J Soc Colon Rectal Surgeon (*Taiwan*) *June 2007*

Case Report

Small Bowel Perforation as a Sequela of Obstructing Colon Cancer

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Key Words
Small bowel perforation;
Complication;
Obstructing colon cancer

Colonic perforation complicating with obstructing colorectal carcinoma is not an uncommon event, but no report of small bowel perforation from malignant intestinal obstruction is identified among the literatures. We described an elderly female patient presenting as acute abdomen at emergency department. Image study of abdominal computerized tomography (CT) and decubitus view of abdominal roentgenography for surgical abdomen revealed pneumoperitoneum as well as an annular tumor over ascending colon. The patient underwent emergent laparotomy by repairing of small bowel perforation and right hemicolectomy with gastrointestinal tract continuity reconstruction. Eventually, the patient had an uneventful hospital course.
[*J Soc Colon Rectal Surgeon* (*Taiwan*) *2007;18:59-64*]

Colorectal cancer is the third most common cause of cancer-related mortality among men and women in Taiwan. Colonic obstruction and perforation are the ominous complications of colorectal malignancy. The patterns of perforation would be categorized as followings: (1) locally advanced disease course with perforation at the tumor site; (2) local inflammatory and desmoplastic changes in the colon wall causing perforation adjacent to the malignancy; (3) obstructive tumor resulting proximal distension, ischemia, and subsequent “diastatic perforation”.[1] Colonic perforation proximal to the tumor accounted for about 1% to 25% of perforation in the malignant colon obstruction cases.[1,2]
Excluded by penetrating abdominal trauma, small intestinal perforation could be ascribed to diverticular disease, inflammatory bowel disease, ischemia bowel, connective tissue disease, primary small intestinal tumor, drug-induced small bowel perforation and unusual foreign body penetration. The patients with bowel perforation from the obstructing gastrointestinal tract lesion complain frequently of chronic constipation for several months with obstipation for period of two to twelve days as well as abdominal colicky pain clinically.[3] At laparotomy, edematous and hypo-/hyper-emic change of segment between the perforation site and obstructive lesion. Pathology of perforation site depicts it as inflammatory processing. Emergent surgical treatment is aimed to eradicate the etiology of intestinal perforation for the management of such toxic abdominal disease entities.
Herein, we proposed an 85-year-old female presenting as surgical abdomen clinically. Preoperative workup has informed us of the condition of hallow organ perforation concurrent

with an obstructing colonic neoplasm. Challenge to us in treating this case was to examine meticulously a preceded pathology contributing to small bowel perforation.

Case Report

An 85-year-old male had a presentation of one- day history of progressive lower abdominal pain and distention. No recent traumatic event was stated by her family. Her past medical history included left hemiarthroplasty from left inter-trochanteric fracture 3 years ago, drowsy consciousness with right hemiparesis and subsequent bed-ridden status from ischemic cerebral vascular episode 2 years ago. She resumed bowel motion every 2 to 4 days with the aid of cathartics. No other underlying medical illness was stated by the family. She had constipation and poor appetite in these 2 months. At our emergency department, the patient was found to be in severe distress with a febrile body temperature of 38.8 ° C and diffuse abdominal tenderness with peritoneal signs. White blood cell count was elevated to 15,800 cells/cubic mili-meter with left shift. Left decubitus view of abdominal roentgenogram displayed intra-peritoneal extra-luminal free air (Fig. 1). Abdominal computerized axial tomography (CT) scan showed pneumo-peritoneum, ascites, dilated bowel loops, infiltration change of mid-part of small bowel loops and a circumferential ascending colon wall thickening compatible to tumor change (Fig. 2). Under the impression of hallow organ perforation and an obstructing ascending colon tumor, the patient was sent to operating room immediately for surgical intervention.

At laparotomy, we inspected the whole small bowel loops prudently and neither organic lesion nor adhesion between loops was disclosed but the perforated hole. A transverse tear less than one-third circumference of small bowel at 70 cm proximal to ileocecal valve without other small bowel lesion (Fig. 3a) and an annular ascending colon tumor mass (Figs. 3b-c) with collapsed colon distal to the tumor were noted. Simple closure of small bowel perforation hole and right hemicolectomy with a primary side-by-side stapled ileocolonic anastomosis under the impression of malignant colonic obstruction were performed smoothly. No harvested tissue after debridement of small perforation was sent for pathological confirmation. Stage IIIb moderately-differentiated adenocarcinoma of ascending colon tumor was diagnosed. Before completion of this article, the patient was doing well.

Discussion

Malignant colonic complete obstruction or perforation necessitates emergent surgical intervention. These patient groups account for 7% to 40% of patients undergoing operations for colorectal cancer.[4] The incidence of complete obstruction has a range from 8%[5] to 40%[6] and that of perforation as about 2.6%[7] to 10%[8]. There were three patterns of colonic perforation related to an obstructive distal colorectal neoplasm: tumor site perforation, perforation adjacent to the tumor, or diastatic perforation. We present the first reported case of a small bowel perforation from a complete obstructive colonic adenocarcinoma. Our case demonstrates no other etiology of small bowel perforation after thorough pre-operative examination and intra-operative checkup.

Proximal colon perforations would be the consequence of excessive intra-luminal pressure overwhelming the colonic perfusion pressure, and the coexistence of competent ileocecal valve. Wangensteen[9] and Sperling[10] demonstrated that at an intra-luminal pressure of 60 mm-Hg venous stasis existed and at 90 mm-Hg the artery supply would be markedly reduced. Competence of ileocecal valve plays a pivotal role in determining whether or not a colonic perforation occurs. If it is competent, it remains closed even pressures rise high enough to perforate the colon proximal to the obstructive lesion. However, an incompetent ileocecal valve allows for colonic decompression into the small bowel. Dilatation of small bowel ensues and non-perforated colon would be preserved. In general, a non-obstructive proximal small bowel segments would divert the intraluminal pressure from the obstructed colon lesion in cases of the incompetence of the ileocecal valve. It was rather unusual that elliptical with regular-shaped perforation hole without necrosis or gangrenous change surrounding the perforation site was identified in this case. Even though such a perforation was small, elliptical tears through the outer layers with mucosa pouting

outward due to stretching and thinning of the small bowel, which diverted the elevating intra-luminal pressure from a completely obstructive tumor. Based on no coexistence of other etiology of small bowel perforation, the obstructive colon cancer in this case would be inferred to be the possible cause of bowel perforation.

Proximal colon perforation subsequent to distended and/or ischemic colon wall change from a complete malignant colonic obstruction may carry a more catastrophic prognosis than uncomplicated colorectal cancer cases in oncological or surgery-related outcomes.[6] The rationales of unfavorable outcome in these patients would be summarized as (1) fecal peritonitis presentation; (2) advanced staging of primary colorectal cancer; (3) malignant tissue spreading *via* the perforation hole; (4) palliative resection of tumor.[1-8,11] The presented case underwent emergent surgery of extensive peritoneal lavage, simple closure of small bowel perforation, and curative tumor resection. She had an uneventful hospital stay. In conclusion, small bowel perforation would be a sequela of a completely obstructing colonic neoplasm in this case. Early diagnosis of small bowel perforation and emergent surgical intervention could salvage the patient from peritonitis and malignancy.

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