

Fig. 2. A cardiac echogram with its schema showing a tumor mass in the left ventricle. LV, left ventricle; LA, left atrium; Ao, aorta.

Since February 1998, however, anorexia and constipation appeared. Because the symptoms did not improve, he was admitted again in March 1998. On admission, there was no sign of recurrence in the tongue, mesopharynx, hypopharynx, esophagus or neck. His blood pressure was 103/60 mmHg, and his pulse rate was 78 beats/min. Laboratory findings revealed hyperleucocytosis, hyponatremia, hypercalcemia

and a high value of C-reacting protein (Table 1). ECGs showed elevations of ST waves in leads I, aVL, V5 and V6, and a depression in lead aVF (Fig. 1). Cardiac echography revealed a tumor mass in the lower portion of the lateral wall of the left ventricle (Fig. 2). Sudden and serious arrhythmias were provoked on 12 March 1998, and he died on 22 March of cardiac insufficiency by arrhythmia. The post-

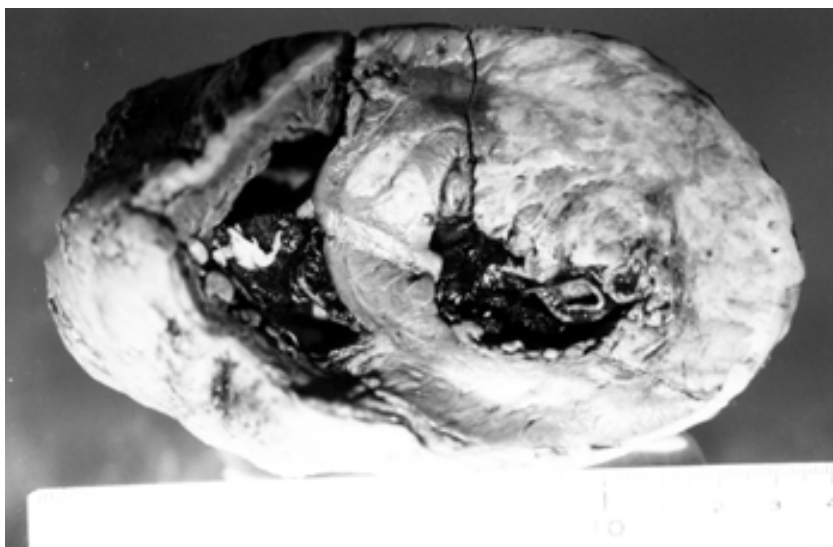


Fig. 3. The heart at autopsy. The metastatic tumor mainly exists in the anterior and lateral wall of the left ventricle, reaching to the septum.

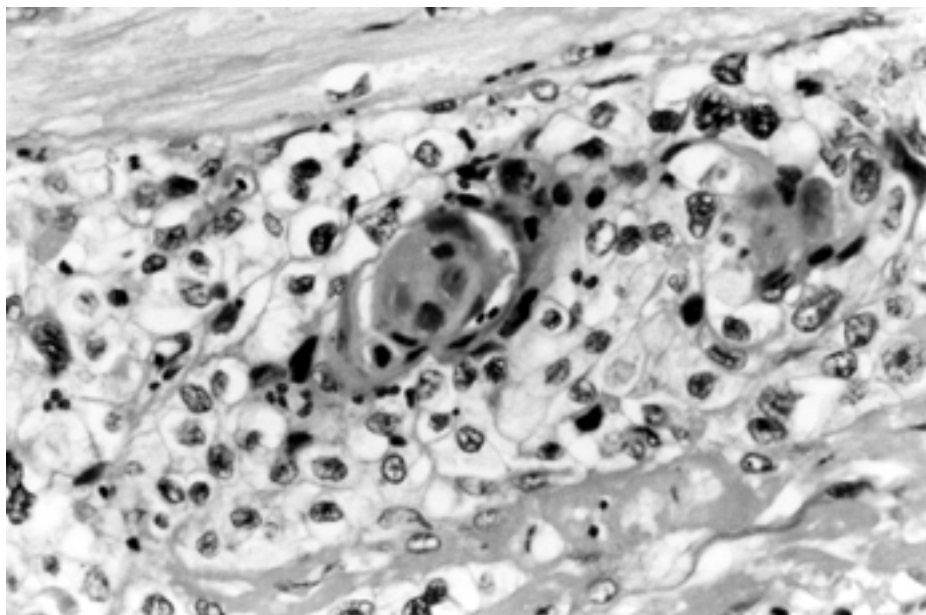


Fig. 4. Tumor cells composed of squamous cell carcinoma. Hematoxylin eosin stain, $\times 200$.

mortem examination showed the heart was 550 g in weight and involved in the tumor. The cardiac tumor metastasized mainly into the anterior and lateral wall of the left ventricle, and reached the septum (Fig. 3). Microscopically, a low or moderately differentiated type of squamous cell carcinoma invaded the myocardium (Fig. 4). Other distant metastases were found at autopsy in the right lung, bilateral adrenal glands, renal chorion, bilateral kidneys and right upper extremity.

Discussion

Concerning the incidence of cardiac metastases from malignant tumors, Abraham et al. (1990) reported 11.8% and Nakayama et al. (1966), 9.7%. However, reported incidences have varied according to the type of institutions, because cardiac metastases are generally found at autopsy, and clinically evident cardiac metastases are uncommon (Abraham et al., 1990). Malignant tumors of the head and neck with cardiac metastases are particularly rare. Among tumors of

the head and neck, primary malignant tumors of the tongue are frequent (DeLoach and Haynes, 1953; Nakayama et al., 1966). Nakayama et al. (1966) reported that cardiac metastases were found at autopsy in 6 of 12 patients with tongue carcinomas. Myocardial or pericardial involvement was observed at autopsy in 1 of 9 patients with tongue carcinomas (DeLoach and Haynes, 1953), and in 2 of 126 patients with primary tongue carcinoma (Gasman et al., 1955). To the best of our knowledge, antemortem diagnosis was reported only in 3 cases, including the present one, of squamous cell carcinoma of the tongue with metastasis to the heart (Werbel et al., 1985; Rivkin et al., 1999). Concerning the distribution of metastases within the heart, Abraham et al. (1990) carried out postmortem examinations for 3314 cases over a 14-year period, and reported that the myocardium was the most common site (53.9%), followed by the pericardium (28.4%), epicardium (13.7%) and endocardium (3.9%). Most reported cases of cardiac metastases have been involved in the right atrium or ventricle, and metastases in the left ventricle have been quite uncommon. The

present case suffered from a metastatic tumor in the left ventricle, presumably spread by the hematogenous route.

Cardiac metastases have no characteristic symptoms nor peculiar ECG findings. Differentiation of cardiac metastases from ischemic heart disease or endocarditis is difficult. Bisel et al. (1953) reported a retrospective survey on ECG findings in 59 patients with cardiac metastasis: ECGs showed normal findings in 42% and abnormal findings in 58%. Of the abnormal findings, T-wave abnormalities were the most common (14 cases), followed by low-voltage QRS complexes (7 cases), ST-segment deviations (5 cases), Q-wave abnormalities (2 cases) and prolonged A-V conduction (1 case). But these abnormal findings occur also in other diseases such as ischemic heart disease and endocarditis. In our case, follow-up was carried out through periodical ambulatory examination, in which the oral cavity, chest and abdomen were carefully checked by CT. Examination of the heart was not done because there were no suspected symptoms of cardiac metastasis. But with the uncommon ECG and cardiac-echographic findings, we could clinically have made an antemortem diagnosis in retrospect. Because echogram-guided biopsy was not carried out, definite diagnosis depended on postmortem examinations.

Cardiac metastases are highly likely to provoke conduction disorder of the heart, myocardial ischemia and cardiac tamponade. In preventing sudden death, it is important to make a correct diagnosis. However, even if cardiac metastasis is diagnosed, applying curative therapy is difficult because most cardiac metastases are spread by a systematic route, causing a relatively critical status in general. Werbel et al. (1985), Moser et al. (1991) and Murase et al. (1992) reported on resection of cardiac metastasis, but surgery in each case was unsuccessful. Shelburne and Aronson (1940) reported on a conservative treatment for cardiac metastasis, which was irradiation for a case of pericardial effusion. Rivkin et al. (1999) reported treatment by chemotherapy for palliation. In a case of squamous cell carcinoma in the uterine cer-

vix reported by Batchelor et al. (1997), chemotherapeutic treatment applied for 1 year successfully produced no recurrence. For the present patient, application of curative or palliative therapy such as radiation and chemotherapy was not possible because he had already been in a critical status. Almost all patients are considered fatal when they are diagnosed with cardiac metastasis. But, if cardiac metastases of malignant tumors are found early by ECG or cardiac echogram, chemotherapy or radiation therapy could bring apothanasia to patients. The paucity of antemortem diagnosis of cardiac metastasis emphasizes the importance and significance of this.

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