

Electrocardiographic evidence of heart metastasis from a primary lung cancer

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Hearth metastasis is usually discovered during autopsy. Electrocardiographic abnormalities are common with tumor invasion of the heart. We report a patient with lung cancer metastasis of the heart which was presented with electrocardiographic (ECG) changes. Echocardiography and computerized tomography (CT) of chest confirm the diagnosis. Careful and regular observations of ECG changes are primarily important in assessing patients with cardiac metastasis.

Metastasis of the heart is rarely recognized prior to autopsy. The primary source of metastasis may be various malignant tumors such as lung cancer, lymphoma, breast cancer, leukemia, stomach cancer and melanoma. Lung cancer is the most frequent primary tumor and heart metastases may be detected in 29-53% of patients with fatal lung cancer.¹ The majority of heart metastasis from lung cancer occurs in the pericardium. The incidence of myocardial metastasis from lung cancer is 5.3-10.6%.² Electrocardiography of patients with myocardial metastasis revealed ST-T wave changes and various types of arrhythmia.² We report a case with lung cancer showing ECG changes during radiation therapy to chest.

A 49-year-old male patient was admitted to our clinic for radiation therapy. The patient had smoked 20-25 cigarettes per day for 30 years. The CT scan of the chest showed a parenchymal shadow in the left upper and lower lobe with lower lobe atelectasis. A biopsy obtained by bronchoscopy revealed a squamous cell carcinoma. At the first visit, the patient was suffering from chest pain and dyspnea. Radiation therapy had been planned. For the palliation of these symptoms, the external radiotherapy is delivered to the left hemithorax with 2 opposing anteroposterior-posteroanterior fields by using Co-60 with 3 Gy per fraction up to a total dose of 30 Gy. An ECG was taken with the other routine tests during the hospitalization of the patient. The ECG recorded high ventricular speed in atrial fibrillation (156 per minute), pathologic Q pattern in leads I, V1, V2 and atrioventricular block (Figure 1).

The ECG changes were stable during hospitalization and the values of creatinine phosphokinase (CPK), MB isoenzyme, lactate dehydrogenase (LDH) and troponin I were within

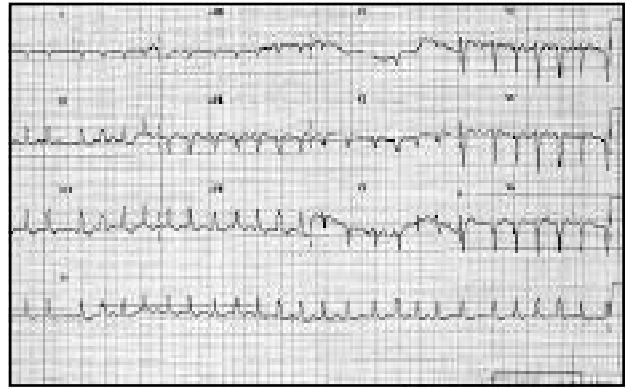


Figure 1 - Signs of antero-septal ischemia and atrial fibrillation in electrocardiography (ECG).

normal limits. A Doppler-echocardiographic study confirmed the presence of a minimum pericardial effusion and metastatic mass infiltrating wall of the left atrium.

The CT scan of the chest was repeated and showed a mass in the upper and lower lobe and huge subcarinal lymphadenopathy infiltrating the heart's left atrium. This metastatic tumor region was already in the radiation field. After the radiation therapy, the symptoms were palliated and no acute radiation toxicity was observed.

Lung cancer involvement of the heart is usually diagnosed after death due to lack of specific signs. Cardiac involvement appears to be related to the histological cell type, degree of tumor cell differentiation and extent of the disease.² The mechanisms for involvement of the heart include direct invasion, retrograde lymphatic extension, hematogenous seeding and transvenous infiltration.²

Ante mortem diagnosis of cardiac metastasis is difficult due to nonspecific nature of the clinical findings. The ECG findings demonstrate ST segment elevation or T wave inversion, mimicking acute myocardial infarction.³ Serum CPK levels have been reported to be within the normal range in patients with myocardial metastasis.⁴ Patients with cardiac metastasis had high incidence of arrhythmia.² For our patient, the indication of a past myocardial infarction on ECG can be suggested as heart metastasis. It is possible that tumor invasion may cause atrial fibrillation.

Echocardiography provides a rapid evaluation of the size and location and may help in differential diagnosis.⁵ The CT or magnetic resonance imaging (MRI) may offer insight to the origin of the tumor.

In conclusion, electrocardiographic abnormalities are commonly seen with tumor invasion of the heart. However, most of these abnormalities are nonspecific. Serial electrocardiograms are useful for screening in clinical settings in lung cancer patients.

The ST-T changes, atrial fibrillation and arrhythmia should suggest the need for echocardiography in order to define to diagnosis.

Received 12 January 2005. Accepted for publication in final form 23rd April 2005.

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References

1. Skhvatsabaja LV. Secondary malignant lesions of the heart and pericardium in neoplastic disease. *Oncology* 1986; 43: 103-106.
2. Tamura A, Matsubara O, Yoshimura N, Kasuga T, Akagawa S, Aoki N. Cardiac metastasis of lung cancer: A study of metastatic pathways and clinical manifestations. *Cancer* 1992; 70: 437-442.
3. Abe S, Watanabe N, Ogura S, Kunikane H, Isobe H, Yamaguchi E, et al. Myocardial metastasis from primary lung cancer: myocardial infarction-like ECG changes and pathologic findings. *Jpn J Med* 1991; 30: 213-218.
4. Yao NS, Hsu YM, Liu JM, Chen LT, Liao CS. Lung cancer mimicking acute myocardial infarction on electrocardiogram. *Am J Emerg Med* 1999; 17: 86-88.
5. Weg IL, Mehra S, Azueta V, Roster F. Cardiac metastasis from adenocarcinoma of the lung. Echocardiographic-pathologic correlation. *Am J Med* 1986; 80: 108-112.