revised International Prognostic Index (R-IPI) score of 1 (classified as low risk group). He was started on systemic chemotherapy with dose reduced R-CHOP (rituximab, cyclophosphamide, vincristine, doxorubicin, and prednisone). He achieved a complete remission as documented by PETCT scan done after two cycles, and was then kept on the same chemotherapy regimen for a total of six cycles.

DISCUSSION

Primary pulmonary diffuse large B cell lymphoma is an extremely rare entity that generally occurs in immunocompromised or elderly patients but can also be seen in immunocompetent individuals [5, 6]. Male and female patients have similar incidence with median age at presentation of around 60 years [1]. It is considered as the aggressive subtype of PPL and is associated with poorer prognosis compared to MALT lymphoma which usually follows an indolent clinical coarse [7].

Patients usually have non-specific clinical presentation and radiologic findings which makes it a challenging diagnosis. Clinically, the chief complaints are usually pulmonary such as cough, dyspnea, chest pain, and hemoptysis, and/or systemic such as fever, night sweats, fatigue, and unintentional weight loss [1, 8–10]. Our patient presented with a productive cough and significant

weight loss. Occasionally, patients may be asymptomatic. Radiologically, PPDLBCL may show a wide spectrum of non-specific findings making it difficult to differentiate from other more common primary lung malignancies such as bronchogenic carcinoma or other pulmonary pathologies such as pneumonia, lung abscess, and lung metastasis. Based on the clinical presentation and the radiologic findings, our primary differential diagnosis in this patient was bronchogenic carcinoma. Primary pulmonary diffuse large B cell lymphoma can present as single or multiple nodules or masses (in 50% of cases), areas of consolidation, reticular or interstitial infiltrates with air bronchograms, or ground-glass opacities involving one or both lungs [9, 11–13]. Nodal involvement including mediastinal and hilar lymphadenopathy may be seen but is more common in secondary pulmonary lymphoma [1, 12, 14, 15]. These findings overlap with those of primary pulmonary MALT lymphoma. Primary pulmonary diffuse large B cell lymphoma commonly has areas of necrosis leading to cavitation which presents as low attenuation on CT scan and is a much more common finding (50% of cases) than in MALT lymphoma [13, 16]. Pleural effusion is also often present [8]. In the present case, chest CT scan showed a single left lower lobe mass with a subcarinal mediastinal lymph node and moderate left sided pleural effusion. The definitive diagnosis is established by histology.

The pathogenesis of PPDLBCL is not well understood; however, it is often seen in patients with underlying immunological disorders such as human immunodeficiency virus (HIV) infection, immunosuppression in solid organ transplantation, and autoimmune diseases like Sjogren syndrome [16–19]. In addition, it has been associated with long-term methotrexate use [20].

In clinical practice, different therapeutic options have been used to treat PPDLBCL including surgery, chemotherapy, radiation, or combined treatments. Surgery can be the treatment of choice in localized PPDLBCL and if complete resection can be achieved which is a rare occurrence due to its rapid spread into the mediastinum and extrathoracic locations. Vanden Eynden et al. showed that a complete resection is associated with 90% 10-year survival [21]. However, because of the high risk of recurrence even after complete resection, adjuvant chemotherapy or radiation should be considered in patients with PPDLBCL [22]. Radiotherapy has a limited role in PPDLBC mainly due to its toxicity in the lungs and is usually used in cases of chemotherapeutic resistance or in patients with a small lesion in a poorly mobile site and with contraindication to surgery [7, 10]. Previously, anthracycline based chemotherapy as CHOP (cyclophosphamide, doxorubicin, vincristine, and prednisone) was the most effective treatment [3]. After the addition of rituximab to chemotherapy has led to improved survival in diffuse large B cell nodal lymphomas, rituximab was added to the treatment of PPDLBCL and R-CHOP has become the gold standard therapy since then [23]. Recently, the introduction of novel treatments, such as monoclonal antibodies, antibody-drug conjugates (ADC), bispecific antibodies (BsAbs), and chimeric antigen receptor (CAR) T-cell therapy, is changing the landscape of treatment for lymphoproliferative diseases including DLBCL. Polatuzumab vedotin, an anti-CD79b antibody drug conjugate, in combination with R-CHP (rituximab, cyclophosphamide, doxorubicin, and prednisone), a modified R-CHOP regimen, was approved for first-line therapy for patients with previously untreated DLCBL, based on the results of POLARIX trial. This trial showed improved progression free survival in patients treated with polatuzumab vedotin-R-CHP (pola-R-CHP) compared to R-CHOP (77% vs 70%) without significant difference in overall survival [24].

Based on the staging of PPL, our patient has stage II2E PPDLBCL (with lung and mediastinal lymph node involvement). This implies that his tumor is theoretically surgically resectable. However, given that the patient has a large mass that is invading the mediastinum, it would be difficult to achieve complete surgical resection with intent to cure, and given that PPDLBCL is an aggressive tumor, adjuvant chemotherapy would be needed even in the case of surgical resection. Therefore, we opted to start chemotherapy with R-CHOP treatment, with the possibility of surgery or radiation later on in the course of his treatment, that is, if the patient did not have a complete response to chemotherapy.

CONCLUSION

In conclusion, PPDLBCL is an exceedingly rare entity, presenting a diagnostic and therapeutic challenge due to its non-specific clinical features and radiologic findings. This case underscores the importance of considering PPDLBCL in the differential diagnosis of pulmonary masses. In our case, the patient achieved complete remission following R-CHOP chemotherapy, highlighting the efficacy of this regimen in treating PPDLBCL. Further research into novel treatments modalities is important to optimize outcomes for patients with this rare and aggressive malignancy.

REFERENCES

1. Piña-Oviedo S, Weissferdt A, Kalhor N, Moran CA. Primary pulmonary lymphomas. Adv Anat Pathol 2015;22(6):355–75.
2. L'Hoste RJ Jr, Filippa DA, Lieberman PH, Bretsky S. Primary pulmonary lymphomas. A clinicopathologic analysis of 36 cases. Cancer 1984;54(7):1397–406.
3. Chilosi M, Zinzani PL, Poletti V. Lymphoproliferative lung disorders. Semin Respir Crit Care Med 2005;26(5):490–501.
4. Poletti V, Ravaglia C, Tomassetti S, et al. Lymphoproliferative lung disorders: Clinicopathological aspects. Eur Respir Rev 2013;22(130):427–36.

5. Shahani L, McKenna M. Primary pulmonary lymphoma in a patient with advanced AIDS. BMJ Case Rep 2014;2014:bcr2013203265.
6. Seeram V, Shujaat A, Jones L, Bajwa A. An 82-year-old woman with left upper lobe atelectasis. Diffuse large B-cell lymphoma. Chest 2012;142(6):1669–74.
7. Zinzani PL, Martelli M, Poletti V, et al. Practice guidelines for the management of extranodal non-Hodgkin's lymphomas of adult non-immunodeficient patients. Part I: Primary lung and mediastinal lymphomas. A project of the Italian Society of Hematology, the Italian Society of Experimental Hematology and the Italian Group for Bone Marrow Transplantation. Haematologica 2008;93(9):1364–71.
8. Cadranel J, Wislez M, Antoine M. Primary pulmonary lymphoma. Eur Respir J 2002;20(3):750–62.
9. Bai Y, Liang W. CT and PET/CT findings of primary pulmonary diffuse large B-cell lymphoma: One case report and literature review. Medicine (Baltimore) 2017;96(47):e8876.
10. Zhu Z, Liu W, Mamlouk O, O'Donnell JE, Sen D, Avezbakiyev B. Primary pulmonary diffuse large B cell non-Hodgkin's lymphoma: A case report and literature review. Am J Case Rep 2017;18:286–90.
11. Graham BB, Mathisen DJ, Mark EJ, Takvorian RW. Primary pulmonary lymphoma. Ann Thorac Surg 2005;80(4):1248–53.
12. Chua SC, Rozalli FI, O'Connor SR. Imaging features of primary extranodal lymphomas. Clin Radiol 2009;64(6):574–88.
13. Kligerman SJ, Franks TJ, Galvin JR. Primary extranodal lymphoma of the thorax. Radiol Clin North Am 2016;54(4):673–87.
14. Shinoda K, Taki H, Tsuda T, Hayashi R, Nomoto K, Tobe K. Primary pulmonary lymphoma presenting with multiple lung nodules. Am J Respir Crit Care Med 2014;190(9):e30–1.
15. Dong Y, Zeng M, Zhang B, et al. Significance of imaging and clinical features in the differentiation between primary and secondary pulmonary lymphoma. Oncol Lett 2017;14(5):6224–30.
16. Hare SS, Souza CA, Bain G, Seely JM, Frcpc, Gomes MM, Quigley M. The radiological spectrum of pulmonary lymphoproliferative disease. Br J Radiol 2012;85(1015):848–64.
17. Travis WD, Brambilla E, Burke AP, Marx A, Nicholson AG. Introduction to the 2015 World Health Organization Classification of Tumors of the Lung, Pleura, Thymus, and Heart. J Thorac Oncol 2015;10(9):1240–2.
18. Ray P, Antoine M, Mary-Krause M, et al. AIDS-related primary pulmonary lymphoma. Am J Respir Crit Care Med 1998;158(4):1221–9.
19. Yousem SA, Randhawa P, Locker J, et al. Posttransplant lymphoproliferative disorders in heart-lung transplant recipients: Primary presentation in the allograft. Hum Pathol 1989;20(4):361–9.
20. Ebeo CT, Girish MR, Byrd RP, Roy TM, Mehta JB. Methotrexate-induced pulmonary lymphoma. Chest 2003;123(6):2150–3.
21. Vanden Eynden F, Fadel E, de Perrot M, de Montpreville V, Mussot S, Dartevelle P. Role of surgery in the treatment of primary pulmonary B-cell lymphoma. Ann Thorac Surg 2007;83(1):236–40.
22. Kim JH, Lee SH, Park J, et al. Primary pulmonary non-Hodgkin's lymphoma. Jpn J Clin Oncol 2004;34(9):510–4.
23. Coiffier B, Thieblemont C, Van Den Neste E, et al. Long-term outcome of patients in the LNH-98.5 trial, the first randomized study comparing rituximab-CHOP to standard CHOP chemotherapy in DLBCL patients: A study by the Groupe d'Etudes des Lymphomes de l'Adulte. Blood 2010;116(12):2040–5.
24. Tilly H, Morschhauser F, Sehn LH, et al. Polatuzumab vedotin in previously untreated diffuse large B-cell lymphoma. N Engl J Med 2022;386(4):351–63.

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Author Contributions

Ghada Araji – Conception of the work, Design of the work, Acquisition of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Sah Sajan – Design of the work, Acquisition of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Zaid Khamis – Design of the work, Acquisition of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Michel Al Achkar – Design of the work, Acquisition of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Authors declare no conflict of interest.

Data Availability
All relevant data are within the paper and its Supporting Information files.