Case Report

Simultaneous spontaneous pneumothorax and colonic perforation in a patient with rectosigmoid carcinoma with metastases: A complex multisystem presentation

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ABSTRACT

Rectosigmoid carcinoma commonly presents with complications such as bowel obstruction, bleeding, and perforation. Spontaneous pneumothorax in patients with colorectal cancer (CRC) is rare and is usually associated with pulmonary metastases or chemotherapy-related lung injury. The simultaneous occurrence of spontaneous pneumothorax and malignant colonic perforation is exceptionally uncommon and poses significant diagnostic and therapeutic challenges. We report the case of a 71-year-old man with metastatic rectosigmoid adenocarcinoma on second-line chemotherapy who presented with per-rectal bleeding and subsequently developed sigmoid colon perforation with feculent peritonitis along with a concomitant spontaneous pneumothorax. The patient required urgent thoracic and abdominal interventions, intensive post-operative care, and coordinated multidisciplinary management. This case highlights the importance of the early recognition of rare synchronous complications in advanced CRC and emphasizes the role of prompt surgical and supportive management in achieving clinical stabilization.

Key words: Colonic perforation, Colorectal cancer, Pneumoperitoneum, Spontaneous pneumothorax

Colorectal cancer (CRC) is the third most commonly diagnosed malignancy and the second leading cause of cancer-related mortality worldwide [1]. Patients may present with rectal bleeding, altered bowel habits, abdominal pain, or intestinal obstruction [2]. Common complications of CRC include bowel obstruction, gastrointestinal bleeding, and perforation. Spontaneous pneumothorax in association with CRC is rare and has been reported mainly in patients with pulmonary metastases or as a consequence of chemotherapy-induced lung injury [3,4]. The synchronous occurrence of spontaneous pneumothorax and colonic perforation in CRC is exceedingly uncommon and represents a complex multisystem emergency. Such presentations require a high index of suspicion and prompt multidisciplinary intervention.

We report a rare case of metastatic rectosigmoid carcinoma complicated by the simultaneous development of spontaneous pneumothorax and malignant colonic perforation.

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CASE REPORT

A 71-year-old man with a known diagnosis of metastatic rectosigmoid adenocarcinoma presented with fresh per-rectal bleeding of 1 day duration. At the time of initial diagnosis, metastatic disease involved the liver and lungs. Histopathological examination confirmed the patient as a case of moderately differentiated adenocarcinoma, Stage IV, with molecular profiling positive for KRAS, APC, and TP53 mutations. The patient received 10 cycles of modified FOLFOX (mFOLFOX) chemotherapy initially, along with three cycles of bevacizumab.

A positron emission tomography-computed tomography (PET-CT) scan initially demonstrated stable disease on radiologic assessment. Subsequently, the patient completed two additional cycles of mFOLFOX chemotherapy administered fortnightly and a total of six cycles of bevacizumab administered every 4 weeks. Follow-up PET-CT imaging later revealed progressive disease, following which the patient was started on second-line chemotherapy with the FOLFIRI regimen. The patient had undergone endoscopic placement of a self-expanding metallic colonic stent approximately 3 weeks before admission for malignant large bowel

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obstruction. He was also a known case of type 2 diabetes mellitus on regular treatment.

On admission, the patient was conscious and oriented. Vital signs were as follows: Blood pressure 140/70 mmHg, heart rate 110/min, respiratory rate 20/min, temperature 98.6°F, and oxygen saturation 97% on room air.

Chest examination revealed bilateral vesicular breath sounds with resonant percussion notes and no added sounds. Abdominal examination showed mild diffuse tenderness without guarding or rigidity. Percussion was tympanic, and bowel sounds were present and normal.

Baseline laboratory investigations showed hemoglobin 11 g/dL, total leukocyte count 3,900/mm³, and platelet count 150,000/mm³. Renal function tests revealed blood urea 24 mg/dL and serum creatinine 0.9 mg/dL. Liver function tests showed total bilirubin 0.4 mg/dL with normal transaminase levels. Serum electrolytes were serum sodium 134 meq/L, potassium 4 meq/L, and chloride 99 meq/L at admission. Electrocardiogram demonstrated a normal sinus rhythm with a heart rate of 80/min without ischemic changes.

The patient underwent sigmoidoscopy, which demonstrated a rectal mass with mucosal friability and telangiectasias, along with a sigmoid colonic stent *in situ* and adjacent ulceration. There was no prior history of pelvic radiotherapy, and the telangiectasias were attributed to tumor-related mucosal vascular changes.

During hospitalization, the patient developed acute abdominal pain and distension accompanied by sudden onset dyspnea. Given the acute respiratory symptoms, an urgent non-contrast CT of the chest was performed, which revealed a left-sided spontaneous pneumothorax (Fig. 1). Concurrent contrast-enhanced CT (CECT) of the abdomen and pelvis demonstrated pneumoperitoneum with a focal perforation at the sigmoid tumor site (Fig. 2).

A left intercostal drainage tube was immediately inserted for pneumothorax. The patient subsequently underwent emergency diagnostic laparoscopy. Intraoperatively, the abdomen was contaminated with feculent ascites and pus. Findings included multiple adhesions, diffuse peritoneal tumor deposits, multiple liver metastases, and jejunal diverticulae. Given the extensive metastatic disease and septic presentation, a palliative, damage-control surgical approach was adopted. Thorough peritoneal lavage was performed, the sigmoid perforation was primarily closed, and a transverse colostomy was fashioned. Cytoreductive resection of peritoneal or hepatic metastases was not attempted due to diffuse disease burden and limited expected oncologic benefit.

The patient was managed in the intensive care unit postoperatively. Empirical broad-spectrum intravenous antibiotics (piperacillin–tazobactam) were initiated and later escalated to meropenem after peritoneal fluid cultures grew extended-spectrum beta-lactamase–producing Escherichia coli, in consultation with infectious disease specialists.

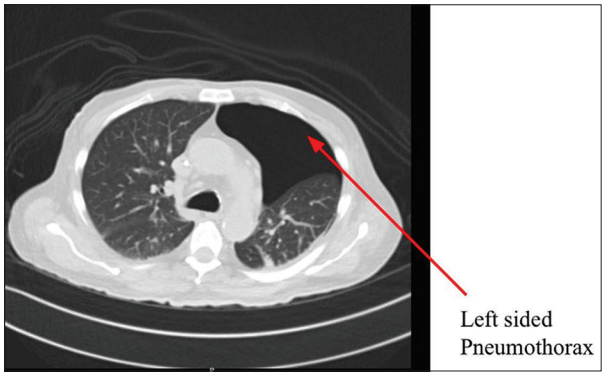

Figure 1: Computed tomography chest axial view showing left side pneumothorax in the patient

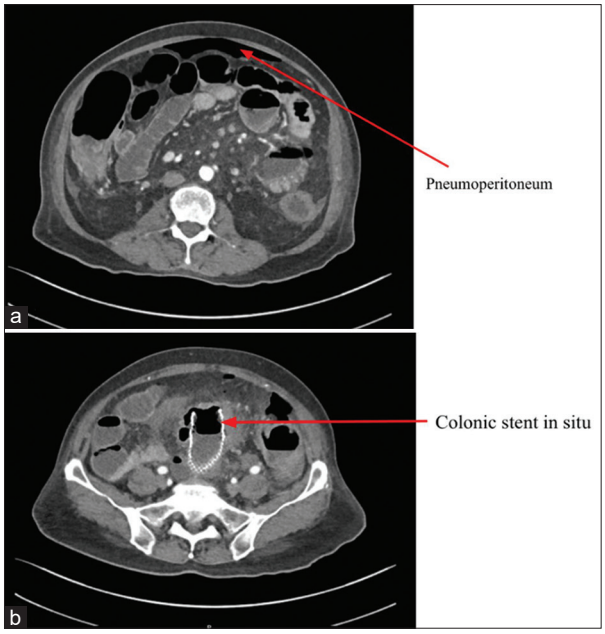

Figure 2: (a) Concurrent contrast-enhanced computed tomography (CECT) abdomen and pelvis axial view showing pneumoperitoneum in the patient and (b) CECT abdomen and pelvis showing colonic metallic stent in the patient

Following adequate lung re-expansion, the intercostal drainage tube was removed on post-operative day (POD) 3. The patient was initiated on oral feeds on POD 3 and transferred to the ward on POD 6. During ward stay, he developed hyponatremia, which was corrected with nephrology input. The remainder of the post-operative course was uneventful, and the patient was discharged in stable condition with plans for follow-up and reassessment of systemic oncologic therapy (Fig. 3).

DISCUSSION

Colonic perforation is a recognized and serious complication of colorectal carcinoma and is associated with significant morbidity and mortality. It may occur due to tumor necrosis, distal obstruction with increased intraluminal pressure, ischemia, or direct transmural invasion by the tumor [5,6]. In advanced disease, perforation often results in feculent peritonitis and sepsis, necessitating urgent surgical intervention. In the present case, perforation occurred at the tumor site and

Table 1: Comparison with reported cases of colorectal cancer with pneumothorax

Author/Year	Age (years)/ Sex	Primary Site	Complication (s)	Management	Outcome
Current case (2025)	71/Male	Rectosigmoid colon	Tumoral perforation+peritonitis+ spontaneous pneumothorax+liver metastases	Laparoscopy, lavage, closure, colostomy; ICD; antibiotics	Stabilized, discharged
Yang *et al*., 2011 [3]	45/Male	Rectosigmoid	Spontaneous pneumothorax after bevacizumab chemotherapy	Chest tube, cessation of therapy	Recovered
Iida *et al*., 2016 [4]	62/Female	Colon	Ruptured lung metastasis→pneumothorax	Thoracic drainage	Symptomatic relief

ICD: International classification of diseases

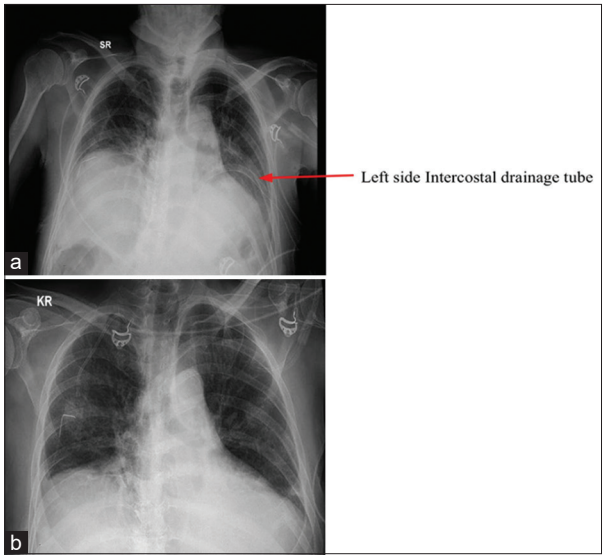

Figure 3: (a) Radiography of chest showing left side pneumothorax with intercostal drainage tube placement in the patient and (b) radiography showing complete resolution of pneumothorax and complete expansion of lungs post-intercostal drainage tube removal status

was confirmed radiologically and intraoperatively. Given the diffuse peritoneal and hepatic metastases, a palliative, damage-control surgical strategy was adopted, which is consistent with recommended management approaches in advanced CRC emergencies [6].

Spontaneous pneumothorax is an uncommon complication in patients with colorectal carcinoma. When reported, it is most frequently associated with pulmonary metastases or chemotherapy-related lung injury [3,4]. Rupture of subpleural metastatic nodules and increased lung parenchymal fragility secondary to systemic chemotherapy have been proposed as possible mechanisms. In addition, pneumothorax is a recognized but underreported adverse effect of anti-vascular endothelial growth factor (VEGF) therapy, including bevacizumab, with several case reports describing its occurrence, particularly in patients with lung metastases [3,7-9]. The proposed mechanisms include tumor necrosis, cavitation of metastatic lung lesions, and impaired tissue repair due to VEGF inhibition. In the present patient, known pulmonary metastases, prior exposure to bevacizumab, and ongoing second-line chemotherapy likely contributed to the development of pneumothorax. The absence of thoracic trauma, invasive thoracic procedures, or mechanical ventilation supports a spontaneous etiology.

The simultaneous occurrence of pneumothorax and pneumoperitoneum is exceedingly rare in CRC. Advanced malignancy-related tissue fragility may predispose patients to multiple organ system complications during the same clinical course. In this case, the concurrent onset of respiratory distress and abdominal signs prompted early imaging of both the chest and abdomen, allowing timely diagnosis and intervention.

Pneumothorax following colonoscopy or sigmoidoscopy is a recognized but rare complication, typically resulting from colonic perforation with air tracking into the mediastinum and pleural cavity [10-12]. Such cases usually present immediately or shortly after the procedure. In contrast, the perforation in the present case occurred with a temporal delay, was localized to the tumor site, and was associated with malignant necrosis and feculent peritonitis, favoring a spontaneous malignant perforation rather than an iatrogenic cause.

This case highlights important diagnostic considerations. In patients with advanced CRC, acute respiratory symptoms are often attributed to pulmonary embolism, infection, or disease progression. However, pneumothorax should also be considered, particularly in patients with pulmonary metastases or those receiving anti-angiogenic therapy such as bevacizumab [3,4]. Table 1 shows the comparison of the reported cases of CRC with pneumothorax [3,4]. Similarly, normal bowel sounds at presentation do not exclude evolving bowel perforation, especially in elderly or immunocompromised patients.

Overall, this case underscores the importance of maintaining a high index of suspicion for rare synchronous complications in advanced CRC. Prompt imaging, early surgical decision-making, and coordinated supportive care can lead to clinical stabilization and meaningful short-term recovery, even in the setting of advanced disease.

CONCLUSION

Advanced colorectal carcinoma may rarely present with synchronous life-threatening complications such as spontaneous pneumothorax and malignant colonic perforation. Early recognition, prompt surgical intervention, and aggressive supportive care are essential in managing such complex presentations. Despite advanced disease and poor oncologic prognosis, meaningful short-term recovery remains achievable.

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