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Diffuse B Cell Lymphoma Leading to Complete Heart Block: Is This Transient or Permanent?

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

EF 1 Waleed K. Al-Darzi
EF 2 Aeman Hana
AE 1 Marc K. Lahiri
AEF 2 Carina Dagher
AE 1 Joshua C. Greenberg
ABEF 1 Khaldoon Alaswad
AE 1 Bobak T. Rabbani
AE 1 James K. McCord
AEF 1 Madhulata Reddy

1 Division of Cardiology, Henry Ford Hospital, Detroit, MI, U.S.A.
2 Department of Internal Medicine, Henry Ford Hospital, Detroit, MI, U.S.A.

Corresponding Author: Waleed K. Al-Darzi, e-mail: waleed.aldarzi@gmail.com
Conflict of interest: None declared

Patient: Female, 72-year-old
Final Diagnosis: Cardiac lymphoma
Symptoms: Dyspnea on exertion
Medication: —
Clinical Procedure: —
Specialty: Cardiology • Oncology

Objective: Rare co-existance of disease or pathology

Background: Cardiac lymphomas can lead to heart block through tumor disruption of the cardiac conduction system. It is reported that with cardiac tumor treatment, conduction abnormalities can resolve. We present a case of cardiac lymphoma resulting in complete heart block requiring a pacemaker, followed by reduction of the pacing burden after chemotherapy.

Case Report: A 72-year-old woman with a medical history of hypertension, hypothyroidism, and persistent atrial fibrillation presented with dyspnea on exertion and fatigue for 2 weeks. Electrocardiography revealed complete heart block with junctional bradycardia of 48 beats per min. Transthoracic echocardiography demonstrated preserved left ventricular systolic function along with a large mass (3.6×3.7 cm). An endomyocardial biopsy was consistent with diffuse large B cell lymphoma, and the cardiac involvement was thought to be secondary based on positron emission tomography scan findings. Her clinical course was complicated by an episode of syncope deemed to be due to transient asystole, and an urgent single-chamber permanent pacemaker was implanted. Chemotherapy was initiated with R-CHOP, and, following the second cycle of chemotherapy, a positron emission tomography scan revealed no increased radiotracer uptake and thus resolution of all tumors. An echocardiogram 6 weeks after chemotherapy showed complete resolution of the cardiac mass. Subsequent serial pacemaker checks demonstrated improvement of atrioventricular nodal function as manifested by reduced pacing burden.

Conclusions: Lymphoma with cardiac involvement can lead to conduction abnormalities, including CHB, and heart block in the setting of these tumors may be reversible with appropriate therapy; however, implantation of a pacemaker remains inevitable is some cases.

MeSH Keywords: Atrioventricular Block • Echocardiography • Heart Neoplasms • Lymphoma, B-Cell

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/925760

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Background

Primary cardiac lymphomas account for less than 1% of cardiac malignancies and frequently occur in immune-deficient or post-transplant patients; secondary cardiac involvement by lymphomas account for 20–25% of such malignancies [1–3]. Diffuse large B cell lymphoma of the heart may involve the pericardium, myocardium, or the conduction system, resulting in heart failure, tachyarrhythmias, or conduction abnormalities [1,3–5]. These tumors can be managed with chemotherapy alone or in combination with radiation or surgical therapy. If not diagnosed and treated early, the prognosis of cardiac lymphoma is poor. Unfortunately, metastatic lymphomas usually present late, leading to poor outcomes [6]. Late diagnosis due to nonspecific symptoms and aggressive involvement of the heart are the major factors contributing to this poor prognosis. The overall median survival with treatment is approximately 7 to 18 months [1–3].

The etiology of conduction abnormalities associated with cardiac tumors is not known, but is thought to be due to either local mass effect or direct infiltration of the conduction system [7]. It is reported that with treatment of the tumor, conduction abnormalities can resolve [8,9]. We present a case of lymphoma involving the heart that presented with symptomatic heart block requiring permanent pacemaker (PPM) implantation before initiation of cancer therapy, which improved with lymphoma treatment.

Case Report

A 72-year-old woman with a medical history of hypertension, treated hypothyroidism, with normal thyroid-stimulating hormone on recent blood work, and persistent atrial fibrillation presented to the hospital with New York Heart Association (NYHA) class II dyspnea and fatigue of 2-week duration. She denied chest pain, palpitations, dizziness, or syncope. Vital signs revealed bradycardia with heart rate 43 beats per min and normotension. The clinical examination was remarkable for bradycardia and trace bilateral lower-extremity edema. A chest X-ray was consistent with mild congestive heart failure. Electrocardiogram revealed complete heart block (CHB) with junctional bradycardia of 48 beats per min (Figure 1; with interpretation). B-type natriuretic peptide was elevated at 495 pg/mL, as well as normal electrolytes and hemoglobin. A transthoracic echocardiogram demonstrated a large mass (3.6×3.7 cm) straddling the inferior interatrial septum (Figure 2, Video 1). This mass did not appear on an echocardiogram taken 1 year ago. Other echocardiographic findings included normal left ventricular (LV) cavity size and function, with LV ejection fraction of 60-65%, grade II diastolic filling with elevated filling pressures with E/e' medial ratio of 22.37, and normal right ventricular size and function. The left (left atrial volume index biplane by method of discs: 55.00 mL/m^2) and right (right atrial volume A4C index: 59.16 mL/m^2) atria were severely dilated. The estimated pulmonary artery pressure was 51 mmHg. There was moderate tricuspid regurgitation with

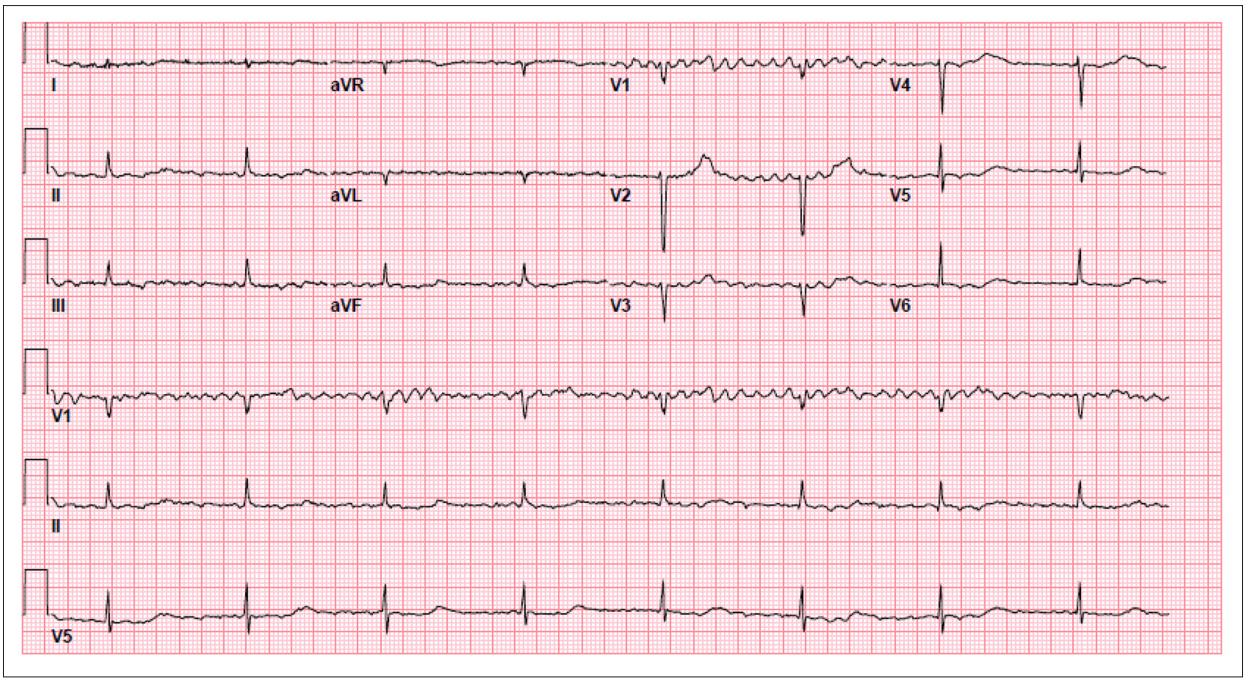

Figure 1. Electrocardiogram on presentation showed a junctional bradycardia at a heart rate of 48 beats per min with underlying atrial fibrillation and complete heart block, poor R wave progression, and nonspecific ST & T wave abnormality. QRS duration is 72 milliseconds and QTc of 468 milliseconds.

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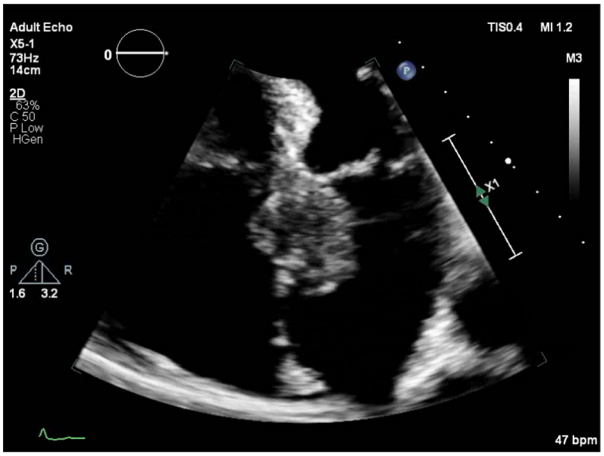
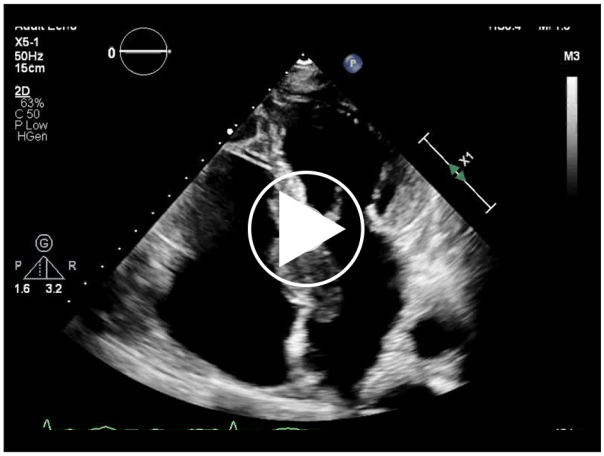
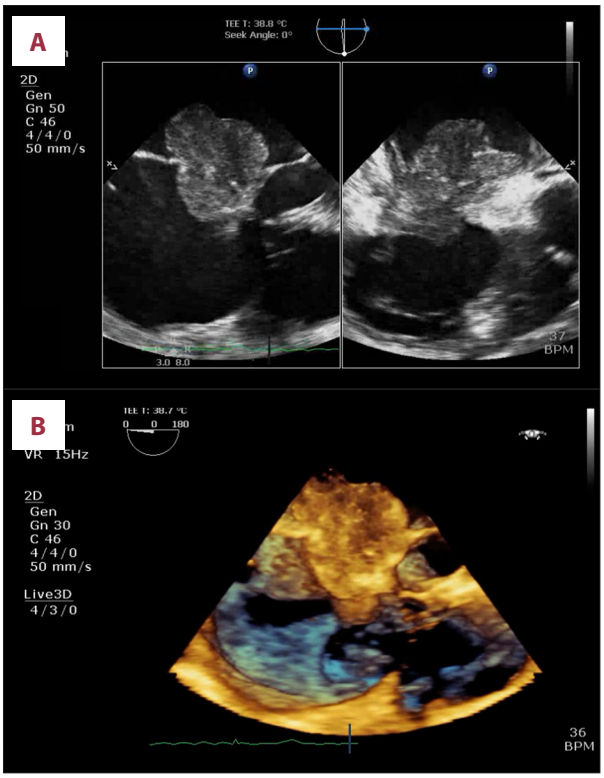


Figure 2. Large interatrial septal mass on the initial echocardiogram. Apical 4-chamber view by transthoracic echocardiogram obtained on presentation showed a large cardiac mass (3.6×3.7 cm) in the interatrial septum.



Video 1. A clip of the apical 4-chamber view via transthoracic echocardiogram was obtained, showing a large interatrial septal mass.



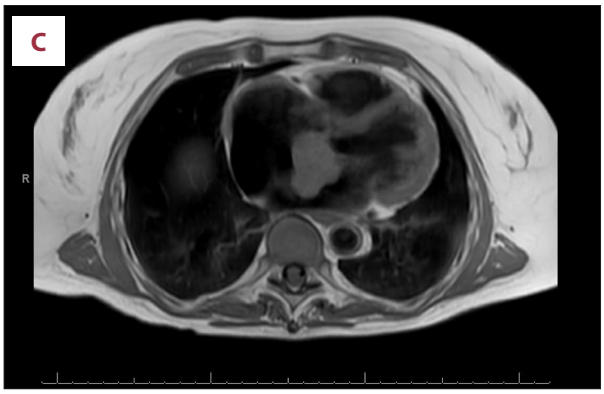


Figure 3. Other cardiac imaging demonstrated the cardiac mass. (**A**) Transesophageal echocardiogram re-demonstrated the mass. (**B**) Three-dimensional acquisition of the cardiac mass obtained during transesophageal echocardiogram. (**C**) Cardiac magnetic resonance imaging confirmed a 3.8×4.3×5.6 cm mass between the atria.

mild mitral and aortic regurgitation. No pericardial effusion was noted. Further evaluation with a transesophageal echocardiogram (Figure 3) and cardiac magnetic resonance imaging confirmed the location and extension of the mass into the coronary sinus. Endomyocardial biopsy was obtained from the right atrium under transesophageal and fluoroscopic guidance, and pathology was consistent with diffuse large B cell lymphoma. Germinal center (GC), MYC, and BCL2 double-expressor were positive. A staging positron emission tomography scan revealed increased radiotracer uptake in the cardiac mass, in addition to involvement of lymph nodes in the neck, chest, abdomen, pelvis, and left kidney. Bone marrow aspirate showed a normocellular marrow with trilineage hematopoiesis and no overt morphologic evidence of lymphoma. A lumbar puncture with cerebrospinal fluid analysis was interpreted as negative for flow immunophenotypic evidence of a mature B cell neoplasm. No endoscopy or lymph node biopsy were performed. Based on these findings, diffuse large B cell lymphoma, stage IV was the final diagnosis, with secondary cardiac involvement.

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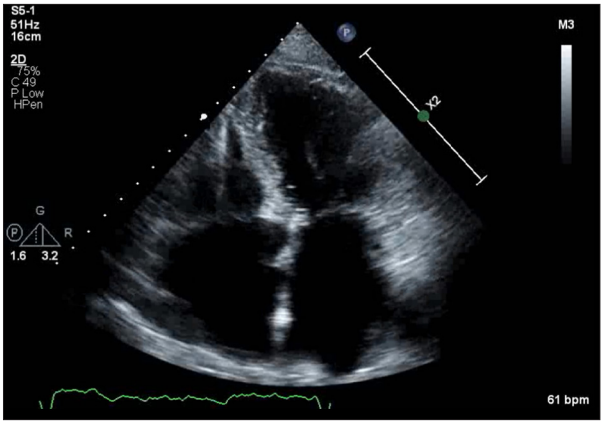

Figure 4. Resolution of the cardiac mass after chemotherapy. Apical 4-chamber view from a repeat transthoracic echocardiogram completed 6 weeks after chemotherapy demonstrated resolution of the cardiac mass after lymphoma treatment.

While undergoing the above-mentioned work-up, the patient had an episode of syncope with head injury, followed by a brief period of altered mentation. Neurological evaluation with head computed tomography scan and brain magnetic resonance imaging revealed no acute process. The event was deemed to have been caused by transient asystole, and an urgent single-chamber, right ventricular lead permanent pacemaker was implanted. Two days after successful placement of the pacemaker, chemotherapy with R-CHOP (rituximab, cyclophosphamide, Adriamycin, vincristine, and prednisone) was initiated. The patient completed 6 cycles of R-CHOP along with intrathecal methotrexate; cycle 1 was given as an inpatient with reduced doses that were followed by full doses from cycle 2 onwards. Following the second cycle of chemotherapy, a positron emission tomography scan revealed no radiotracer uptake, indicating resolution of tumors. Transthoracic echocardiogram at 6 weeks after chemotherapy showed complete resolution of the cardiac mass when compared to the prior study (Figure 4). On subsequent outpatient follow-up, her symptoms of dyspnea on exertion and fatigue had improved. The first pacemaker check, 1 week after implantation, indicated complete pacemaker dependence without any atrioventricular nodal conduction; however, over the next 6 months, serial pacemaker checks demonstrated improvement of atrioventricular nodal function as manifested by reduced (100% to 80%, with lower limit of pacing set at 60 bpm) pacing burden.

Discussion

This patient had a large tumor infiltrating the interatrial septum with resultant complete heart block. It was unclear whether treatment of the tumor with chemotherapy would improve the conduction abnormality or if tumor lysis and fibrosis would cause further damage to the myocardium and conduction system.

The presence of symptomatic CHB with junctional bradycardia is a class 1 indication for permanent pacemaker implantation; however, the timing of permanent pacemaker implantation and recovery of conduction abnormality in such a patient presenting with a cardiac mass is unclear [10]. Use of a prolonged temporary transvenous pacemaker while undergoing treatments was considered inappropriate due to risks of infection, bleeding, and thrombus. A leadless pacemaker was considered given the increased risk of infection and bleeding in the setting of neutropenia and thrombocytopenia from chemotherapy, but an anticipated need for chest radiation with inability to shield the device deterred this choice in favor of a standard single-chamber transvenous system. The patient had permanent atrial fibrillation, so only a single lead was indicated. The device was MRI conditional-approved, which would allow for mass follow-up by MRI if needed.

It was reassuring to observe resolution of the cardiac tumor after the first 2 cycles of chemotherapy with no symptoms to suggest heart failure or infection of the newly-placed PPM. Furthermore, the evidence of pacemaker dependence improved with treatment of the tumor. It was therefore inferred that the conduction system recovery was dependent on resolution of the mass effect/infiltration by the tumor. This case, therefore, serves as a useful demonstration that heart block secondary to cardiac tumor is a potentially reversible phenomenon. While pacemaker implantation may not necessarily be avoidable (as was the case with this patient), there is the possibility of partial or complete conduction recovery with appropriate therapy for the cardiac tumor; therefore, it is imperative to initiate cancer therapies without delay.

Conclusions

Lymphoma with cardiac involvement can lead to conduction abnormalities, including CHB. Heart block in the setting of these tumors may be reversible with appropriate therapy, but implantation of a PPM remains inevitable is some cases.

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References:

1. Gordon MJ, Danilova O, Spurgeon S, Danilov AV: Cardiac non-Hodgkin's lymphoma: Clinical characteristics and trends in survival. Eur J Haematol, 2016; 97: 445–52
2. Jeudy J, Burke AP, Frazier AA: Cardiac lymphoma. Radiol Clin North Am, 2016; 54: 689–710
3. Voigt P, Wienbeck S, Weber MA et al: Cardiac hematological malignancies: Typical growth patterns, imagining features, and clinical outcome. Angiology, 2018; 69: 170–76
4. Miguel CE, Bestetti RB. Primary cardiac lymphoma. Int J Cardiol. 2011;149: 358-63.
5. Chinen K, Izumo T: Cardiac involvement by malignant lymphoma: A clinicopathologic study of 25 autopsy cases based on the WHO classification. Ann Hematol, 2005; 84: 498–505
6. Kaiafa G, Bobos M, Savopoulos C et al: Heart and lymphoma: An unusual case of secondary cardiac lymphoma manifested through presyncope and syncope episodes and atrial flutter. Hell J Cardiol, 2018; 59: 182–85
7. Jayaprakash S: Clinical presentations, diagnosis, and management of arrhythmias associated with cardiac tumors. J Arrhythm, 2018; 34: 384–93
8. Clifford SM, Guerra SM, Mangion JR: Massive metastatic intracardiac lymphoma presenting with complete heart block with resolution following chemotherapy. Echocardiography, 2003; 20: 201–2
9. Giudici MC, Sadler RL, Robken JA et al: Complete atrioventricular block due to large cell lymphoma: resolution with chemotherapy. Clin Cardiol, 1996; 19: 262–64
10. Kusumoto FM, Schoenfeld MH, Barrett C et al: 2018 ACC/AHA/HRS guideline on the evaluation and management of patients with bradycardia and cardiac conduction delay: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. J Am Coll Cardiol, 2019; 74: e51–156

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