Emergency Abdominal Surgery for Small Bowel Perforation Secondary to Metastatic Lung Cancer

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YOKOTA, T., YAMADA, Y., SAKATA, N., KIKUCHI, S., KUNII, Y., TEZUKA, F., SUZUKI, H. and YAMAUCHI, H. *Emergency Abdominal Surgery for Small Bowel Perforation Secondary to Metastatic Lung Cancer*. Tohoku J. Exp. Med., 1999, 188 (3), 265–270 — Emergency surgery for bowel perforation caused by metastases from lung cancer is rare. Two cases of small bowel perforation due to metastasizing lung cancer are reported. Both patients were admitted as a surgical emergency case. One of the two patients presented herein survived and was discharged from the hospital. Perforated small bowel due to metastatic lung cancer is a highly fatal event that occurs in the late phases of the disease. Despite the poor prognosis, early and appropriate therapy will occasionally yield successful surgical palliation. Patients with known lung cancer who develop abdominal complaints should be examined thoroughly and treated quickly. ——— metastatic lung cancer; bowel perforation © 1999 Tohoku University Medical Press

Small bowel perforation secondary to metastatic cancer is an uncommon complication. This is especially true in the natural history of lung cancer, which is otherwise notorious for widespread dissemination such as to bone, liver, adrenal gland and lymph nodes (McNeill et al. 1987). Perforation of the small bowel as the presenting symptom of an apparently silent metastatic lung carcinoma is extremely rare. Such enteric metastases are dire prognosticators, occurring typically in the terminal stages of a widely spread disease (Ejeckam et al. 1979). The first recorded case of small bowel perforation secondary to lung cancer was reported in 1957 by DeCastro (1957).

In this paper we present two emergency surgical cases of jejunal perforation secondary to metastatic lung cancer.

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CASE REPORTS

Case 1

A 64-year-old man was sent to the Sendai National Hospital in June 1998 for evaluation of a left lower lobe lung lesion. Chest roentgenograms showed the lesion had been enlarging over the past 2 years. Bronchoscopic biopsy of the mass disclosed poorly differentiated adenocarcinoma. Computerized tomography of the chest revealed a tumor in the lower lobe of the left lung with a smooth contour and well-defined margin (Fig. 1a). Upper GI series showed stenosis of the esophagus, suggesting tumor spread to the organs around the lower lobe of the left lung. The patient then received 44.8 Gy of radiation over a six-week period. Six months later, he was sent to our hospital with the complaint of abrupt onset of diffuse abdominal pain that had begun 5 hours before admission. The patient appeared cyanotic and seemed to be in mild respiratory distress. Blood pressure was 100/80 mmHg, and the pulse rate was 120 beats/minutes and regular. His temperature was 37.5°C. He was dyspneic with a respiratory rate of 30/minutes.

Fig. 1. a, CT scan demonstrates tumor in the lower lobe of the left lung with a smooth contour and well-defined margin (arrow). b, Posteroanterior chest radiograph showing a large accumulation of right subdiaphragmatic free air (arrow), partial collapse of the lower lobe of the left lung and left pleural effusion. c, Resected jejunal specimen from Case 1: The site of the perforation was formed to be a 1 cm tumor nodule on the anti-mesenteric border of the jejunum (arrow). The opened specimen shows a 1.2×0.8 cm ulcer with a necrotic base. d, Section of the jejunum showing metastatic poorly differentiated adenocarcinoma (Bar = 100 μ m).

Dullness and diminished breath sounds were present over the left chest, and the right hemithorax was clear. Generalized rebound tenderness was present and the bowel sounds were hypoactive. The rectum was empty. The nervous system was essentially normal. Laboratory studies demonstrated a white blood cell count of 28 200; hemoglobin of 11.7 g/100 ml; serum sodium level of 138 mEq/liter; serum potassium level of 4.5 mEq/liter; serum chloride level of 103 mEq/liter; BUN of 14 mg/100 ml; and a serum creatinine level of 0.9 mg/100 ml. Arterial blood studies demonstrated pH of 7.466; PO₂ of 55.4 mmHg and PCO₂ of 31.3 mmHg. Liver enzyme study was normal except for an LDH level of 1542 mU/ml. Posteroanterior chest radiographs (Fig. 1b) revealed a large accumulation of right subdiaphragmatic free air, collapse of the lower lobe of the left lung, a small pleural effusion and a suspicious mass in the hilum of the left lung.

An emergency laparotomy was performed. A perforation of the jejunum measuring 1.2 × 0.8 cm together with purulent peritonitis was found. There were 20 metastatic sites widely spread throughout the small intestine. There were metastatic nodules in the bilateral lobes of the liver. A small bowel resection and end-to-end anastomosis were carried out. The resected specimen consisted of a 5-cm segment of the small bowel. There was a perforation measuring 1.2 × 0.8 cm on the anti-mesenteric border, 2 cm from one margin of resection. The bowel wall was thickened and measured 1 cm (Fig. 1c). On cross section, there was a firm grayish mass in the wall of the intestine surrounding the perforation. Serosal tumor deposit was absent. Microscopic examination showed that the jejunal wall was infiltrated by sheets of tumor cells that were large, poorly differentiated adenocarcinoma (Fig. 1d). The lesion was histologically identical to the previously biopsied mass.

Postoperatively, the patient remained afebrile and was tolerating a regular diet at the time of his discharge on the postoperative day 23.

Case 2

A 67-year-old man with known adenocarcinoma of the lung presented himself in August 1989 with abdominal pain, anorexia, obstipation, and distension of 1-week duration. Physical examination revealed a tympanitic markedly distended abdomen. His leukocyte count was 19 100 with a leftward shift. Abdominal radiographs showed dilated loops of the bowel with multiple air-fluid levels and a large amount of stools in the colon. A functional bowel obstruction due to paralytic ileus was suspected. Twelve days later, he developed worsening distension, and physical examination revealed rebound tenderness all over his abdomen with sluggish bowel sounds. Perforation of a viscus was diagnosed. This was confirmed by abdominal radiographs disclosing free air under the diaphragm (Fig. 2a). At laparotomy, over 2 liters of purulent fluid was found in the peritoneal cavity, and the small bowel was covered by a thin layer of fibrous exudate. Two tumors measuring 3.0 × 2.5 cm and 2.0 × 1.5 cm were present in the jejunum 150 cm

Fig. 2. a, Abdominal radiograph shows large free intraperitoneal air (arrow). b, Poorly differentiated adenocarcinoma cells infiltrating almost the entire wall of the jejunum and extending to the edge of the perforation (Bar = 100 μ m).

from the ligament of Treitz, and two tumors measuring 2.5×2.5 cm and 1.0×1.0 cm were present in the ileum 200 cm from the ileocecal valve. One distinct focus of the most-proximal metastatic tumor of the jejunum had perforated. Hepatic metastases were present. A part of the jejunum containing the perforated lesion and a part of the ileum containing the other two tumors were then resected, and an end-to-end jejunojejunostomy and ileoileostomy were performed. The segment of the jejunum that was removed measured 17 cm in length and the wall was slightly thickened in the region of the perforation, which measured 1.5×1.0 cm. Microscopic examination revealed multifocal deposits of metastatic poorly differentiated adenocarcinoma extensively involving all layers of the intestine (Fig. 2b). The lesion was histologically identical to the previously biopsied lung mass. Although the immediate postoperative course was uncomplicated, the patient died 9 weeks later after admission to our hospital in a debilitated state. Autopsy was performed. Metastases were observed in the heart involving the endocardium, pericardial sac, liver, pancreas, bilateral kidneys, adrenal glands, thyroid gland, skin of the body, right lower extremity and regional lymph nodes.

DISCUSSION

Lung cancer is the most frequent malignancy as well as the commonest cause of cancer-related death; approximately 48 000 deaths due to lung cancer occur yearly in Japan. In about one half of all patients, metastatic disease is present at the time of initial diagnosis (Winchester et al. 1977; Gitt et al. 1992). The most common sites of distant metastasis include bone, liver, and adrenal glands, but the gastrointestinal tract has been reported to be rarely involved (Pang and King 1987; Woods and Koretz 1990). When gastrointestinal metastases become

clinically significant, the patient may present with acute symptoms of intestinal obstruction or perforation. Such cases of acute intra-abdominal conditions requiring surgery have a very poor prognosis. In 1957, DeCastro (1957) reviewed 25 cases of metastatic carcinoma with single or multiple metastases to the small bowel that had been treated at the Mayo Clinic from 1905 to 1954 and found 26 similar cases in the literature; the cervix, kidney and skin were the most frequent sites of the primary tumor, and obstruction was the most common manifestation. Seven of these cases presented as perforation. Only one case involved metastases from a primary bronchogenic tumor and perforation of the bowel was found in this case. Perforation of the small bowel secondary to metastatic lung cancer is extremely rare, although the incidence of such perforation is increasing (Shiraishi et al. 1998). Gitt et al. (1992) have reported the largest series in the literature of patients with bowel perforation due to metastatic lung cancer. They documented three cases and reviewed 24 cases in the literature. Among these 27 cases of bowel perforation due to metastatic lung carcinoma, nine lung tumors were large cell type, eleven were squamous cell type, and seven were adenocarcinomas. The most common locations of these metastatic deposits were the small bowel (in 24 patients), followed by the cecum (in 3 patients).

McNeil et al. (1987) found occult, small and clinically-apparent bowel metastases of lung cancer in 46 of 431 patients with primary lung cancer who had undergone autopsy over an 11-year period. Among the 46 patients, six patients had clinically-apparent small bowel metastases during the same period, and one had an acute abdomen as the initial presentation of the lung cancer. They concluded that the incidence of lung cancer metastases to the small bowel is higher than is clinically apparent.

A patient may or may not have a known diagnosis of lung cancer at the time of intestinal perforation. The surgeon, thus, must consider the possibility of intestinal perforation on this basis as his or her differential diagnosis, especially when evaluating patients with symptoms and signs suggestive of lung cancer, as more than 10% of patients with lung cancer have occult or apparent small bowel metastases. The abdominal presentation will be that of an acute abdomen, and free air will be demonstrated radiographically.

Treatment of a perforated small bowel is the same as for any acute abdomen; the procedure of choice is resection of the involved region of small intestine with primary enteroenterostomy (Liedich and Rudolf 1981), but the prognosis is extremely poor (Mosier et al. 1992). No patient has survived for more than 16 weeks following such an operation because bowel perforation occurs late in the course of lung cancer (McNeill et al. 1987). While the eventual prognosis for the vast majority of patients is poor, a significant number of patients can experience successful palliation by surgical intervention that will allow them to be discharged from the hospital and have a good quality of life at home (Koury and Kenady 1988; Gitt et al. 1992). Actually, the first patient described in this report was

discharged from the hospital and returned to normal life. As the incidence of lung cancer continues to rise in Japan, surgeons may be called on more frequently to evaluate patients with lung cancer who present with intraabdominal crisis. Even though surgeons may be reluctant to recommend an operation for patients with disseminated carcinoma of the lung, a palliative approach will be most successful for patients who are diagnosed expeditiously and who are treated quickly and appropriately.

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