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Disappearance of Complete Atrioventricular Block After Chemotherapy for Malignant Lymphoma: A Case Report

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Abstract

A 77-year-old man with malignant lymphoma presented with dizziness and exertional dyspnea. Physical examination revealed marked bradycardia (36 beats/min). Twelve-lead electrocardiography showed complete atrioventricular block with narrow QRS escape beats. Gallium scintigraphy demonstrated significant abnormal uptake in the heart. Transesophageal echocardiography showed a thick interatrial septum with increased echogenecity. He underwent chemotherapy under external temporary pacing with a suspected diagnosis of complete atrioventricular block secondary to cardiac invasion of malignant lymphoma. Atrioventricular conduction progressively improved and the complete atrioventricular block disappeared. He is currently well and has required no cardiac pacing for 6 months. We conclude that complete atrioventricular block may be reversible in some patients with malignant lymphoma, even in the elderly.

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Key Words

- **Arrhythmias, treatment of (complete heart block)**
- **Radionuclide imaging (gallium scintigraphy)**
- **Ultrasonic diagnosis**
- **Neoplasms (cardiac lymphoma)**

INTRODUCTION

The heart is a site invaded by several metastatic tumors, including malignant lymphoma. Cardiac invasion by malignant lymphoma induces various nonspecific cardiac signs and symptoms[1-3]. However, antemortem diagnosis of cardiac involvement of malignant lymphoma is only rarely established. We present a patient with malignant lymphoma in whom complete atrioventricular block disappeared after chemotherapy.

CASE

A 77-year-old man was referred to our hospital because of dizziness and exertional dyspnea. He had been treated for malignant lymphoma (diffuse large cell type, T cell type) for 7 years. The diagnosis was based on biopsy findings of the skin and

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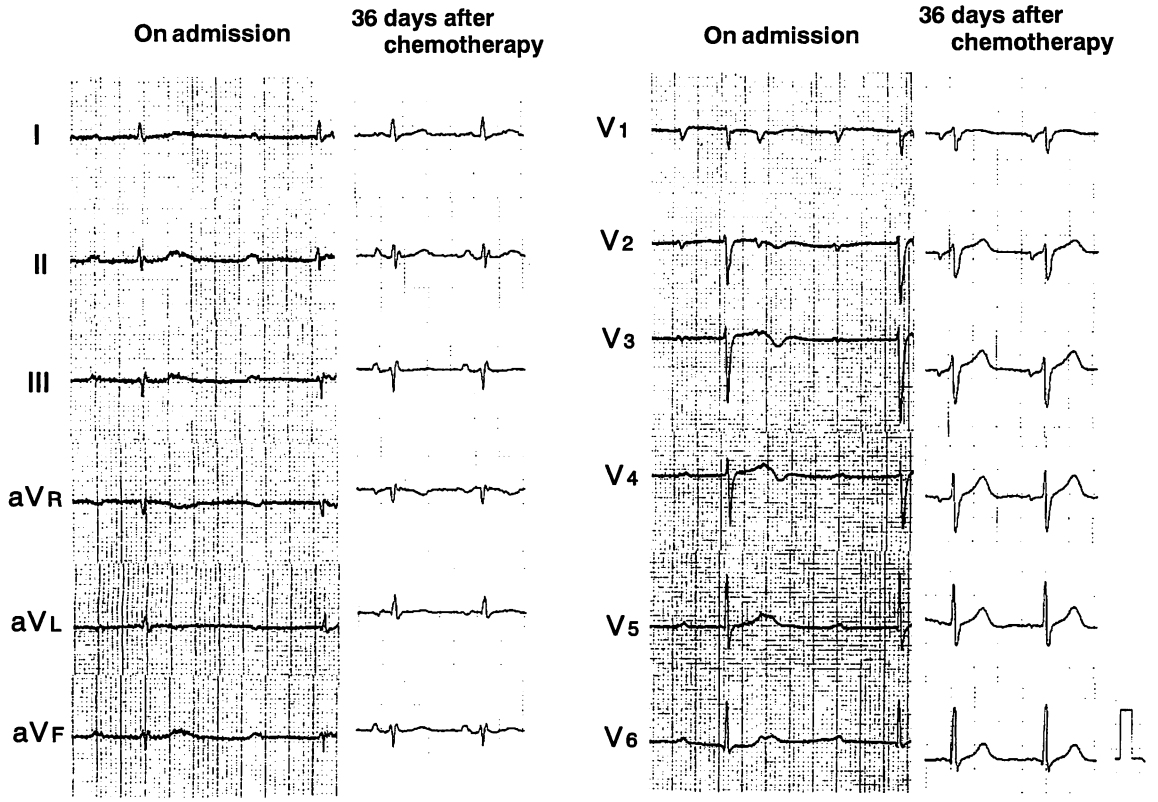

Fig. 1 Twelve-lead electrocardiograms on admission and 36 days after chemotherapy
Complete atrioventricular block on admission returned to normal sinus rhythm.

oral mucosa. Before admission, he had taken prednisolone (10 mg daily). Physical examination revealed eruptions over the entire body and marked bradycardia (36 beats/min). Twelve-lead electrocardiography (ECG) showed complete atrioventricular block with narrow QRS escape beats (36 beats/min; **Fig. 1**). External cardiac pacing was accomplished transvenously. The serum concentration of potassium was 4.2 mEq/*l*. Gallium scintigraphy demonstrated significant abnormal uptake in the heart (**Fig. 2-A**). Transesophageal echocardiography showed a thick interatrial septum with increased echogenecity (**Fig. 2-C**). Twenty-three days after admission, he developed chest pain and ECG showed complete atrioventricular block with wide QRS escape beats (left bundle branch block pattern; **Fig. 3-B**). He underwent the first course of CHOP chemotherapy (800 mg cyclophosphamide for 1 day, 40 mg adriamycin for 1 day, 2 mg vincristine for 1 day, 140 mg prednisolone for 5 days) under external pacing. On the last day of the first course of CHOP, the QRS duration on escape beats was shortened, and his chest pain disappeared. Atrioventricular conduction progressively improved to 1 : 1 atrioventricular conduction with a PR interval of 240 msec on day 13, and 120 msec on day 36 (**Figs. 1, 3**). Twenty-three days after the initiation of chemotherapy, gallium scintigraphy revealed no significant abnormal uptake in the heart, and transesophageal echocardiography showed a slight decrease in the interatrial septal thickness (**Figs. 2-B, D**). Six months after admission, he was well and undergoing the second course of CHOP without cardiac pacing.

DISCUSSION

Autopsy data have shown that 20% of patients with malignant lymphoma experience cardiac metastasis[2,3]. However, most patients with cardiac involvement of malignant lymphoma show nonspecific clinical signs and symptoms of cardiac dysfunction, and cardiac involvement is undetected before death. The most common ECG findings of cardiac involvement of malignant lymphoma are sinus tachycardia, nonspecific ST-T changes, and low voltage[2]. These findings of ECG may be nonspecific, and cannot be considered diagnostic. However, Koiwaya *et al.*[4] noted that in some

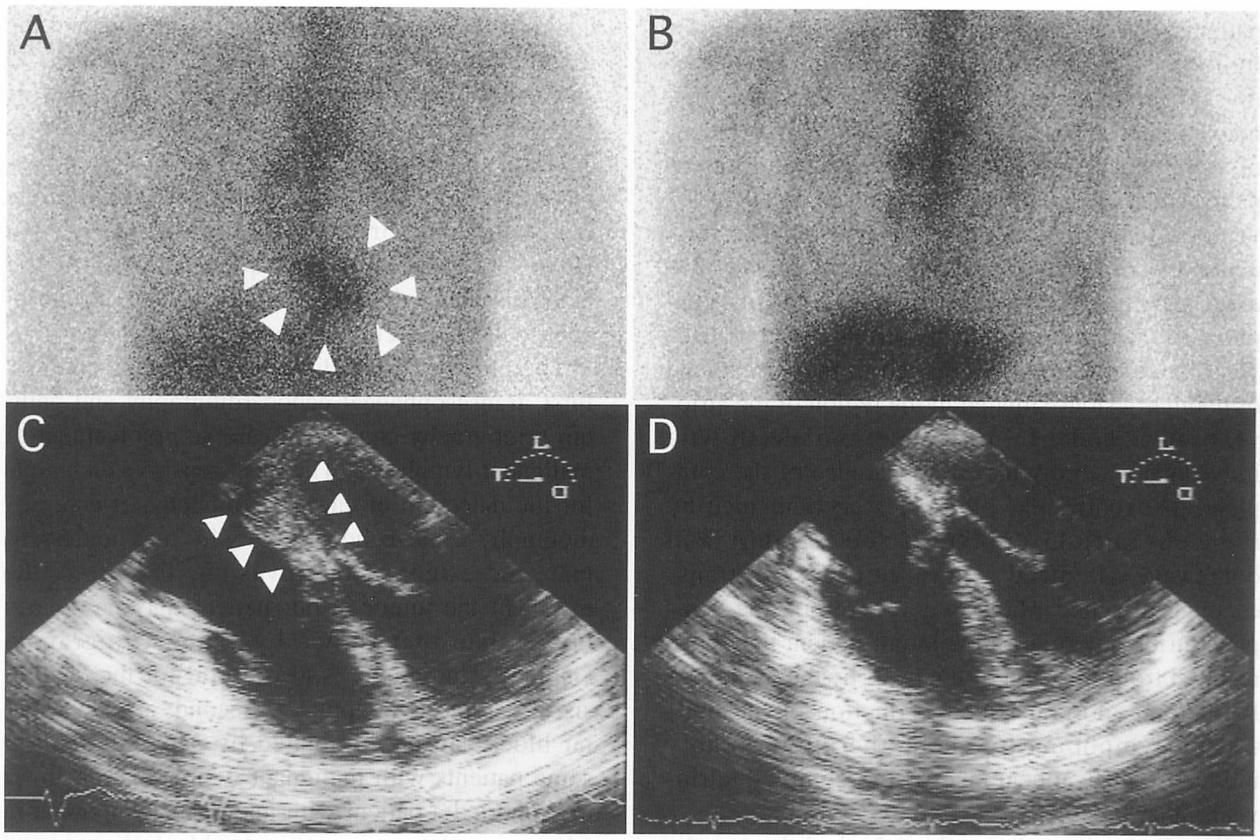

Fig. 2 Gallium scintigrams (*A*, *B*) and transesophageal echocardiograms (*C*, *D*)
A and *C* were taken before chemotherapy under external temporary pacing, and *B* and *D* after chemotherapy without pacing. Arrowheads indicate abnormal uptakes (*A*) and increased interatrial septum thickness (*C*).

Fig. 3 Serial electrocardiograms in lead V_1 on admission (*A*), during chest pain (*B*), 11 days (*C*), 13 days (*D*), and 36 days (*E*) after chemotherapy
10 mm = 1 mV.

patients, careful observation of serial ECG was useful for the diagnosis and assessment of the mode of invasion into the heart. Changes in ECG findings may be important for detecting cardiac involvement of malignant lymphoma. Therefore, in the present patient, the sudden development of complete atrioventricular block was an important sign. The incidence of complete atrioventricular block was 3% after cardiac involvement of malignant lymphoma[2,3]. Miyazaki *et al.*[5] reported that the atrioventricular block may be related to the appearance of nodular lesions situated in the region of the atrioventricular node. In our patient, no electrolytic imbalance was present. Disappearance of the complete atrioventricular block was accompanied by reduced gallium uptake in scintigraphy and decreased interatrial septum thickness in transesophageal echocardiography. Therefore, the complete atrioventricular block in our patient may have resulted from invasion of the heart by the malignant lymphoma and consequent reduction of the infiltrating lymphoma by chemotherapy probably induced the disappearance of the complete atrioventricular block.

We obtained no electrophysiological data on the complete atrioventricular block, so the origin of the conduction disturbance is unknown. It may be argued that the conduction disturbance could have developed in the His bundle, because the duration of the QRS wave was 80 msec, and the ventricular rate was 36 beats/min. The malignant lymphoma could have infiltrated into both the atriums and the distal portion of the His bundle, because ECG showed complete atrioventricular block with wide QRS complexes when he suffered chest pain (**Fig. 3**), and the morphology of P and QRS waves recorded 36 days after chemotherapy were different from those recorded on admission (**Fig. 1**). However, although the complete atrioventricular block disappeared, we are not sure whether the atrioventricular conduction recovered completely.

The present case indicates 2 important findings. First, transesophageal echocardiography and gallium scintigraphy can detect cardiac involvement of malignant lymphoma. The most sensitive technique for the detection of cardiac lymphoma is echocardiography[1], but echocardiography may underestimate the extent of the invasion. Therefore, the extent of the tumor in our patient may have been larger than that shown by echocardiography. Gallium scintigraphy is also useful for the diagnosis of cardiac lymphoma[6,7]. Second, atrioventricular block can be eliminated by chemotherapy in some patients with malignant lymphoma. Otsuji *et al.*[8] reported a patient with malignant lymphoma in whom complete atrioventricular block disappeared after chemotherapy, but first degree atrioventricular block did not. The most significant finding in the present patient was the complete disappearance of atrioventricular conduction, indicating that chemotherapy should be performed in patients with malignant lymphoma and atrioventricular block.

要　約

化学療法後に完全房室ブロックが消失した悪性リンパ腫の1症例

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症例は77歳，男性．悪性リンパ腫の診断のもとに，約7年間経過観察されていた．入院の約2週間前から眩暈，歩行時呼吸困難感があり来院．来院時の脈拍数は36/min，整であった．心電図では，完全房室ブロックを，Gaシンチグラフィーでは心臓への異常集積を認めた．経食道心エコー図所見では，心房中隔を中心に凹凸不整の著明な肥厚を呈し，Gaシンチグラフィーの集積部位の像と一致した．完全房室ブロックは悪性リンパ腫に起因すると考えられたため，化学療法(CHOP療法)を行った．1クール終了後，完全房室ブロックの消失とともにGaシンチグラフィーの異常集積所見が消失した．退院後6ヵ月の現在も，ペースメーカーの使用なく経過している．本症例は，高齢者の悪性リンパ腫による完全房室ブロックに対して，化学療法が有効であった貴重な1例である．

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