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Bowel perforation secondary to metastatic lung cancer: Report of two cases with literature review☆

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ABSTRACT

INTRODUCTION: Gastrointestinal metastases from pulmonary neoplasm represent a rare but potentially fatal pathology that can complicate the disease in most advanced stages; this is a rare but well-known phenomenon in Literature and small intestine is the most common metastatic site. Generally these are patients with a known or surgically treated pulmonary neoplasm; the onset of pulmonary neoplastic disease with a symptomatic intestinal metastasis is to be considered extremely rare.
PRESENTATION OF CASES: We report two cases of small intestine perforation from pulmonary metastasis; diagnosis was made at the time of exploratory laparotomy and the operation was in one patient the resection of the perforated bowel and in the second a resection and an intestinal bypass to overcome the stenosis caused by the metastatic masses. In the postoperative period, a patient died of pulmonary complications, the second was dismissed, but survival was only three months.
DISCUSSION: Intestinal metastasis of a pulmonary tumor is a rare occurrence but must be suspected in acute abdominal syndrome in a patient with a diagnosed pulmonary neoplasia.
CONCLUSION: Emergency surgical treatment of abdominal metastases of a lung cancer is mandatory but prognosis is extremely unfavorable.

1. Introduction

Lung cancer is mostly diagnosed at the advanced stage of disease and gastrointestinal metastases from pulmonary neoplasm are rare [1,2] often with few or no symptoms; the incidence is estimated around 2–14% [3] and the first reported case dates back to the 60 s [4–6]. Histologically, poor tumor differentiation and advanced T and N stages are associated with intestinal metastasis; clinically, these led to three frequent clinical presentations, perforation, obstruction and bleeding.

Early diagnosis of small intestine metastasis is difficult because of the low incidence of clinically apparent symptoms, but possibility of small bowel metastases should be kept in mind in patients with lung cancer presenting with an acute abdomen. Intestinal perforation occurs in advanced stages and is usually a sign of widespread disease; aggressive surgery can provide effective palliation and may improve short-term survival, but prognosis is however dismal. The progress of chemotherapy protocols for advanced stages of the disease has raised more cases of this disease [7]; perforation of small intestine by lung cancer metastases is a rare occurrence and is a sign of an advanced disease with a survival that, in most cases, is limited to weeks or a few months [8]. In some cases the onset of an acute abdomen may reveal the presence of the primitive neoplasia [8]. In this paper we report two cases of small bowel perforation from lung cancer metastases; while in a patient the tumor was well known, in the second one abdominal complication revealed the presence of pulmonary cancer. Aim of the present study is to report clinical characteristics and outcomes of the patients treated in authors' hospital for GI metastasis from primary lung cancer, and report and analyse the same data concerning patients retrieved from a literature review. This paper has been reported in line with the PROCESS criteria (). Although small intestinal metastatic tumor from lung cancer is rare, it should be considered when acute abdomen is observed; this group of

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patients present a poor prognosis and the gold standard treatment is not defined. Probably primary lung cancer metastasis to the small bowel are not so rare as it is thought and clinical management and treatment decision will be warranted and considered accordingly. Although uncommon, if lung cancer patients present with anemia and melena, enteric metastasis should be part of the differential diagnosis. Abdominal CT scans and PET-CT are effective for early diagnosis. The prognosis of metastatic spread of solid subtype lunga denocarcinoma to the small intestine with mesenteric lymph node metastasis is poor. Subgroups of patients benefitting from metastasectomy and more effective systemic therapy need to be further investigated. The incidence of gastrointestinal metastases from lung cancer is higher than previously thought but clinically significant metastases are rare. Small bowel perforation secondary to metastatic non-small cell lung cancer is a very rare clinical entity.

2. Clinical case 1

A 62-year-old woman complaining of abdominal pain starting about 48 h earlier, with nausea and vomiting was admitted to our emergency department. The patient was affected by a non-resectable "Non-Small Cell Lung Cancer" (NSMLC), with diffuse bone metastases; there was also an history of ischemic heart disease. At clinical examination the abdomen was diffusely painful, the Blumberg sign was intensely positive; white blood cells count was 24,000 × 10 * 3 with marked neutrophilia, hemoglobin 9.6 g / dl, with haematocrit 30.6%. Free air under the diaphragm was present at plain RX abdomen while the CT showed an abscess in the pelvic cavity extending to the left paramedian region, with thickening of the small bowel loops and a bilateral pleural effusion. At laparotomy a diffuse purulent peritonitis was found with presence of multiple ileal masses, one of which was perforated in free peritoneum; a resection of the perforated ileal segment was performed to restore intestinal continuity with latero-lateral mechanical anastomosis. The operative course took place without complications and the patient was dismissed in 15 days. The anatomopathological examination documented the full-thickness invasion of the ileal wall by a neoplastic mass that was diagnosed as a non-small cell lung cancer metastasis by immunohistochemistry.

3. Clinical case 2

A 60-year-old man was admitted at our DEA after an ECG showed an inverted T-wave. The patient complained of a productive cough since 3 months; in the history there was a splenectomy at age 12 for unspecified reasons, COPD, alcohol cirrhosis and prostate hypertrophy. Two weeks before the patient had been subjected to the removal of a skin formation of the posterior region of the ear, awaiting for final anatomopathological examination. An echocardiogram and a chest RX showed pericardial and bilateral pleural effusion; chest CT showed adenopathy of mediastinal stations with central hypodensity (maximum diameter 5.5 cm), a nodule of 1 cm at the apical segment of the right lower lobe, confirming bilateral pleural and pericardial infusion. (Fig. 1) Bilateral adrenal hypodense formations were also observed (maximum 6 cm in diameter on the right and 3 cm in the left), as well as adenopathies at the root of mesentery, celiac, interaortocaval and paraortic nodes, with peritoneal carcinomatosis (Fig. 2). The patient was admitted to the Department of Internal Medicine where, after few days, he complained of abdominal pain; the RX abdomen showed air under the diaphragm and so, after pleural (2000cc) and pericardial (800cc) effusion were drained, emergency laparotomy was performed. Perforation of a jejunal mass was found with purulent peritonitis was found; there were also 6 masses in the small intestine wall causing a stenosis and two more in the thickness of the mesentery. A resection of the perforated tumor mass and an ileoilic bypass were then performed to overcome intestinal obstruction. The anatomopathological examination of the mass showed a poorly differentiated ulcerated adenocarcinoma (g3) perforated in the visceral peritoneum, with metastasis in 7 regional lymph nodes (pT4N1Mx). The skin formation was a poor differentiated carcinoma metastatic to the skin; in both cases the immunohistochemical analysis confirmed the pulmonary origin of the neoplasia. After ten days of surgery, there was the death of the patient for cardiorespiratory complications.

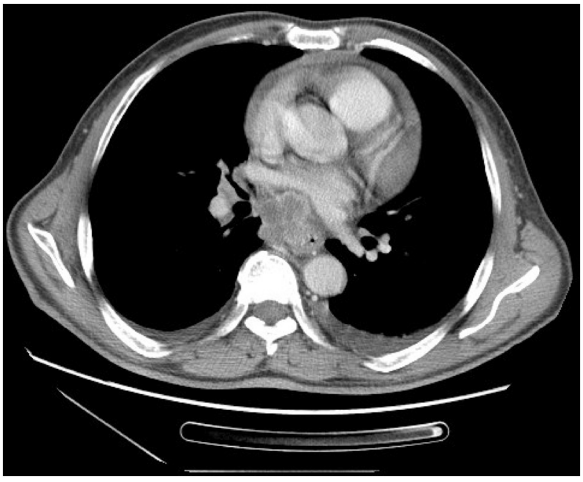

Fig. 1. Lymphadenopathy and pericardial effusion.

Fig. 2. Adrenal metastasis and nodules of peritoneal carcinosis.

4. Discussion

In the two cases we presented intestinal metastases from a pulmonary neoplasm was a diagnostic surprise at emergency laparotomy; however while in the first patient the cancer was well known, in the second one the abdominal perforation revealed the primitive neoplasm, which already metastasized to the skin. Findings of the imaging were useful to decide for emergency laparotomy but not for the diagnosis of abdominal metastasis. This diagnosis, however, is not easy and requires a high index of suspicion; conventional CT has a low sensitivity for small bowel metastasis (33%) while with intravenous and oral contrast reaches 87% [3,9].

Table 1
Literature review.

Author	N° of patients	Study	Site of metastases	Type of Lung Cancer
Gaewood 2009 Am Surg. 2005	98 cases Small bowel perforation	Review	Jejunum53% Ileal 28% Duodenum 4%	Adenocarcinoma 23,7% Squamous cell 22,7% Large Cell 20,6% Small cell carcinoma 19,6%
Rossi J Thorac Oncol. 2007	18 cases of lung cancer onset with abdominal metastases	Personal	Small Bowel 12 pz. Gastric 4 pz. Colon 2 pz.	Large Cell 10 paz. Adenocarcinoma 10 pz.
Sternbygaard Lung Cancer 1999	Autopsy of 218 lung cancer patients	Personal	Small bowel; 10 pz. (4,60%)	Adenocarcinoma
McNeill Cancer 1987	Autopsy of 431 cases of lung cancer patients	Personal	Small bowel 46 pts	Large cell 39% Adenocarcinoma 12,3% Small Cell Carcinoma 8,1% Squamous cell 7,5% Undifferentiated 0,1%

The frequency of these metastases is more than expected [10] particularly in patients with longer survival [7,1,10–14]. The path of metastatic diffusion is still controversial ; although hematogenous way appears to be the most likely [14], other Authors suggested a lymphatic diffusion through the thoracic duct [15]. The onset of symptoms depend on localization [14] and invasion of the intestinal wall [16]; dysphagia, anemia, abdominal pain, melena, nausea, vomiting and weight loss are the most commonly complained symptoms. However, in most cases complications such perforation, bleeding and occlusion [11,8,16–19] reveal abdominal metastases. Bleeding generally occurs in upper or lower intestinal tract sites [13–16], and is a sign of necrosis of the bowel wall, while occlusion and perforation are more frequent in the small intestine [5–25]. Intussusception with consequent occlusion [15,26,27] has also been described. Bowel perforation means an advanced disease and a severe prognosis [10,6], which is characteristic of these patients [8]; perforations occur more often in jejunum (53%) than ileum (28%), less frequently in the duodenum [2–7]. Adenocarcinoma is the most common metastatic tumor follow by large cell neplasm in Table 1 we reported the results of some significant paper in the Literature. Some authors have found that patients with a history of preoperative chemotherapy have greater survival than those who did not undergo neo-adjuvant therapy [27,28]. Lee and Coll [20]. conducted a study of 8159 cases of pulmonary neoplasm, 21 symptomatic for intestinal metastases; these patients were operated with a mortality of 22%. The authors concluded that a preoperative diagnosis of gastrointestinal metastasis is associated with improved survival and, in any case, a more favorable prognosis. However, the surgical attitude outside the emergency remains controversial; while some authors recommend a therapeutic abstinence, others advocate a more aggressive approach for palliation. The rationale is that if the exeresis of a single metastasis can improve the prognosis, surgery can be useful as palliation also to prevent complications such as perforation and obstruction [28–30].

5. Conclusions

Intestinal tumor metastases are uncommon but should be considered in the diagnosis of a patient with an acute abdomen in the emergency room with a story of pulmonary neoplasm. The surgical approach is mandatory, but preoperative diagnosis is not easy even for lack of specific symptoms; in patients with pulmonary neoplasm and in presence of painful abdominal symptoms, the surgeon should think to a complication of intestinal metastases, especially in patient treated with radio chemotherapy. The elective approach must consider the abdominal extension of the disease, possible presence of peritoneal carcinomatosis and general conditions of the patient, bearing in mind that postoperative mortality is not negligible.

Conflict of interest

The authors declare no potential financial conflict of interest related to this manuscript.

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Ethical approval

The study is exempt from ethical approval in our institution.

Consent

Written informed consent was obtained from the patients for publication of this case series and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Study Conception and Design: Fransvea, Garavello.
Acquisition of Data: Frasvea Garavello, Rossi.
Analysis and interpretation of data: Fransvea, Garavello Giacovazzo.
Drafting of Manuscript: Garavello, Fransvea.
Critical Revision: Garavello, Giacovazzo, Rossi, Vincenza Marino.

Registration of research studies

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All authors have contributed to and agreed on the content of the manuscript.

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