Duodenal Metastasis of Malignant Pleural Mesothelioma

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Metastatic malignant mesothelioma of the pleura is uncommon at the time of initial diagnosis. The gastrointestinal lumen is rarely found at autopsy in patients with widespread disease. Here, we describe an extremely rare case of isolated duodenal metastasis of sarcomatoid mesothelioma of the pleura in a 73-year-old man, without memory of any direct exposure to asbestos. The possibility of gastrointestinal tract metastasis should be considered in the presence of anemia or positive occult blood test in patients with malignant pleural mesothelioma.

Key Words: duodenum, mesothelioma, metastasis, pleura, sarcomatoid

Malignant mesothelioma is a rare fatal neoplasm that originates from cells lining the serosal cavities. Approximately 90–95% of mesotheliomas arise in the pleural cavity and 5–10% in the peritoneal cavity. Rarely, mesothelioma arises in the pericardium and tunica vaginalis. Malignant pleural mesothelioma predominantly affects men over the age of 50 years (male/female ratio, 3:1). It is associated with a long latency period (20–40 years) between asbestos exposure and eventual expression of the disease. Malignant pleural mesothelioma usually presents with chest pain, dyspnea, unexplained unilateral pleural effusion, or other nonspecific respiratory symptoms. Metastatic disease is uncommon at the time of initial diagnosis. When metastases are present, major sites include the regional lymph nodes, contralateral lung, liver, adrenal glands and kidneys. Diffuse infiltration of the peritoneum of the gastrointestinal tract is common in patients with extensive abdominal disease at autopsy. However, luminal involvement forming discrete polypoid lesions is very rarely found at autopsy. Here, we describe an extremely rare case of duodenal metastasis of malignant pleural mesothelioma in a 73-year-old man.

Case Report

A 73-year-old man was admitted to our hospital in December 2005 with symptoms of cough with pain in the left chest wall. He denied any systemic underlying disease and occupational exposure to asbestos. On physical examination, he appeared to be in good general health and nutritional condition, except for pale conjunctiva. His blood pressure was 116/74 mmHg, with a regular pulse rate of 80 beats/min. Breathing sounds were decreased in the left lung, with dull percussion. The abdomen was soft but not tender. Laboratory investigations revealed: hemoglobin concentration of 9.1 g/dL (normal, 12–16 g/dL),
mean corpuscular volume of 89.9 fl (normal, 81–92 fl), normal thrombocyte and leukocyte counts, blood urea nitrogen of 13.2 mg/dL (normal, 5–25 mg/dL), creatinine of 1.12 mg/dL (normal, 0.5–1.5 mg/dL), and normal liver enzymes. Stool occult blood was positive.

Chest radiographs and computed tomography (CT) showed left hemithorax nodular pleural thickening, which was suggestive of pleural malignancy and highly suspicious for pleural malignant mesothelioma (Figure 1). Abdominal CT revealed no evidence of peritoneal dissemination.

A core biopsy specimen of the pleura demonstrated proliferation of atypical spindle cells in a fascicular pattern, with invasion of the underlying skeletal muscle bundles. Brisk mitotic activity was noted in the high-power fields. Neoplastic cells were strongly immunoreactive for cytokeratin and focally positive for calretinin. Based on these characteristics, sarcomatoid mesothelioma was finally diagnosed.

Supplementary inquiry with respect to asbestos exposure revealed no patient memory of any direct exposure. Further investigation into the cause of stool occult blood revealed no abnormalities in the colon. Subsequent esophagogastroduodenoscopy demonstrated a friable polypoid lesion and ulceration that involved the second portion of the duodenum (Figure 2).

Microscopic investigation of the biopsy specimen showed interlacing fascicles of spindle cells in the lamina propria of the duodenum. Immunohistochemical staining was positive for cytokeratin and vimentin, but negative for CD34, CD117 (c-kit) and calretinin. Numerous giant desmosome-like junctions and long, slender microvilli were demonstrated ultrastructurally (Figure 3), which was consistent with metastatic sarcomatoid mesothelioma.

Advanced treatment was not suggested because of poor performance status and family objections. Despite supportive care, the patient finally died as a consequence of pneumonia with septic shock 1 month later.

Figure 1. (A) Chest radiography and (B) axial contrast-enhanced computed tomography show nodular pleural thickening (arrows) in the left hemithorax.

Figure 2. Esophagastroendoscopy shows an ulcerative polypoid lesion in the second portion of the duodenum.
Malignant pleural mesothelioma typically manifests locally, and presentation with metastatic disease is uncommon. It is a unilateral disease of the pleura in 95% of cases, and occurs predominantly on the right side (60%). It is aggressive and characterized by rapid progression and invasion of the intrathoracic structures. Median post-diagnosis survival is only about 9 months, with death usually caused by thoracic disease. Such rapid progression may have contributed to the previous belief that malignant mesothelioma is a condition that only manifests locally. In contrast, distant metastases from malignant pleural mesothelioma appear relatively late and are frequently discovered at autopsy. Extensive abdominal involvement is discovered at autopsy in one third of cases. However, involvement of the gastrointestinal lumen alone is exceptional. Reviewing the English-language literature, we encountered only five clinical cases of malignant mesothelioma that involved the gastrointestinal lumen (large bowel, ileum, stomach, duodenal bulb), from pleural (n = 4) and peritoneal (n = 1) primary tumors. Histologically, four mesotheliomas were epithelioid and only one was sarcomatoid. We believe that the present case may be the first documentation of malignant sarcomatoid mesothelioma of the pleura with metastasis to the duodenum, without imaging evidence of peritoneal seeding.

As histologic findings may vary, immunohistochemistry (IHC) and electron microscopy (EM) are helpful for confirming the diagnosis. IHC has proven to be quite valuable in the differentiation of epithelioid mesothelioma from primary pulmonary or metastatic adenocarcinoma. In addition to markers that support a diagnosis of adenocarcinoma, including carcinoembryonic antigen,
Leu-M1, thyroid transcription factor-1, Ber-EP4 and B72.3, there are now a number of commercially available antibodies that are reliable markers of mesothelial differentiation, including calretinin, cytokeratin 5/6, and Wilms’ tumor-1 antigen. There is no single marker that has sufficiently high sensitivity and specificity for malignant mesothelioma. Both sets of markers tend to be less helpful in the differential diagnosis of sarcomatoid lesions. EM of the epithelioid form has shown that it is composed of polygonal cells with numerous long surface microvilli, prominent desmosomes, and abundant tonofilaments. EM of the sarcomatoid variant has revealed the presence of elongated nuclei and copious rough endoplasmic reticulum. In the present case, the primary lesion was a malignant pleural sarcomatoid mesothelioma according to the histologic and IHC findings. The findings from IHC and EM are consistent with a diagnosis of metastatic sarcomatoid mesothelioma of the duodenum.

Duodenal metastases are most frequently located in the periampullary region, followed by the duodenal bulb. Common manifestations are abdominal pain, nausea, vomiting and gastrointestinal bleeding. In our case, the isolated metastasis in the second portion of the duodenum appeared friable, with evidence of ulceration. Diagnosis of metastatic lesions of the duodenum may be problematic. The small intestine may show a mass lesion, mucosal defect or intussusception, but is often unremarkable. Abdominal CT may demonstrate thickening of the wall and folds in the involved segment of the intestine. In our case, the focally thickened duodenal wall and any peritoneal lesion were not identified by abdominal CT. According to abdominal CT, we could at least exclude the possibility of primary or secondary peritoneal lesions. Endoscopic evaluation of the gastrointestinal tract provides an alternative to radiographic evaluation and should be considered when radiographic diagnostic studies are unrevealing. In a recent report by Kakugawa et al, video capsule endoscopy and double-balloon enteroscopy revealed multiple protruding lesions, with central ulceration and bleeding, throughout the entire small intestine, despite CT, esophagogastroduodenoscopy, total colonoscopy and red blood cell scintigraphy failing to identify any cause for the gastrointestinal bleeding. In our case, we did not undertake any advanced procedure to detect other metastatic lesions because the isolated duodenal lesion revealed by esophagogastroduodenoscopy could explain the cause of anemia and occult blood. However, we must keep in mind that detailed small-intestinal studies should be considered if the cause of anemia or occult blood cannot be ascertained.

In conclusion, it appears reasonable to anticipate that, as local control of pleural mesothelioma improves and survival increases, we will see an increasing number of patients presenting with disease that has spread to unusual sites. The possibility of gastrointestinal tract metastasis should be considered in the presence of anemia or occult blood in patients with malignant pleural mesothelioma.

References