Malignant Pleural Mesothelioma Presenting as an Acute Surgical Abdomen due to Metastatic Jejunal Perforation

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Abstract

A 52-year-old man was admitted to our hospital in June 2008 presenting abnormal tumor lesions along the left pleura on chest X-ray. The needle-biopsied specimen of the left pleura proved the biphasic type of malignant mesothelioma. However, he complained of acute abdominal pain 7 days after the diagnosis. Chest X-ray revealed free air below the right diaphragm. Emergency surgery revealed a 4-cm perforating jejunal tumor with peritonitis. Histopathology of the resected jejunum demonstrated a metastatic tumor of malignant pleural mesothelioma. This is the first reported case of malignant pleural mesothelioma presenting as an acute surgical abdomen due to jejunal metastasis with perforation.

Key words: malignant pleural mesothelioma, small bowel metastases, jejunal perforation

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Introduction

Malignant pleural mesothelioma (MPM) is a fatal neoplasm of mesothelial origin in the pleural cavity; it is generally related to previous exposure to asbestos (1). Histologically, MPM can be subclassified as the epithelioid type in 60%, biphasic type in 30%, and sarcomatoid type in 10% of cases (2). MPM typically manifests locally in the hemithorax; presentation with metastatic disease is uncommon. However, MPM may metastasize by either lymphatic or hematogenous pathways (3).

Rare cases of MPM presenting as gastrointestinal metastasis including the large bowel, ileum and small bowel have been reported (4-8). As far as small bowel metastases of MPM are concerned, only three cases have been reported in addition to the present case (6-8). However, MPM presenting as an acute surgical abdomen due to metastatic jejunal perforation has not been reported previously.

Case Report

A 52-year-old man was admitted to our hospital in June 2008 presenting abnormal tumor lesions along the left pleura on chest X-ray. He was a heavy smoker (smoking index: 660) and had been exposed to asbestos for over 30 years as an electrical engineer by profession. Chest X-ray and computed tomography (CT) showed diffuse left pleural thickening with pericardial and thoracic wall invasion and left hilar lymph node swelling. CT-needle biopsied specimens of the left pleura demonstrated a biphasic type of MPM. There was no evidence of distant metastases of MPM at the initial staging. Abdominal CT and fluorodeoxyglucose-positron emission tomography (FDG-PET) revealed no evidence of peritoneal dissemination, metastatic mass lesions or ascites. He was diagnosed as MPM in stage IV (cT4N1M0) according to the criteria of International Mesothelioma Interest Group (IMIG). However, he was readmitted with a sudden onset of severe acute abdominal pain 7 days after the diagnosis.

The physical examination on admission revealed that his
body temperature was 38°C, blood pressure 113/73 mmHg, heart rate 85 beats/minute with regular rhythm and respiratory rate 24 /minute. Chest auscultation revealed decreased breath sounds in the left lung field. His abdomen was distended with marked diffuse tenderness. Bowel sounds were absent. A hemogram revealed a white cell count of 13,500/μL with 86.6% neutrophils, hemoglobin of 14.7 g/dL and platelet count of 269×10^3/μL. On biochemical examination, C-reactive protein (CRP) was 3.2 mg/dL. Arterial blood gas analysis revealed PaO₂ of 61.1 torr and PaCO₂ of 37.4 torr in room air. All tumor markers were within normal ranges.

Chest X-ray on admission showed free air below the diaphragm (arrow) with diffuse pleural thickening in the left lung field. Abdominal CT revealed the presence of gas bubbles on the anteroliver surface with no mass lesion, ascites or peritoneal dissemination. Emergency surgical operation revealed a perforating tumor measuring 4 cm at the jejunum and located 40 cm distal to the ligament of Treitz. The tumor invaded the full thickness of the jejunal wall with a central perforating ulcer. There was no thickening of the mesentery or of the disseminated nodules containing small amounts of purulent ascitic fluid. A segmental small intestinal resection was performed.

Pathological findings of the resected specimen showed a diffuse infiltration of atypical cells with a biphasic growth pattern which were interlacing fascicles of spindle cells with partly glandular and/or papillary formations of epithelioid cells. Immunohistochemical staining of the tumor was positive for calretinin and vimentin, but negative for CEA (Fig. 4).

The CT-needle biopsied left pleural specimen revealed the same immunohistopathological pattern as the resected jejunal tumor, such as a biphasic growth pattern and positive reactions for calretinin and vimentin, but a negative reaction for CEA (Fig. 5). These histopathological characteristics are consistent with a diagnosis of metastatic jejunal tumor of MPM origin. The patient received chemotherapy with cisplatin and pemetrexed for one month after the operation. Although, the primary lesion of the left hemithorax remained as stable disease, he suffered from brain metastasis at 8 months, and multiple liver metastases with peritoneal dissemination at 10 months after the operation. He died of ad-

Figure 1. Chest X-ray on emergency admission showed free air below the diaphragm (arrow) with diffuse pleural thickening in the left lung field.

Figure 2. a) b) Chest CT showed tumor lesions with diffuse pleural thickening of the left hemithorax (arrowheads). c) d) Abdominal CT revealed the presence of gas bubbles on the anterior liver surface (arrowheads) with no mass lesion, ascites or peritoneal dissemination.
Figure 3. Macroscopic findings of the resected tumor of the jejunum. a) A perforated tumor measuring 4 cm at the jejunum was located 40 cm distal to the ligament of Treitz. The tumor invaded the full thickness of the jejunal wall with a central perforating ulcer. b) The serosal surface revealed inflammatory reaction around the perforated ulcer without disseminated tumor nodules (arrow).

Figure 4. Microscopic findings of the resected tumor of the jejunum. a) b) Hematoxylin and Eosin staining and magnification of tumor cells showed diffuse infiltration of atypical cells with a biphasic growth pattern which were interlacing fascicles of spindle cells with partly glandular and/or papillary formations of epithelioid cells. Scale bar=1 mm (a), 50 μm (b). c) d) e) Immunohistochemical staining of the tumor was positive for calretinin, but negative for CEA. c) CEA staining; Scale bar=1 mm, d) e) Calretinin staining; Scale bar=1 mm (d), Scale bar=50 μm (e).

Discussion

As reported in 2001 (9), MPM has an extremely poor prognosis (a median survival of <1 year and a 5-year survival rate of<1%). Recently, the median overall survival has been improved, ranging between 9 and 17 months, as a result of combination chemotherapy with a platinum agent, antifolates and gemcitabine (10). MPM typically manifests as a locally invasive tumor in the hemithorax. However, rare cases of MPM presenting unusual metastatic sites such as supraventricular lymph nodes, tongue, and other rare sites have been reported (11-14). On autopsy, extensive abdominal involvement is found in one-third of the cases (15). As far as small bowel metastases of MPM are concerned, only three cases have been reported (6-8), probably because these metastases are difficult to diagnose during the clinical evaluation. Advanced MPM at 12 months after the operation.
Figure 5. Microscopic findings of the left pleural tumor. a) b) Hematoxylin and Eosin staining showed papillary structures with epithelioid cells and interlacing fascicles of spindle cells. Scale bar=100 μm (a), 25 μm (b). c) Calretinin staining was positive. Scale bar=25 μm. d) CEA staining was negative. Scale bar=25 μm.

Table 1. Reported Cases of Small Intestinal Metastases of MPM

<table>
<thead>
<tr>
<th>Case</th>
<th>Author</th>
<th>Year/sex</th>
<th>Metastatic sites</th>
<th>Histological type</th>
<th>Symptoms</th>
<th>Diagnostic methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kakukawa et al.</td>
<td>62/M</td>
<td>multiple (jejunum–ileum)</td>
<td>unknown</td>
<td>bloody stool</td>
<td>CE, DBE</td>
</tr>
<tr>
<td>2</td>
<td>Chen et al.</td>
<td>73/M</td>
<td>duodenum</td>
<td>SM</td>
<td>bloody stool</td>
<td>GIF</td>
</tr>
<tr>
<td>3</td>
<td>Terashita et al.</td>
<td>63/M</td>
<td>duodenum</td>
<td>EM</td>
<td>no symptoms</td>
<td>GIF</td>
</tr>
<tr>
<td>4</td>
<td>Present case</td>
<td>52/M</td>
<td>jejunum</td>
<td>BM</td>
<td>abdominal pain</td>
<td>Ope</td>
</tr>
</tbody>
</table>


The reasons for the difficulties involved in finding small bowel metastases are as follows: 1) physicians have little knowledge of clinically rare metastases such as small bowel metastases, 2) non-specific symptoms may be considered as general complaints or as side effects of chemotherapy, and 3) follow-up CT scans have a low sensitivity for the detection of small intestinal tumors. In the present case, the focally thickened intestinal wall and other signs were not identified at the initial staging by abdominal CT.

Table 1 shows four cases of MPM (including the present case) that were reported with small intestinal metastases. All patients were men. The sites of metastatic lesions were multiple in jejunum to ileum in one case, duodenum in two and jejunum in one case. Regarding the symptoms related to the metastases of the small intestine, two out of four cases (Cases 1, 2) presented with progressive bloody stool, one had no symptom (Case 3) and the present case (Case 4) showed acute abdominal pain. Three of these four cases had emergent abdominal symptoms. It seems reasonably natural to presume that small bowel tumors have the characteristic to cause a severe emergency when they reach a size that causes symptoms. Therefore, it is important to find the small bowel metastases before it becomes apparent emergent.
Among the cases with intestinal metastasis from primary lung cancer, renal cell carcinoma or breast cancer, the clinical symptoms or signs of acute abdomen caused by intestinal perforation or obstruction (16-18) were very similar to the present case. We believe that there are no differences in the clinical symptoms or signs of intestinal metastases between MPM and various other cancers.

In the short term, it is important to establish new endoscopic and imaging techniques that can help in finding the small bowel metastases of MPM (19-21). Spada et al reported that video capsule endoscopy was useful for detecting small bowel tumors (19). Iwata et al reported a case that had a metastatic bowel tumor identified by double-balloon endoscopy (20). Kakugawa et al (6) reported that the combination of capsule endoscopy and double-balloon endoscopy contributed to the diagnosis of small bowel metastases of MPM (Case 1). However, these endoscopic techniques such as capsule endoscopy and double-balloon endoscopy are not yet widely used clinically, so it is recommended that these endoscopic techniques should be studied further.

In addition, according to the imaging technique, it has also been reported that PET-CT is useful for investigating distant metastasis of MPM (21). Although Shiono et al reported a lung cancer patient with small bowel metastasis identified by PET-CT (22), FDG-PET did not detect the metastasis in the present case.

In conclusion, the possibility of small bowel metastasis should be taken into consideration in the presence of acute abdominal pain and/or bloody stool in patients with MPM.

References