



Case Reports

Diffuse Large B Cell Lymphoma presenting as Right Atrial Mass and Cardiac Tamponade

Chinmayi Kothari, MBBS¹, Lakshmi Kattamuri, MD², Prasana Ramesh, MD³, Ziad Zalaquett, MD⁴, Patrick Collier, MD⁴, Ben Alencherry, MD⁴, Aravinda Nanjundappa, MD⁴

¹ Department of Internal Medicine, All India Institute of Medical Sciences, New Delhi,

² Department of Internal Medicine, Texas Tech University Health Sciences Center, El Paso,

³ Department of Internal Medicine, University of Massachusetts-Baystate Health,

⁴ Division of Cardiology, Department of Internal Medicine, Cleveland Clinic

Journal of Brown Hospital Medicine

Vol. 4, Issue 4, 2025

Article Information

Keywords: lymphoma, right atrial mass, tamponade, cardiovascular imaging, DLBCL

<https://doi.org/10.56305/001c.144088>

Submitted: July 24, 2025 EDT

Accepted: September 06, 2025 EDT

Published: October 01, 2025 EDT

Abstract

Diffuse large B-cell lymphoma (DLBCL) is the most prevalent histologic subtype of non-Hodgkin lymphomas. It usually presents with nodal involvement (cervical, mediastinal, or abdominal), but approximately 30% of patients will exhibit extranodal involvement, with 2-4% presenting as a primary cardiac mass. Multimodal imaging is essential to distinguish these masses from other common benign lesions and to assist in surgical planning. Here, we report a case of DLBCL manifested as a right atrial mass, pericardial effusion, and cardiac tamponade. Transesophageal echocardiogram (TEE) and cardiac magnetic resonance imaging (CMR) were complementary to transthoracic echocardiogram in diagnosing the cardiac neoplasm, with positron emission tomography (PET-CT) aiding in staging and localizing the primary tumor. Biopsy of the cardiac mass or extracardiac involvement confirms the histopathological subtype and guides the treatment. Although primary and secondary cardiac tumors have poor outcomes, early diagnosis and aggressive treatment can influence prognosis.

BACKGROUND

Primary cardiac lymphoma (PCL) is a rare malignancy that is confined to the heart and pericardium, representing 1.3 to 3% of all primary cardiac tumors.¹ Among non-Hodgkin's lymphomas (NHL), diffuse large B-cell lymphoma (DLBCL) is the most common and aggressive subtype, accounting for approximately 25% of all NHL cases.² DLBCL typically presents with nodal involvement, but extranodal involvement is observed in approximately 30% of cases, often with a poor prognosis. Secondary cardiac involvement is more common, occurring in 8.7% to 27.2% of cases, while primary cardiac presentation is rare, affecting only 2-4% of NHLs.^{1,2} In patients with PCL, the common presenting symptoms include dyspnea and arrhythmias, with cardiac tamponade occurring in up to 20% of cases at initial presentation.³ Cardiac lymphomas are often reported in immunocompromised individuals and are characterized by rapid progression, requiring urgent intervention to prevent fatal outcomes. The diagnosis of these tumors requires multimodal imaging and biopsy to differentiate them from other common cardiac masses, such as myxomas and angiosarcomas.^{4,5} We report a rare case of DLBCL presenting with cardiac tamponade and an associated right atrial mass, with a par-

ticular focus on the diagnostic challenges and investigative approach.

CASE PRESENTATION

A 56-year-old male with a past medical history of gastroesophageal reflux disease was transferred to our institution for further evaluation of a right atrial mass. One week prior, he was admitted to an outside facility for dizziness and hypotension. Transthoracic echocardiogram (TTE) during that admission revealed a right atrial mass (8 cm in size) and pericardial effusion with signs of cardiac tamponade. Emergent pericardiocentesis with drain placement was performed, yielding 760 mL of serosanguinous exudate with negative cytology, resulting in hemodynamic stabilization. The analysis of the pericardial fluid is summarized in [Table 1](#). The patient was initiated on colchicine therapy. Further evaluation with Contrast-enhanced computed tomography (CT) of the chest and abdomen demonstrated a large, lobulated interatrial mass extending into the right atrial lumen. Additional findings included bilateral adrenal masses measuring 3.5 cm on the right and 5.3 cm on the left, left iliac chain lymphadenopathy, and subcentimeter retroperitoneal lymph nodes. A CT-guided core biopsy of the left adrenal mass was performed, but did not result prior to the hospital transfer. The patient was subsequently transferred to our

facility for further evaluation of the right atrial mass. The patient denied constitutional symptoms, including weight loss, night sweats, and fever. His remaining medical history was unremarkable.

On admission, the patient was hemodynamically stable, with a blood pressure of 120/80 mmHg, a heart rate of 80 beats per minute, a respiratory rate of 20 breaths per minute, a temperature of 36.3°C, and an oxygen saturation of 96% on room air. Physical examination revealed no palpable cervical, axillary, or inguinal lymphadenopathy; no jugular venous distension; clear lung fields; and normal heart sounds without murmurs, rubs, or gallops. There was no hepatosplenomegaly, peripheral edema, or pericardial rub appreciated. Laboratory parameters are summarized in [Table 1](#). Chest radiograph demonstrated an enlarged cardiac silhouette. Electrocardiography (ECG) revealed atrial fibrillation with a 2:1 block, a controlled ventricular rate, and low-voltage QRS complexes without evidence of electrical alternans. Transthoracic echocardiography (TTE) identified a large (8 cm) intracardiac mass occupying the right atrium, mild pericardial effusion, and a preserved left ventricular ejection fraction (LVEF) of 55–60%. Transesophageal echocardiography (TEE) further characterized the mass as an 8 cm lesion predominantly located in the right atrium, with invasion of the interatrial septum extending into the left atrium. Additionally, thickening and structural destruction were noted along the mitral annular fibrosa and the periaortic region, while LVEF remained within normal limits ([Figure 1](#)). Similar findings were noted in the axial chest computed tomography (CT). For further characterization, cardiac magnetic resonance imaging (MRI) revealed multilobulated, enhancing interatrial mass measuring approximately $9 \times 7 \times 6$ cm, protruding into the right atrium with a significant mass effect, causing narrowing of the inferior vena cava (IVC) at the Cavo-atrial junction. There was also a mild mass effect on the left atrium, suggesting a possible cardiac neoplasm. The lesion demonstrated a left lytic component extending to the base of the tricuspid septal leaflet, without evidence of thrombus formation ([Figure 2](#)). Left ventricular size and function were preserved.

Whole-body staging with positron emission tomography-computed tomography (PET-CT) demonstrated fluorodeoxyglucose (FDG)-avid uptake in the right atrial mass, along with FDG-avid bilateral adrenal masses, a right lower lobe pulmonary nodule, and lymphadenopathy involving the right cervical, right axillary, precarinal, retroperitoneal, and iliac lymph nodes—findings suggestive of a metastatic process. As a part of the staging process, an MRI of the brain was unremarkable. Histopathological examination of the CT-guided biopsy of the left adrenal mass confirmed diffuse large B-cell lymphoma (DLBCL), with medium to large atypical lymphoid cells positive for CD20, MUM1, BCL6 and c-MYC (focally greater than 40%). Fluorescence in-situ

hybridization was positive for a BCL6 rearrangement at 3q27.3 and negative for rearrangements involving BCL2. The Ki-67 proliferation rate was greater than 90%. A multidisciplinary discussion was done, and cardiac surgery was deferred in view of metastatic disease and high-risk surgical candidacy. Given the aggressive nature of the disease and metastatic spread, the patient was promptly initiated on R-CHOP chemotherapy (rituximab, cyclophosphamide, epirubicin, vincristine, and prednisone) on an urgent basis, as DLBCL is highly chemosensitive. He tolerated the chemotherapy well and received one cycle of treatment before being discharged. The patient remained hemodynamically stable with no recurrence of pericardial effusion. The pericardial drain was removed four days after it was placed. A bedside point-of-care ultrasound (POCUS) was performed, confirming only a small, stable effusion without features of tamponade, and the pericardial drain had been removed. A multidisciplinary discussion determined that the patient was safe for discharge, given stable hemodynamics and absence of complications. This facilitated initiation of outpatient chemotherapy with close cardiology and oncology follow-up.

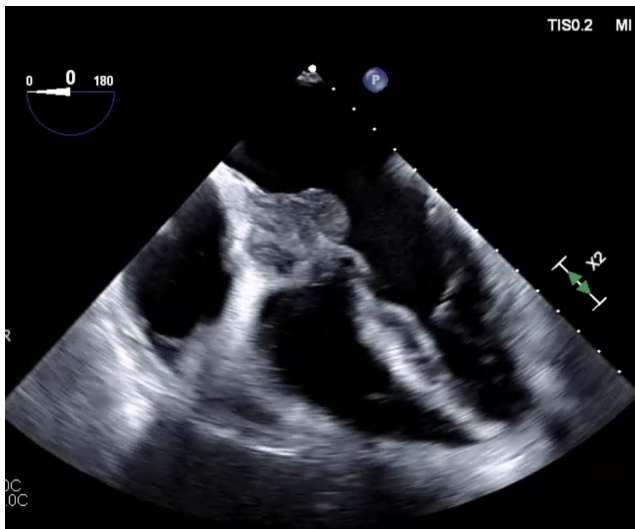
In the outpatient setting, the patient was switched from R-CHOP to Pola-R-CHP (polatuzumab vedotin, rituximab, cyclophosphamide, hydroxydaunorubicin [epirubicin], and prednisone) starting with cycle 2. He completed a total of six cycles of therapy. A follow-up PET/CT at five months demonstrated a complete metabolic response, with no evidence of residual FDG-avid disease. Clinically, he reported feeling “back to 100%,” resumed full-time work, and experienced only minor peripheral neuropathy, which subsequently improved with minimal residual symptoms.

DISCUSSION

Lymphomas involving the heart and pericardium are most often secondary to disseminated disease, with primary cardiac lymphoma (PCL) being a rare occurrence, accounting for only 1.3% of cases.^{1,6} PCL is defined as lymphoma that primarily affects the heart, with tumor burden localized to the cardiac chambers, myocardium, or pericardium, even in the presence of limited extracardiac involvement.⁷ In a large US nationwide database study of PCL, B-cell lymphomas were the predominant lineage (79.9%), with DLBCL being the most common histological subtype (64%).⁸ Notably, nearly half of the patients were classified as having Ann Arbor stage I disease.⁸ Clinical presentations of PCL typically include dyspnea and arrhythmias, with approximately 20% of patients presenting with pericardial tamponade as the initial manifestation.³ In our case, although the patient had additional sites of disease, the cardiac mass was the dominant and initial presentation, fulfilling the clinical criteria for primary cardiac lymphoma. This classification

Table 1. Laboratory Parameters at Admission and Initial Pericardial Fluid Analysis

Parameter	Values (At Admission)	Normal Value Range
Blood Investigations		
Hemoglobin Levels	11.3 g/dL (decreased)	13.0 - 17.0 g/dL
Total Leukocyte Count (TLC)	10.85 k/uL	3.70 - 11.00 k/uL
Platelet Count	257,000/uL	150,000 - 400,000/uL
Lactate dehydrogenase (LDH)	495 U/L (elevated)	135 - 225 U/L
Blood Urea Nitrogen	30 mg/dL	7-20 mg/dL
Creatinine	1.4 (at baseline)	male 3 mg/dL (adult)
Erythrocyte Sedimentation Rate (ESR)	47 (High)	0 - 20 mm/hr
C-reactive protein	6.1 (High)	< 0.3 mg/dL
Pericardial Fluid Analysis		
Color, Pericardial Fluid	Serosanguinous	Straw-colored
RBC, Pericardial Fluid	19,000/uL (High)	< 2,000/uL
Total nucleated cells, Pericardial Fluid	91/uL	< 1,000/uL
Neutrophils (%), Pericardial Fluid	9% (High)	0-1%
Lymphocytes (%), Pericardial Fluid	64% (High)	18-36%
Gram Stain	Not performed	Negative
Acid Fast Stain	Negative	Negative
TB-PCR	Negative	Negative
Culture for Bacterial, Fungal, and Mycobacteria	Not performed	Negative
Cytology	Negative for malignant cells; few atypical cells with intracellular and extracellular cocci likely contaminants	-

**Figure 1.** 2D Transthoracic Echocardiogram without contrast, apical four chamber view showing an 8 cm mass predominantly in the right atrium with invasion into the interatrial septum and left atrium.

There is thickening and destruction of the mitral annular fibrosa. The superior vena cava and coronary sinus are nearly obstructed by the mass.

emphasizes the central role of cardiac involvement in driving the presentation and acute hemodynamic compromise, which differentiates it from cases where cardiac involvement is a late manifestation of systemic lymphoma.

Clinical presentations of primary cardiac lymphoma (PCL) are often nonspecific, making it challenging to distinguish from other more common cardiac masses, such

as myxomas, angiosarcomas, or pseudo-masses, which differ in management strategies and prognosis. Multi-modal imaging and biopsy are essential for an accurate diagnosis.⁹ Transthoracic echocardiography (TTE) serves as a first-line, noninvasive imaging modality in cases of cardiac lymphoma, with TTE identifying approximately 55% of intracardiac masses. However, its ability to assess soft tissue characteristics and extracardiac structures is limited, and its utility may be further constrained by poor acoustic windows, especially when evaluating the right heart chambers in obese patients.¹⁰ Transesophageal echocardiography (TEE) offers improved sensitivity and better anatomical delineation, but its use is limited by its invasive nature, operator dependence, and inability to provide detailed information about coronary arteries and certain other cardiac structures, such as the thoracic aorta.^{10,11}

Cardiac computed tomography (CCT), cardiac magnetic resonance imaging (CMR), and positron emission tomography-computed tomography (PET-CT) serve as complementary imaging modalities to transthoracic echocardiography (TTE) in the diagnosis of right atrial masses. CCT with contrast provides optimal anatomical details and coronary artery assessment prior to surgical intervention. Additionally, ECG-gated CCT can provide lesion mobility. On CCT, lymphoma typically appears as multiple solid masses attached to the myocardium or, more commonly, as an infiltrative mass within the myocardium or epicardium, which is hypodense or isodense relative to the myocardium, with slight contrast enhance-

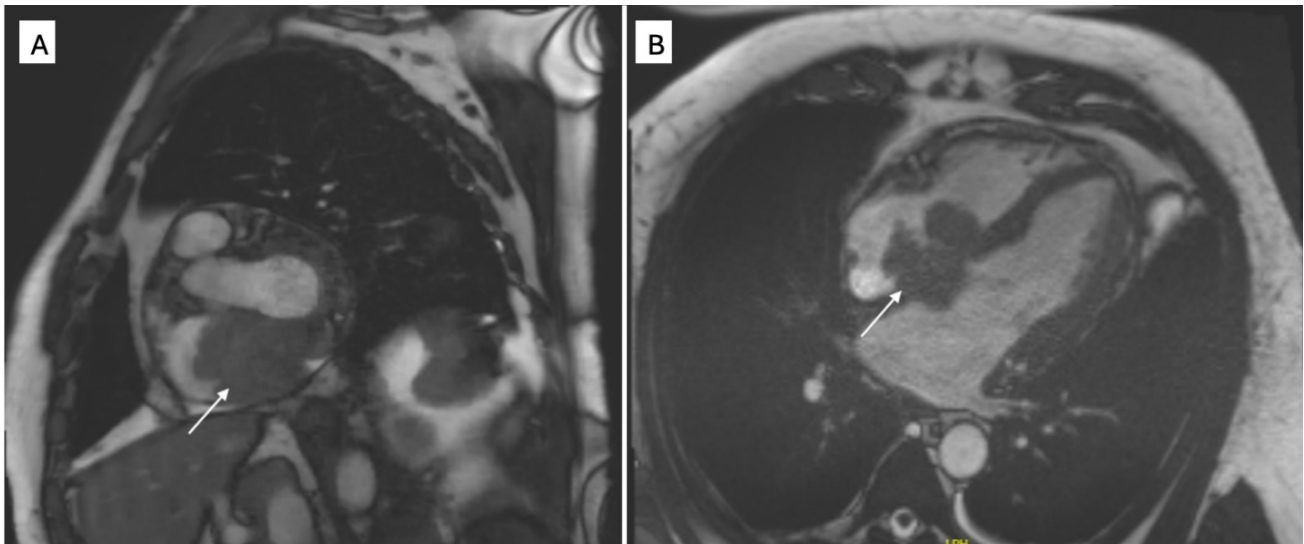


Figure 2. Cardiac magnetic resonance imaging (MRI), sagittal section (A) and axial section (B) showing a multilobulated, enhancing interatrial mass (white arrows) measuring approximately $9 \times 7 \times 6$ cm, protruding into the right atrium with a significant mass effect, causing narrowing of the inferior vena cava (IVC) at the cavo-atrial junction.

ment. A distinctive feature of cardiac lymphoma is diffusion along the surfaces of adjacent structures.¹⁰ Although the latest generation of CCT scanners offers a viable alternative to CMR, their use remains limited in cases where radiation exposure is undesirable. CMR avoids radiation; lymphoma appears as a homogeneous, hypointense mass on T1-weighted images and hyperintense on T2-weighted images. Contrast enhancement may be either homogeneous or heterogeneous, but it is generally less intense compared to other malignant tumors. The absence of necrosis or hemorrhage within the lesion is a helpful feature in distinguishing cardiac lymphoma from angiosarcoma.¹² In addition to these modalities, PET-CT was obtained to evaluate systemic disease involvement and for accurate staging of diffuse large B-cell lymphoma, as 18F-FDG PET-CT is the recommended imaging modality for aggressive lymphomas. It identifies metabolically active extranodal disease and better defines disease burden, thereby guiding prognosis and systemic therapy. Histologic examination is essential for confirming the diagnosis of lymphoma. Right-sided lesions are amenable to transvenous biopsy.¹³ This approach may not always yield diagnostic tissue; therefore, a comprehensive evaluation with a total body survey for accessible tissue samples is recommended. Alternatively, CT-guided biopsy can be used; if this is nondiagnostic, excisional or open biopsy may be necessary, although the latter is associated with a higher risk of complications.

Chemotherapy remains the standard treatment for lymphoma, with the first-line regimen of R-CHOP demonstrating a favorable response rate. Alternative regimens, such as R-EPOCH and R-Pola-CHP, are also viable options.^{3,14} Surgical resection may be considered in the early stages of the disease, particularly in conjunction with chemotherapy. Debulking surgery can be beneficial

in cases of superior vena cava syndrome, hemodynamic compromise, or right ventricular obstruction.^{15,16} Radiation therapy may be indicated for patients with progressive disease despite chemotherapy or for palliative intent.¹⁷ Colchicine was initiated after pericardiocentesis to reduce the recurrence of malignant pericardial effusion and prevent constrictive pericarditis. Recent observational data indicate that colchicine administered following drainage is associated with lower risks of effusion recurrence, constriction, and mortality, likely due to its anti-inflammatory effects, which involve the inhibition of neutrophils and blockade of the NLRP3 inflammasome.¹⁸ The prognosis for primary cardiac lymphoma and secondary cardiac lymphoma remains generally poor, with a median overall survival of approximately 2.2 years.¹⁷ Reported median survival for PCL ranges from 6 to 12 months, with occasional durable remissions when treated promptly with chemotherapy. In contrast, secondary cardiac involvement typically reflects disseminated disease, with a median survival of less than 6 months.^{19,20} In parallel, novel therapeutic approaches are expanding the treatment landscape for refractory or high-risk DLBCL. CAR-T cell therapies targeting CD19, bispecific antibodies such as glofitamab and epcoritamab, and antibody–drug conjugates like polatuzumab vedotin (used in pola-R-CHP) have demonstrated promising results in relapsed settings and may represent future options for patients with cardiac involvement.²¹ Despite its high mortality rate, case reports indicate it may be curable with aggressive chemotherapy, depending on the stage of the tumor.²²

CONCLUSION

The occurrence of DLBCL presenting as a right atrial mass with cardiac tamponade is extremely uncommon. Multimodal imaging helps with the diagnosis and staging of the tumor. Primary and secondary cardiac tumors typically have poor prognosis. However, early diagnosis and aggressive treatment have implications on the outcomes.

.....

Disclosures/Conflicts of Interest

The authors have no conflicts of interest to disclose.

Corresponding author

Chinmayi Kothari, MBBS
All India Institute of Medical Sciences,
New Delhi, India
Email: chinmayikothari@gmail.com



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-NC-4.0). View this license's legal deed at <https://creativecommons.org/licenses/by-nc/4.0> and legal code at <https://creativecommons.org/licenses/by-nc/4.0/legalcode> for more information.

REFERENCES

1. Yang CC, Tsai HW, Lai ST, Wu HC, Lo CY, Chang Y. Mediastinal diffuse large B-cell lymphoma invading the left atrium mimicking coronary artery disease with a mural thrombus. *J Chin Med Assoc.* 2012;75(11):606-609. doi:[10.1016/j.jcma.2012.08.009](https://doi.org/10.1016/j.jcma.2012.08.009)
2. Swerdlow SH, Campo E, Pileri SA, Harris NL, Stein H, Siebert R, et al. The 2016 revision of the World Health Organization classification of lymphoid neoplasms. *Blood.* 2016;127(20):2375-2390. doi:[10.1182/blood-2016-01-643569](https://doi.org/10.1182/blood-2016-01-643569). PMID:26980727
3. Petrich A, Cho SI, Billett H. Primary cardiac lymphoma: an analysis of presentation, treatment, and outcome patterns. *Cancer.* 2011;117(3):581-589. doi:[10.1002/cncr.25444](https://doi.org/10.1002/cncr.25444)
4. Kikuchi Y, Oyama-Manabe N, Manabe O, Naya M, Ito YM, Hatanaka KC, et al. Imaging characteristics of cardiac dominant diffuse large B-cell lymphoma demonstrated with MDCT and PET/CT. *Eur J Nucl Med Mol Imaging.* 2013;40(9):1337-1344. doi:[10.1007/s00259-013-2436-5](https://doi.org/10.1007/s00259-013-2436-5)
5. Berton L, Van Ballaer V, Ghekiere O, De Caluwé E. Primary cardiac diffuse large B-cell lymphoma presenting with cardiac tamponade: a case report. *Eur Heart J Case Rep.* 2022;6(5):ytac151. doi:[10.1093/ehjcr/ytac151](https://doi.org/10.1093/ehjcr/ytac151). PMID:35528120
6. Miguel CE, Bestetti RB. Primary cardiac lymphoma. *Int J Cardiol.* 2011;149(3):358-363. doi:[10.1016/j.ijcard.2010.02.016](https://doi.org/10.1016/j.ijcard.2010.02.016)
7. Burke A, Tavora F. The 2015 WHO Classification of Tumors of the Heart and Pericardium. *Journal of Thoracic Oncology.* 2016;11(4):441-452. doi:[10.1016/j.jtho.2015.11.009](https://doi.org/10.1016/j.jtho.2015.11.009)
8. Sultan I, Bianco V, Habrath A, Kilic A, Gleason TG, Aranda-Michel E, et al. Long-Term Outcomes of Primary Cardiac Malignancies: Multi-Institutional Results From the National Cancer Database. *Journal of the American College of Cardiology.* 2020;75(18):2338-2347. doi:[10.1016/j.jacc.2020.03.041](https://doi.org/10.1016/j.jacc.2020.03.041)
9. Pradella S, Grazzini G, Letteriello M, De Amicis C, Grassi R, Maggialetti N, et al. Masses in right side of the heart: spectrum of imaging findings. *Acta Biomed.* 2020;91(8-s):60-70.
10. Jeudy J, Kirsch J, Tavora F, Burke AP, Franks TJ, Mohammed TL, et al. From the radiologic pathology archives: cardiac lymphoma: radiologic-pathologic correlation. *Radiographics.* 2012;32(5):1369-1380. doi:[10.1148/rg.325115126](https://doi.org/10.1148/rg.325115126)
11. Ceresoli GL, Ferreri AJ, Bucci E, Ripa C, Ponzoni M, Villa E. Primary cardiac lymphoma in immunocompetent patients: diagnostic and therapeutic management. *Cancer.* 1997;80(8):1497-1506. doi:[10.1002/\(SICI\)1097-0142\(19971015\)80:8](https://doi.org/10.1002/(SICI)1097-0142(19971015)80:8)
12. Motwani M, Kidambi A, Herzog BA, Uddin A, Greenwood JP, Plein S. MR imaging of cardiac tumors and masses: a review of methods and clinical applications. *Radiology.* 2013;268(1):26-43. doi:[10.1148/radiol.13121239](https://doi.org/10.1148/radiol.13121239)
13. Zhuang S, Chang L, Feng X, Hu W, Yang Z, Zhang Y. Primary cardiac lymphoma: a clinicopathological study of 121 cases. *Front Oncol.* 2024;14:1509100. doi:[10.3389/fonc.2024.1509100](https://doi.org/10.3389/fonc.2024.1509100). PMID:39839800
14. Tilly H, Morschhauser F, Sehn LH, Friedberg JW, Trněný M, Sharman JP, et al. Polatuzumab Vedotin in Previously Untreated Diffuse Large B-Cell Lymphoma. *New England Journal of Medicine.* 2022;386(4):351-363. doi:[10.1056/NEJMoa2115304](https://doi.org/10.1056/NEJMoa2115304). PMID:34904799
15. Habrath A, Ehrlich M, Wiedemann D, Mora B, Rath C, Kocher A. A rare case of primary cardiac B cell lymphoma. *Journal of Cardiothoracic Surgery.* 2014;9(1):14. doi:[10.1186/1749-8090-9-14](https://doi.org/10.1186/1749-8090-9-14). PMID:24422789
16. Jonavicius K, Salcius K, Meskauskas R, Valeviciene N, Tarutis V, Sirvydis V. Primary cardiac lymphoma: two cases and a review of literature. *Journal of Cardiothoracic Surgery.* 2015;10(1):138. doi:[10.1186/s13019-015-0348-0](https://doi.org/10.1186/s13019-015-0348-0). PMID:26518127
17. Yin K, Brydges H, Lawrence KW, Wei Y, Karlson KJ, McAneny DB, et al. Primary cardiac lymphoma. *The Journal of Thoracic and Cardiovascular Surgery.* 2022;164(2):573-80.e1. doi:[10.1016/j.jtcvs.2020.09.102](https://doi.org/10.1016/j.jtcvs.2020.09.102)
18. Kim SR, Kim EK, Cho J, et al. Effect of anti-inflammatory drugs on clinical outcomes in patients with malignant pericardial effusion. *J Am Coll Cardiol.* 2020;76(13):1551-1561. doi:[10.1016/j.jacc.2020.08.003](https://doi.org/10.1016/j.jacc.2020.08.003). PMID:32972532
19. Petrich A, Cho SI, Billett H. Primary cardiac lymphoma: An analysis of presentation, treatment, and outcome patterns. *Cancer.* 2011;117(3):581-589. doi:[10.1002/cncr.25407](https://doi.org/10.1002/cncr.25407). PMID:20824789
20. Chong J, Lederer DJ, Lee TC, Guan DJ, Sheppard MN, Stewart S, et al. Primary cardiac lymphoma: Diagnosis and treatment. *Blood Rev.* 2005;19(5):291-299. doi:[10.1016/j.blre.2004.10.002](https://doi.org/10.1016/j.blre.2004.10.002). PMID:15979780

21. Trabolsi A, Arumov A, Schatz JH. Bispecific antibodies and CAR-T cells: dueling immunotherapies for large B-cell lymphomas. *Blood Cancer J*. 2024;14:27. doi:[10.1038/s41408-024-00997-w](https://doi.org/10.1038/s41408-024-00997-w)

22. Daralammouri Y, Hamayel H, Ismail Y, Majadla S, Odeh R. Diffuse large B-cell lymphoma with uncommon cardiac invasion. *SAGE Open Med Case Rep*. 2022;10:2050313x211070942. doi:[10.1177/2050313X211070942](https://doi.org/10.1177/2050313X211070942). PMID:35096395