CASE REPORT

Diffuse Large B-cell Lymphoma Presenting as Empyema: A Case Report and Review of Literature

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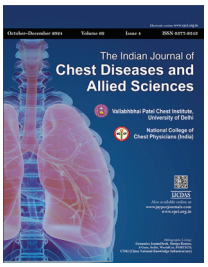

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Abstract

Aim and background: Non-Hodgkin lymphoma (NHL) is the most common hematological malignancy, and diffuse large B-cell lymphoma (DLBCL) is the most frequent subtype. It is a highly aggressive B-cell lymphoma resulting in the clonal proliferation of a germinal or post-germinal malignant B cell. The diagnosis is confirmed by biopsy of the affected node/extra-nodal site. Pleural involvement in lymphoma has a diverse presentation; however, presentation as an empyema, as in our case, has not been reported previously.

Case description: We present a very rare case of a young, previously healthy female patient who presented with a right-sided pleural collection, who was initially suspected to have empyema due to characteristic findings on ultrasonography and pleural fluid appearance. Her pleural fluid cytology revealed atypical cells and was later diagnosed with an underlying anterior mediastinal mass confirmed to be DLBCL.

Conclusion: Empyema may be the first harbinger of malignancy, especially in young immunocompetent patients. Timely diagnosis may be challenging but it improves the prognosis of such patients.

Clinical significance: In a TB-endemic country like India, a patient with empyema poses a diagnostic dilemma. Cytology/biopsy and immunohistochemistry aid in diagnosis in such cases. Imaging also plays a key role in tumor staging, therapeutic planning, and follow-up of patients.

Keywords: Case report, Diffuse large B-cell lymphoma, Empyema, Lymphoma, Pleural effusion.

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Abbreviations used in this Article

ADA = Adenosine deaminase levels; DLBCL = Diffuse large B cell lymphoma; NHL = Non-Hodgkin lymphoma; PE = Pleural effusion.

Introduction

Diffuse large B-cell lymphoma (DLBCL) is an extremely aggressive type of non-Hodgkin lymphoma (NHL) characterized by rapid growth and widespread involvement of both lymph nodes and extra-nodal organs. While DLBCL typically presents with fever and weight loss, it can occasionally mimic other diseases, leading to diagnostic challenges and delayed treatment, potentially impacting patient outcomes. Here, we present an exceedingly rare case of a lady with DLBCL who was initially suspected of having empyema. The existing literature on DLBCL suggests that pleural effusion (PE) is an established presentation, but there have been no reported cases of DLBCL presenting as frank empyema.

Case Description

A 28-year-old female came to the emergency room with complaints of high-grade fever for 20 days along with progressive dyspnea, cough, and chest discomfort. She had undergone a cesarean section at term in June 2024, which was uneventful. Two weeks after the cesarean, she went to a local hospital for the same complaints, where she was diagnosed with right-sided tubercular empyema after diagnostic thoracentesis revealed turbid and exudative fluid. Despite two weeks of antitubercular treatment, the patient's symptoms persisted. She presented with fever and respiratory distress with room air oxygen saturation of 82%. A chest X-ray showed a homogeneous opacity in the right lung, signs of collapse and consolidation. Ultrasonography of the chest was suggestive of PE. The pleural fluid appearance was milky and turbid, investigations revealed an exudative picture with low sugar, adenosine deaminase levels (ADA) of 44.93 u/L, and 2740 cells/uL, predominantly lymphocytes with atypical cells. High-resolution computerized tomography of the chest revealed a large anterior mediastinal mass (15 × 14 × 10 cm) encasing major vessels and airways, along with moderate pericardial and bilateral PE. These features were suggestive of neoplastic etiology: a lymphoma/thymic tumor.

An 18F-fluorodeoxyglucose positron emission tomography (18F-FDG PET) scan showed a metabolically active, heterogeneously enhancing anterior mediastinal mass encasing the mediastinal vessels and trachea (bulky disease) with metabolically active

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Patient consent statement: The author(s) have obtained written informed consent from the patient for publication of the case report details and related images.

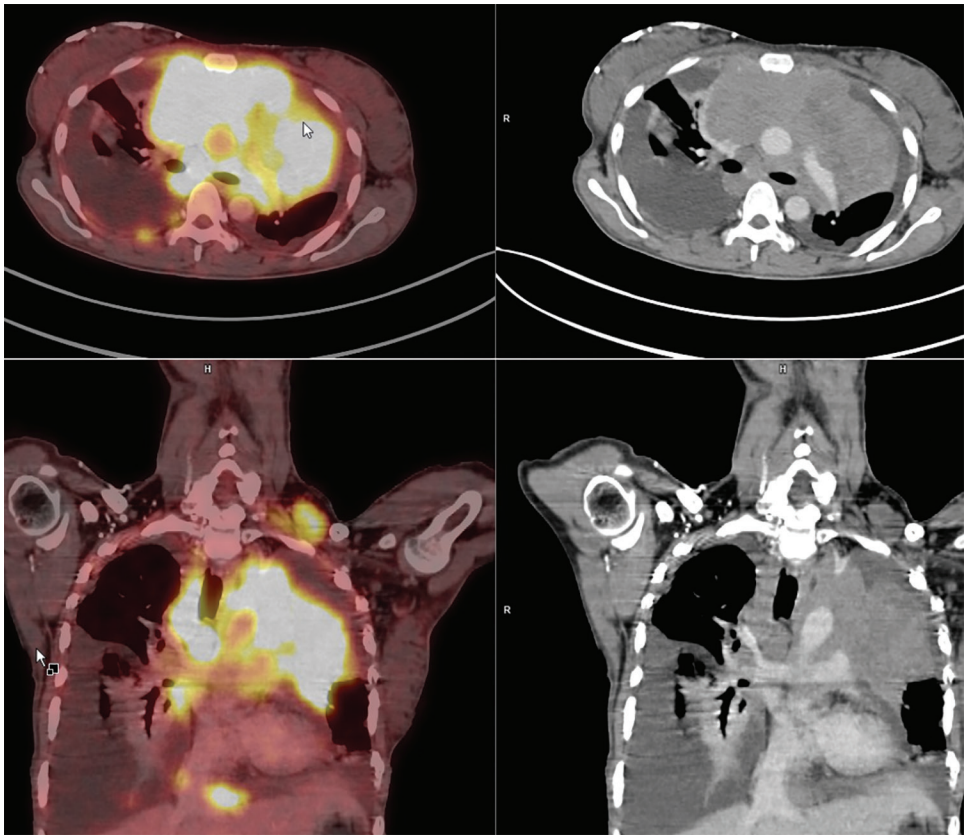

Fig. 1: Positron emission tomography–computed tomography (PET-CT) images showing heterogeneously enhancing large lobulated mass in the anterior mediastinum with increased FDG uptake (standardized uptake value max 14.1). Moderate right pleural (maximum diameter 6 cm; with fissure extension) and mild left pleural effusion is noted. Non-FDG avid passive consolidative changes involving the right lung middle and lower lobe is noted. Multiple FDG avid discrete soft tissue nodular lesions noted along the right lung pleura (measuring approximately 1.2 × 0.9 cm, standardized uptake value 6.2)

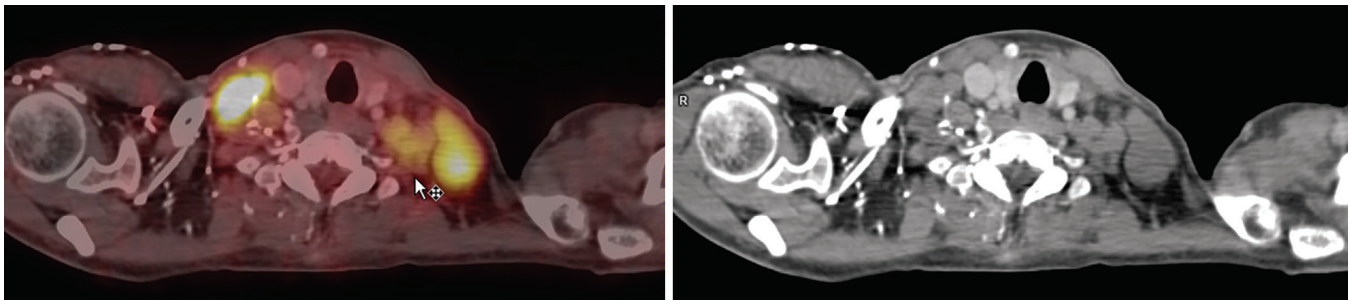

Fig. 2: PET CT showing increased FDG of homogeneously enhancing enlarged bilateral cervical and bilateral supraclavicular lymph nodes (on the left measuring 3.6 × 2.4 cm, standardized uptake value max 5.9). Biopsy taken from avid supraclavicular node under ultrasound guidance

lymphadenopathy involving bilateral cervical, supraclavicular, left axillary, and upper abdominal lymph nodes (Figs 1 and 2). Moderate right and mild left PE with multiple metabolically active soft tissue nodular lesions along the right pleura were noted. Overall, scan features favored lymphoproliferative disorder. The biopsy of the supraclavicular lymph node showed atypical medium to large lymphoid cells with large nuclei, mildly eosinophilic cytoplasm, and increased mitotic activity arranged in sheets. On immunohistochemistry, tumor cells were positive for CD45 (2B11 + D7/26), CD20 (L26), PAX-5 (DAK-Pax5), CD23 (EP75), and CD30 (Ber-H2) while being negative for CD10 (56C6), TDT (EP266), PAN CK (AE1 and AE3), and CD15 (Carb-3). Final impression was suggestive of primary mediastinal B cell lymphoma or diffuse large B cell lymphoma, non-GCB type.

Chemotherapy was started as per R-CHOP protocol consisting of vincristine, doxorubicin, prednisolone, and cyclophosphamide. Right-side therapeutic thoracentesis was done for the collection, wherein patient improved symptomatically and could be discharged on room-air after repeated therapeutic thoracenteses.

Discussion

Diffuse large B cell lymphoma is the most common subtype of NHL, accounting for 30–40% cases. Diffuse large B cell lymphoma is a fast-growing B cell lymphoma characterized by the clonal expansion of malignant B cells, either from the germinal center or post-germinal center.

Pleural effusion occurs in 16–20% of patients with NHL, with nearly two-thirds of them being associated with DLBCL lymphoma.[1] Around 10% of malignant PEs are attributed to NHL, which could either be primary or secondary. Primary pleural lymphoma could be primary effusion lymphoma (PEL) or pyothorax-associated lymphoma, both rare subtypes. Secondary pleural NHL can develop through hematogenous dissemination, lymphatic spread or direct extension. In Hodgkin's lymphoma, transudative effusion caused by extrinsic compression may be encountered occasionally.[2] Usually, pleural fluid in DLBCL cases appears serious or serosanguineous, unlike in our case, where fluid was turbid and milky, prompting a diagnosis of probable empyema.

Pleural involvement in lymphoma can manifest in diverse ways, but presentation as an empyema, as in our case, has not been reported previously. The initial investigation of choice is pleural fluid cytology, though false negatives can occur in more than 50% of the cases. However, in our patient the preliminary pleural fluid cytology report showed abundant atypical cells, that aided timely intervention. In a retrospective Spanish study of 185 patients with DLBCL by Porcel et al., 55 (30%) had PE, and pleural fluid cytology gave the diagnosis in nearly 70% of the patients, like our case.[3] They found that malignant effusions were usually exudative with ADA levels > 35 U/L in more than 1/3rd of the cases, which is in line with our findings, nearly half of them needed some intervention to alleviate symptoms. In Taiwan, Chen et al., evaluated DLBCL patients (excluding PEL) from 1999 to 2007. Among 41 (18.4%) patients with PE, 19 had malignant effusions—6 due to local spread and 13 from extensive dissemination.[4] Diffuse large B cell lymphoma patients with lymphomatous effusions typically carry poor prognosis and are thus considered as stage IV diseases.

In 2020, Takanori et al., reported a case of DLBCL masquerading as malignant mesothelioma in a 75-year-old man with a right PE and PET avid diffuse pleural lesions that significantly improved after two cycles of chemotherapy.[5] More recently, Chang et al., reported an elderly woman diagnosed with primary pericardial DLBCL based solely on PE cytology.[6] These reports highlight the evasive presentation of DLBCL with respect to isolated pleural involvement, but there have been no reports of DLBCL masquerading as an empyema prior to this.

Conclusion

Empyema may emerge as an early harbinger of malignancy, particularly in young immunocompetent patients. Adequate evaluation and timely diagnosis of such patients, though challenging, greatly improve prognosis. Imaging plays a crucial role in disease staging, treatment planning, and patient follow-up.

Clinical Significance

In a TB-endemic country like India, a patient with empyema poses a diagnostic dilemma. Cytology/biopsy and immunohistochemistry aid in diagnosis in such cases.

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