

CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Surgery Quiz – Case 17

A 82-year-old female patient, with a history of right hemicolectomy and ileal resection 6 months previously for a low intermediate risk, stage IIE, primary diffuse large B-cell non-Hodgkin's lymphoma of the terminal ileum, presented to the emergency department complaining of vague, constant, diffuse abdominal pain with no other concurrent symptoms over the preceding 3 days. The patient had completed 8 cycles of chemotherapy 20 days ago with the R-CHOP regimen (cyclophosphamide 750 mg/m², doxorubicin 50 mg/m², vincristine 1.4 mg/m² and rituximab 375 mg/m² by intravenous infusion on day 1, oral prednisolone 40 mg/m² on days 1–5 administered every 21 days). On presentation, the patient was afebrile, physical examination of the abdomen was normal, white blood cell (WBC) count and C-reactive protein (CRP) level were normal, and arterial blood gas analysis was within normal reference range. Abdominal radiograph and computed

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2019, 36(1):137–139

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tomography (CT) on presentation are presented below (fig. 1).

What is your diagnosis?

Comment

Pneumatosis intestinalis (PI) is an imaging phenomenon representing the presence of gas in the bowel wall. Based on autopsy studies, its incidence has been estimated as 3 per 10,000 individuals in the general population. Intramural gas may originate from intraluminal gastrointestinal gas, bacterial gas production, pulmonary gas, and its collection in the bowel wall may be explained by the following pathophysiological mechanisms: (a) bowel necrosis, (b) mucosal disruption, (c) increased mucosal permeability, and (d) pulmonary disease. PI can be divided into primary and secondary which attribute to 15% and 85% of cases, respectively. Although primary PI is benign, secondary PI can be benign or life-threatening, based on etiology. Bowel obstruction, perforation, ischemia and severe colitis represent the most life-threatening causes of secondary PI. However, secondary PI may be the result of numerous non-ischemic

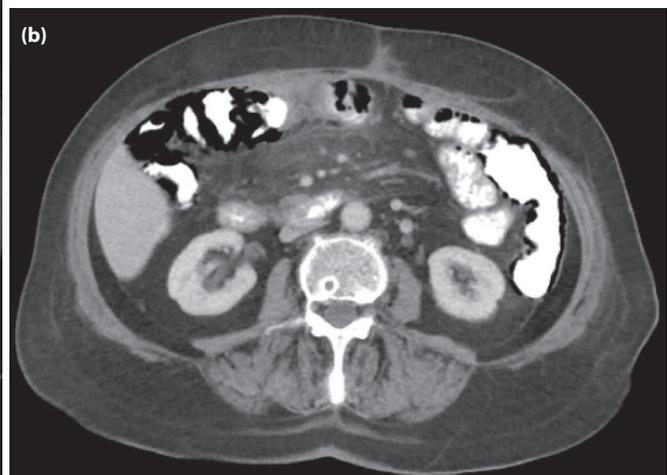


Figure 1. Abdominal (a) radiograph and (b) computed tomography (CT) at initial presentation.

and non-obstructive gastrointestinal conditions along with various pulmonary and systemic conditions, as shown in table 1.

Regarding clinical and laboratory assessment, in 2017 the American Association for the Surgery of Trauma, in a prospective multicenter study of 127 patients with PI, showed that clinical findings of ileus, peritoneal signs on physical examination, sepsis, hypotension and laboratory findings of elevated international normalized ratio (INR), decreased hemoglobin, lactate value of more than 2.0 mmol/L were significantly correlated with worrisome PI. Regarding imaging assessment, in 2017 Goyal et al, in a retrospective study

of 167 patients with PI, showed that location in the small bowel, bowel dilation, mesenteric stranding, bowel enhancement, portal vein gas, mesenteric vein gas and moderate mesenteric edema were imaging findings significantly correlated with worrisome PI.

PI patients with worrisome clinical, laboratory and imaging findings should undergo surgical treatment. In the absence of worrisome findings, patients should undergo a trial of non-surgical treatment under strict re-evaluation. Non-surgical management should focus on treating the underlying gastrointestinal or systemic disease and discontinuation of possible instigating medications. Antibiotics,

Table 1. Causes and pathophysiology of pneumatosis intestinalis (PI).

Primary PI		
Secondary PI		
<i>Gastrointestinal causes</i>		
<i>Life-threatening</i>		
Mesenteric ischemia		
Intra-abdominal infection		
Intestinal obstruction		
Severe colitis-toxic megacolon		
<i>Benign or potential life-threatening</i>		
Blunt trauma		
Ileus		
Inflammatory bowel disease		
Enteritis and colitis		
Bowel stenosis		
Carcinoma		
Peptic ulcer		
Celiac sprue		
<i>Non-gastrointestinal benign or potential life-threatening causes</i>		
Drug induced		
Corticosteroids		
Chemotherapy		
Transplantation		
Bone marrow		
Kidney, liver, lung		
Graft versus host		
Iatrogenic		
Endoscopy		
Intestinal anastomosis		
Enteric tube placement		
Barium enema		
Infectious		
HIV		
Virus		
<i>Candida albicans</i>		
<i>Mycobacterium tuberculosis</i>		
Autoimmune and systemic		
Systemic lupus erythematosus		
Inflammatory arthritis		
Inflammatory myopathies		
Systemic sclerosis		
Sarcoidosis		
<i>Pulmonary</i>		
Asthma		
Chronic obstructive pulmonary disease		
PEEP ventilation		
Cystic fibrosis		
	Intramural induction of intraluminal gas or production of bacterial gas due to <ul style="list-style-type: none"> • Mucosal disruption • Increased mucosal permeability 	
	Intramural induction of pulmonary gas	

especially metronidazole 500 mg per os three times daily for up to 3 months or until documented resolution of PI, cessation of oral diet, introduction of an elemental diet, which is totally absorbed in the small intestine, and hyperbaric oxygen therapy has all been recognized as an effective therapy for PI leading to cyst regression on imaging and symptoms resolution.

In the present case, the patient diagnosed with total colonic pneumatosis based on CT findings (fig. 1b). As no evidence of intramural bowel gas was present on pre-operative staging CT, pneumatosis coli considered to be secondary. Based on initial assessment, life-threatening etiological factors such as bowel obstruction, perforation, ischemia and severe colitis were excluded; secondary survey with repeated clinical, laboratory and imaging evaluation initiated. On re-assessment, pneumatosis coli seemed to be benign as no worrisome clinical, laboratory and imaging findings developed. As no other etiologic factors identified, pneumatosis coli considered to be chemotherapy-induced. The patient treated conservatively with cessation of enteral nutrition and broad spectrum antibiotics (2nd generation cephalosporin and metronidazole). After a one week hospital stay, interval abdominal radiograph and CT showed almost complete resolution of imaging findings; the patient referred to a tertiary hospital for hematology and oncology specialty care.

References

1. VITOLO U, SEYMOUR JF, MARTELLI M, ILLERHAUS G, ILLIDGET, ZUCCA E ET AL. Extranodal diffuse large B-cell lymphoma (DLBCL) and primary mediastinal B-cell lymphoma: ESMO clinical practice guidelines for diagnosis, treatment and follow-up. *Ann Oncol* 2016, 27(Suppl 5):v91–v102
2. GRAY EJ, DARVISHZADEH A, SHARMA A, GANESHAN D, FARIA SC, LALL C. Cancer therapy-related complications in the bowel and mesentery: An imaging perspective. *Abdom Radiol (NY)* 2016, 41:2031–2047
3. LASSANDRO F, VALENTE T, REA G, LASSANDRO G, GOLIA E, BRUNESE L ET AL. Imaging assessment and clinical significance of pneumatosis in adult patients. *Radiol Med* 2015, 120:96–104
4. FEUERSTEIN JD, WHITE N, BERZIN TM. Pneumatosis intestinalis with a focus on hyperbaric oxygen therapy. *Mayo Clin Proc* 2014, 89:697–703
5. WU LL, YANG YS, DOU Y, LIU QS. A systematic analysis of pneumatosis cystoids intestinalis. *World J Gastroenterol* 2013, 19:4973–4978
6. FERRADA P, CALLCUT R, BAUZA G, O'BOSKY KR, LUO-OWEN X, MANSFIELD NJ ET AL. Pneumatosis Intestinalis Predictive Evaluation Study: A multicenter epidemiologic study of the American Association for the Surgery of Trauma. *J Trauma Acute Care Surg* 2017, 82:451–460
7. GOYAL R, LEE HK, AKERMAN M, MUI LW. Clinical and imaging features indicative of clinically worrisome pneumatosis: Key components to identifying proper medical intervention. *Emerg Radiol* 2017, 24:341–346

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