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Case report

Pericardiac metastasis from advanced gastric cancer

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Abstract: A 64-year-old man complaining of anterior chest pain, weight loss, and neck tumors was found to have advanced gastric cancer with pleuritis carcinomatosa and multiple lymph node and bone metastases. The patient was treated with combination chemotherapy consisting of mitomycin C (MMC), tegafur (UFT), and lentinan, and then with MMC and 5-fluorouracil (5FU) instillation into the pleural spaces after pleural drainage. With these treatments, the primary tumors and cancerous ulcers of the stomach improved markedly, and the lymph node enlargement and pleural effusion disappeared completely. Afterwards pericardiac metastasis complicated by cardiac tamponade occurred, but repeated pericardiocentesis and administration of MMC into the pericardiac cavity effectively eliminated the effusion. These treatments appeared potentially useful for advanced gastric cancer with generalized metastases including pericardiac involvement. However, the patient died of cardiac tamponade with massive pericardiac bleeding, probably due to the repeated pericardiocentesis and/or the administration of anticancer drugs.

Key words: pericardiac metastasis, gastric cancer, chemotherapy

Introduction

Pericardiac metastasis from advanced gastric cancer is a rare clinical condition. It requires, however, rapid and appropriate diagnosis and therapy because of the significant risk of cardiac tamponade.

We present a case of pericardiac metastasis from gastric cancer that was successfully treated temporarily by repeated pericardiocentesis and by the intrapericardiac administration of anticancer drugs.

Case report

A 64-year-old man was admitted with a 2-month history of anterior chest pain. He had had a 5-kg weight loss over the previous 2 months and had become aware of bilateral neck tumors 1 week prior to admission.

Physical examination revealed generalized peripheral lymphadenopathy of bilateral cervical, supraclavicular, axillary, and inguinal lymph nodes. The patient's heart sound was clear, and results of abdominal examination were negative.

Stools were positive for occult blood test. Hemoglobin level was 9.2 g/dl and hematocrit 30.3%. The erythrocyte sedimentation rate was 52 mm/h. The serum total protein level was 6.7 g/dl, albumin 3.0 g/dl, lactic dehydrogenase 832 IU/l, alkaline phosphatase 4.2 KAU, total bilirubin 0.7 mg/dl, glutamic oxaloacetic transaminase (GOT) level 38 IU/l, and serum carcinoembryonic antigen (CEA) 193.1 ng/ml.

Electrocardiography on admission showed sinus tachycardia and low voltage at limb leads. Chest radiography showed large left pleural effusion, which was tapped, yielding bloody fluid containing adenocarcinoma cells, and prominence of the right pulmonary hilum, suggesting paratracheal lymph node enlargement (Fig. 1). An upper gastrointestinal (GI) series disclosed irregular stenosis of the pyloric antrum and deformities of the lesser curvature of the gastric angle. Endoscopy showed multiple tumors, with irregular ulcerations, scattered throughout the gastric angle and the antrum, presenting pyloric stenosis (Fig. 2A). Endoscopic biopsy specimens of the gastric tumors revealed poorly differentiated adenocarcinoma (Fig.

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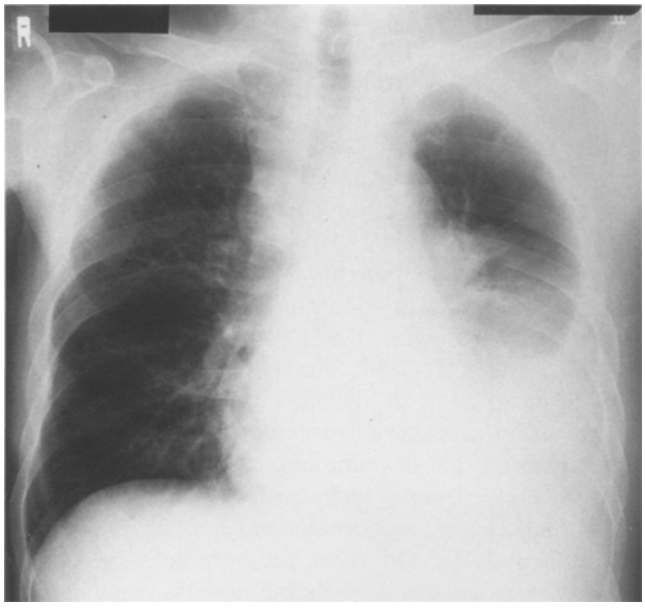

Fig. 1. Chest X-ray before treatment, revealing large left pleural effusion and right hilar adenopathy

3). A computerized tomographic (CT) scan of the abdomen revealed paraaortic lymph node enlargement (Fig. 4A). Technetium-99m (99mTc) bone scans revealed multiple abnormal uptake throughout the body. A diagnosis of advanced gastric cancer complicated by multiple lymph node and bone metastases and pleuritis carcinomatosa was established, with no indication for laparotomy.

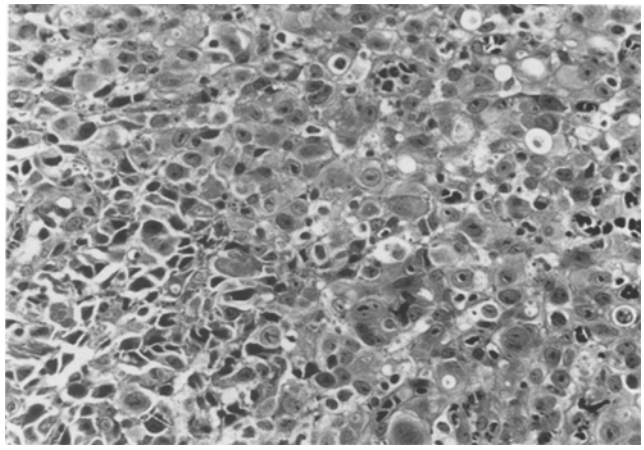

Fig. 3. Histology of the biopsy specimen, showing poorly differentiated adenocarcinoma. H&E

On June 11, 1992, chemotherapy was initiated, consisting of 6 mg i.v. mitomycin C (MMC), once a week; 500 mg i.v. 5-fluorouracil (5FU), on days 1, 3, and 5; and 1 mg i.v. lentinan, twice a week (Fig. 5). One week later, however, 5FU was discontinued, after a total dose of 1500 mg, because of general fatigue; tegafur (UFT; 600 mg/day per os) was then begun. The tegafur + MMC (UFTM) therapy was continued for 1 month and then UFT only was continued, to a total dose of 66 g. After pleural drainage, 4 mg MMC and 10 mg 5FU were instilled into the bilateral pleural spaces, resulting in diminution of the pleural effusion on chest radiography on August 2, 1992.

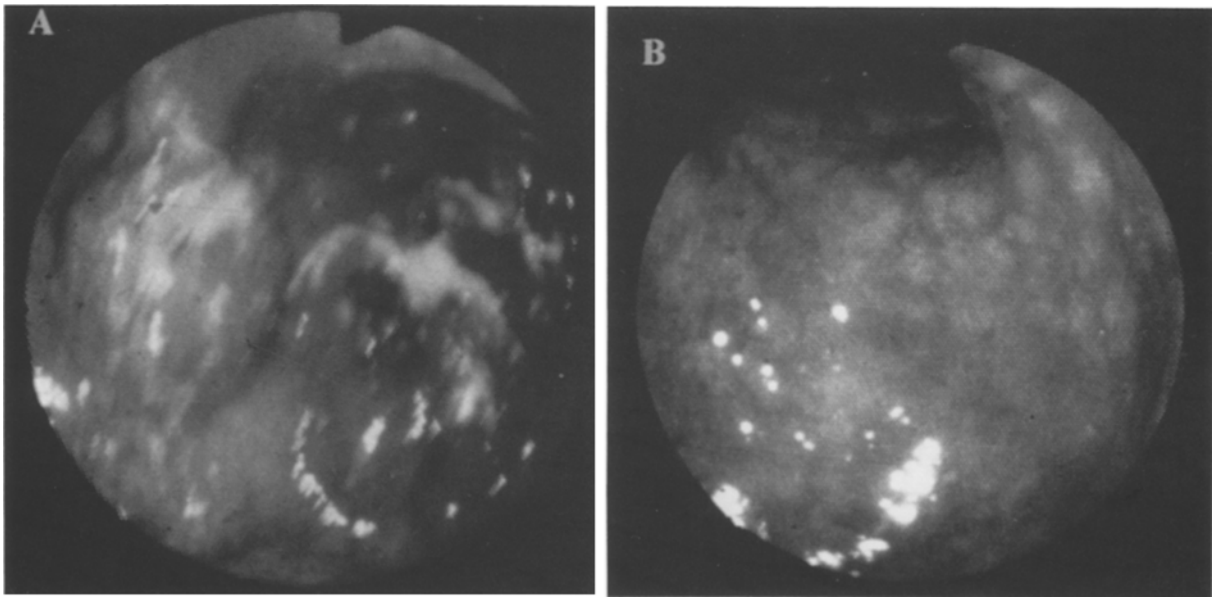

Fig. 2A,B. Endoscopic appearance of the stomach, **A** before treatment, showing multiple tumors with irregular ulcerations scattered throughout the gastric angle along to the antrum; **B** after treatment, showing disappearance of the tumors and cancerous ulcers

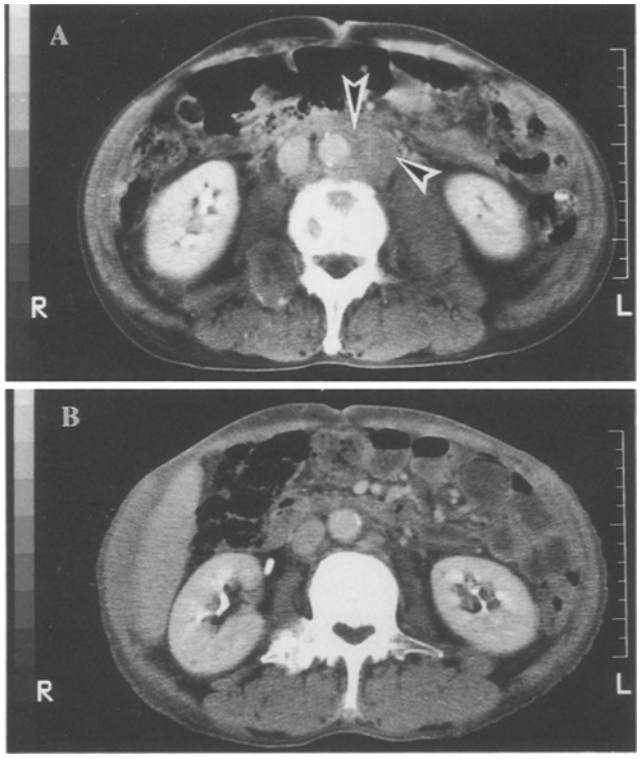

Fig. 4A,B. Abdominal computerized tomographic scan, **A** before treatment, showing paraaortic lymph node swelling (*arrows*); **B** after treatment, revealing marked reduction in the extent of the paraaortic lymph node enlargement

One month after initiation of the chemotherapy, a marked shrinking of the primary tumors and cancerous ulcers was seen by endoscopy (Fig. 2B). On physical examination, the generalized superficial lymphadenopathy had completely disappeared. In addition, the complete disappearance of the paraaortic and right paratracheal lymph node enlargement was also confirmed, by CT (Fig. 4B) and chest radiography, respectively. Accompanying these objective responses, the patient's general condition improved, and he was discharged on July 31, 1992.

On August 31, 1992, the patient was readmitted to our hospital with dyspnea on exertion. Physical examination revealed engorgement of the jugular vein and bilateral basal pulmonary rales. Electrocardiography showed sinus tachycardia, low voltage at all leads, and electrical alternans and T wave inversion at leads II and III. On chest radiography, the cardiac shadow was enlarged, with pulmonary vascular congestion and bilateral pleural effusion. Central venous pressure (CVP) was 25 cmH_2O. Echocardiography showed a moderate amount of pericardiac effusion (Fig. 6A) and a diagnosis of pericardiac tamponade was made. The CEA level decreased to 11.0 ng/ml on September 1, 1992 (Fig. 5).

Pericardiocentesis yielded 200 ml of bloody fluid containing malignant cells compatible with adenocarcinoma. Two milligrams of MMC was instilled into

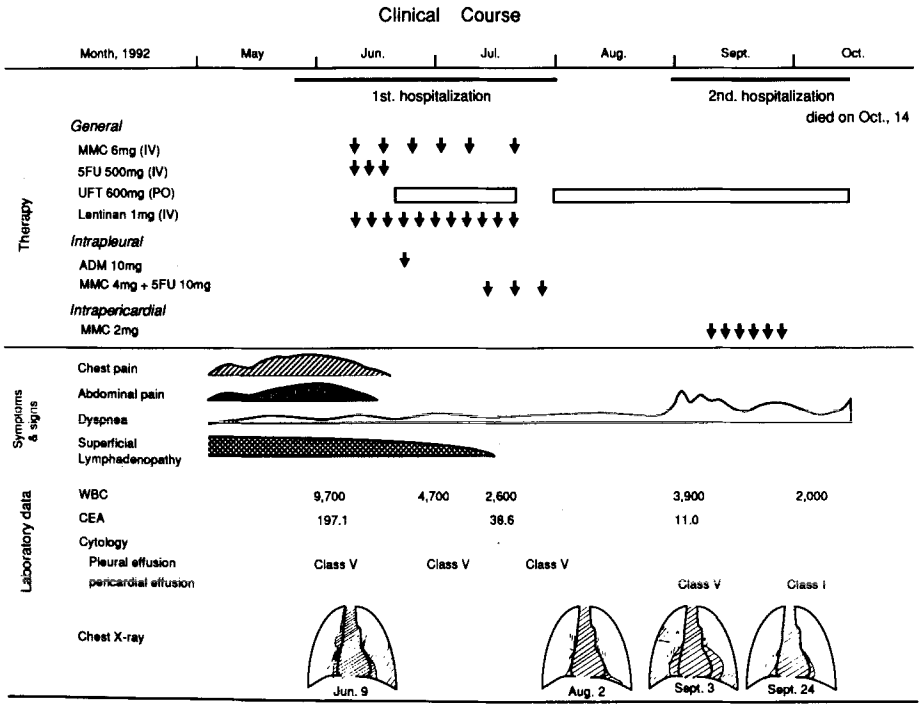

Fig. 5. Clinical course of the patient. *MMC*, Mitomycin C; *5FU*, 5-fluorouracil; *UFT*, tegafur; *ADM*, adriamycin

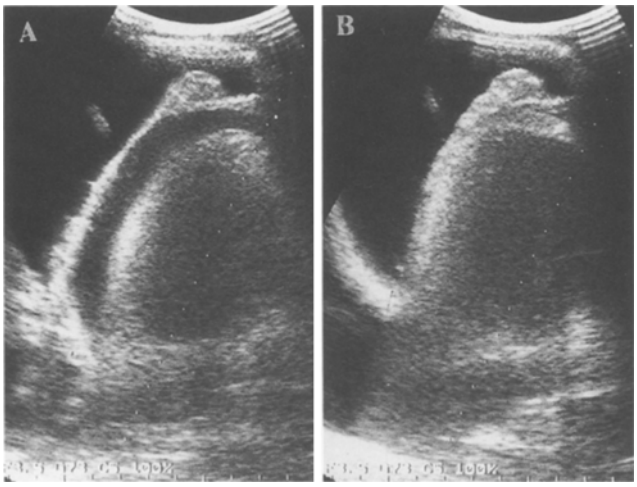

Fig. 6A,B. Echocardiography, **A** before treatment, showing a moderate amount of pericardiac effusion; **B** after treatment, revealing diminution of the pericardiac effusion

the pericardiac cavity (total dose 12 mg) following drainage of the effusion, carried out six times. After the therapy, the effusion diminished (Fig. 6B). However, retention of massive effusion occurred again, on October 2, 1992. The effusion was bloody, with 37% hematocrit, but the cytological test was negative, suggesting intrapericardiac bleeding. The patient became hypotensive and unresponsive to drainage of the effusion, and died on October 14, 1992.

Discussion

Cardiac metastases; secondary tumors of the heart and/or pericardium are not uncommon. Most investigators have found cardiac metastases in 5%–10% of cancer deaths.[1] From autopsy examinations, cardiac metastases from primary tumors in various different organs have been noted. Edward et al.[2] have reported 7 (22.6%) metastases to the heart from 31 esophageal cancers, 41 (19.6%) from 209 lung cancers, 8 (13.3%) from 60 breast cancers, and 2 (5.1%) from 39 stomach cancers. In Japan, Mukai et al.[3] have observed 136 (28.1%) metastases to the heart from 484 lung cancers, 35 (18.1%) from 193 breast cancers, 25 (13.4%) from 391 esophageal cancers, and 30 (7.7%) from 391 stomach cancers. Nakayama et al.[4] have reported 13 (25.0%) metastases to the heart from 52 breast cancers, 20 (18.0%) from 111 lung cancers and 6 (4.3%) from 140 stomach cancers. Taken together, lung and breast cancer frequently metastasize to the heart, whereas gastric cancer rarely does.

The routes by which the cardiac metastases commonly travel from the primary tumors are believed to be: (1) by direct extension, (2) by lymphatic spread, (3) by hematogenous spread, and (4) by combinations of two or all three of the above.[4–6] In the literature, most patients with cardiac metastasis have been reported to have mediastinal lymph node metastases, indicating some extent of lymphatic spread. Kline[7] has reported that in 716 cases of malignancy, all 61 patients with cardiac metastases had mediastinal lymph node metastases. In the present case, lymphatic spread is suggested, since the patient had systemic lymph node metastases, including involvement of the mediastinal lymph nodes.

Clinical manifestations in patients with secondary cardiac tumors include diffuse pericardiac infiltration with constriction,[8,9] myocardial infiltration with congestive heart failure,[10] arrhythmias[11] or pericarditis with effusion, and, usually, evidence of cardiac tamponade. Despite the frequency of cardiac involvement by tumors, cardiac failure is often overlooked clinically, since the cardiac dysfunction appears to be part of the deteriorating general condition of the patients.[12] Electrocardiography and echocardiography are helpful for the diagnosis of cardiac metastases, as was indicated in the present case. Rapid and appropriate treatment is necessary because the amount of effusion is often large and rapidly accumulating, and thus carries a significant risk of tamponade.

Therapy for cardiac metastases is mostly conservative and aimed at reducing the patient's discomfort. Pericardiocentesis, radiotherapy, local or systemic chemotherapy, and the creation of a pericardiac window have been used to control cardiac metastases.[13,14] Hayano et al.[15] have reported that, in local chemotherapy for carcinomatous pericarditis with adenocarcinoma, MMC had a suppressive effect on the reaccumulation of pericardiac effusion. Similarly, in our patient, administration of MMC into the pericardiac cavity resulted in a reduction of the effusion and in the disappearance of the malignant cells. Massive pericardiac effusion occurred again, with 37% hematocrit and no evidence of malignancy, suggesting pure hemorrhage. Local chemotherapy was effective for the pericarditis carcinomatosa. However, inflammatory changes in the pericardium, evoked by the mechanical or chemical stimulation of the repeated pericardiocentesis or by the administration of anticancer drugs may have caused intrapericardiac bleeding.

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