Small Bowel Perforation Secondary to Metastasis from Small Cell Carcinoma of the Lung

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Abstract
Lung cancer is responsible for approximately 30% of all cancer-related deaths among men and women worldwide. The most common sites of metastasis are the brain, adrenal glands, bones and liver. Multiple clinical studies suggest that gastrointestinal tract (GIT) metastases are unusual with complications occurring in only 0.4-0.5% of patients with metastases to the small bowel. These complications include perforation, obstruction, intussusception, GIT hemorrhage and malabsorption. The management of lung cancer patients presenting with symptomatic GI metastases remains controversial with some authors advocating conservative management with maximum comfort care due to poor outcome. Others have recommended aggressive surgery because of the potential to offer effective palliation. We present a case of a small intestinal metastasis from a small cell carcinoma of the lung which presented with constipation for three weeks and small bowel perforation. The patient underwent emergent surgical intervention with a favorable outcome.

Case Presentation
A 67-year-old male with a 100 pack year smoking history was seen by his primary care physician (PCP) complaining of unintentional weight loss and intermittent, sharp left upper chest pain, radiating to his left upper back three weeks prior to admission. The patient was passing flatus but complained of abdominal distension and no bowel movement for three weeks prior to admission. Elevated LFTs at his PCP’s office prompted a liver ultrasound, which demonstrated liver lesions. Follow up CT of chest, abdomen and pelvis demonstrated a lung mass with multiple metastatic lesions in the liver, chest and neck adenopathy and peritoneal disease. Fine needle aspiration of his left supraclavicular sentinel node demonstrated small cell carcinoma of the lung. Abdominal distention and discomfort prompted hospital admission. At that time, the patient was distended and endorsed mild tenderness in his right lower quadrant. His white blood cell count (WBC) was elevated to 20.4. Abdominal plain X-ray demonstrated a large amount of stool within the right side of the colon with very little stool distal to the mid transverse colon. The outpatient CT scan had showed no evidence of large bowel obstruction, so conservative treatment was pursued with a nasogastric tube, parenteral fluid, strict bowel regimen and a Gastrografin enema. After four days, the patient remained distended; free intraperitoneal air was noted on a chest Xray (Figure 1). Subsequent CT of abdomen and pelvis demonstrated perforation involving the small bowel with extravasation of enteric contrast material within the right lower quadrant, and a small volume of free intraperitoneal air (Figure 2). Surgical consultation was obtained. Due to the quick progression from diagnosis to perforation, the patient had not had time to discuss treatment options or make end of life decisions. After a thorough surgical discussion, including its palliative role, the patient opted for surgical intervention to give him a chance to leave the hospital and spend time with his family. He was taken to the operating room for an exploratory laparotomy. A segment of small bowel containing perforation was identified in the right lower quadrant. There was a mesenteric mass at this site encasing the small bowel and likely causing ischemia and perforation. This portion of ileum was resected initially to minimize contamination. Inspection of the remaining small bowel and colon revealed no other suspicious lesions involving the intestine. Palpable lymphadenopathy was evident throughout the right colon mesentery and near the stomach. The liver was largely replaced with tumor. Upon mobilizing the cecum and terminal ileum, a large amount of thickened, phlegmonous tissue with fibrinous exudate surrounding the cecum was noted. Due to the possibility of cecal involvement, as well as the phlegmonous changes, the terminal ileum and cecum were also resected. The decision was made to create an ileostomy and mucous fistula. The postoperative course of the patient was uneventful and the patient was discharged with home hospice care nine days later. He was contacted by phone two days after discharge. He reports that he is comfortable, able to
eat, and has scheduled appropriate follow-up appointments. The histopathological examination of the perforated segment of small bowel demonstrated small cell carcinoma (Figure 3). The segment of terminal ileum and cecum had focal mucosal involvement by small cell carcinoma (Figure 4) and the appendix had focal transmural small cell carcinoma involvement as well (Figure 5). Metastatic carcinoma was identified in six of fourteen lymph nodes (Figure 6).

**Discussion**

Lung cancer is responsible for a greater number of cancer deaths worldwide than any other malignancy. At time of diagnosis, approximately 50% of patients have progressed to metastatic disease [1]. Leidich and Rudolph summarized the pathogenesis of GIT metastases. Lung cancer cells spread via hematogenous and lymphatic routes to the bowel and cancer cells replace the bowel wall, thus resulting in various complications. Necrotic tumors tend to perforate, bulky tumors cause obstruction, ulcerative tumors bleed and extensive mucosal involvement causes malabsorption [2]. The literature on GI metastases from lung cancer, mostly case reports and small case series, have demonstrated that GIT metastases from lung cancer are more common than previously thought. However, patients are rarely symptomatic [3]. GIT perforations are the leading cause of symptomatic metastases, and have been reported in all histological subtypes of lung cancer including adenocarcinoma (23.7%), squamous cell carcinoma (22.7%), large cell carcinoma (20.6%) and small cell carcinoma (19.6%), as was the case with our patient [3-7].

In a case series by McNeil et al. [8] the authors suggested that GIT metastasis is a poor prognostic sign occurring late in the course of lung cancer. In their evaluation of six patients and nine cases in the literature, nine of fifteen patients died in the immediate postoperative period. None of the remaining six patients survived more than four months after surgery. Based on these limited results, the authors concluded that surgery in this group of patients is associated with a high morbidity and mortality due to the cancer, age and concomitant medical problems. Another recent review included 98 cases of small bowel perforation secondary to lung metastases. The authors reported that 50% of patients who underwent surgery did not survive past 30 days and their overall mean survival was 66 days, with only two patients surviving more than one year [9]. In contrast, patients with
stage IV lung cancer in general have a 1-year survival of 20% \[10,11\]. These dismal results after surgery were consistent with reports by others and these studies have prompted some clinicians to advocate non-operative treatment in this high-risk group of patients.

In contrast, Goh et al. \[4\] reported that only one of nine patients in their cohort died peri-operatively, due to bleeding from an unresected lesion. In another study, Woods and Koretz reported a 30-day mortality of 31\% after aggressive surgical intervention, with 8 of 13 patients recovering to be discharged from the hospital. The mean postoperative survival was 3 months \[12\].

**Conclusion**

Small bowel perforation as a presentation of lung cancer metastasis is rare and signifies poor prognosis for the patient. We conclude that GIT metastases should be considered in patients with lung cancer presenting with an acute abdomen, and that aggressive abdominal surgery for these patients may be indicated despite a short postoperative survival, as it can provide good palliation. The procedure should be tailored according to the extent of disease and it should provide adequate palliation of the presenting symptoms and take into consideration the patient’s overall health condition and life expectation.

**References**