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Colonic stenting for malignant colonic obstruction with pneumatosis intestinalis: A case report



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ABSTRACT

INTRODUCTION: Pneumatosis intestinalis is one of serious conditions following mechanical bowel obstruction. Emergency surgery is generally required to be a definite treatment in these patients of pneumatosis intestinalis, because of its risk of bowel ischemia and perforation. Since the operation in unprepared colon usually resulted in unfavorable outcome, the use of colonic stent is considered one of potential options as a bridge to definitive surgery. Presently, there is no widely published report of using colonic stent in these patients, particularly for stepping to curative surgery. Therefore, we herein report a case of obstructing sigmoid cancer with pneumatosis intestinalis who underwent successfully emergency metallic stent placement to convert from emergency to elective surgery.

PRESENTATION OF CASE: A 50-year-old woman presented with 3-day history of abdominal pain and obstipation. Abdominal computed tomography demonstrated a short segment of circumferential luminal narrowing at sigmoid colon, the presence of pneumatosis intestinalis at cecum, including ascending colon, and no extraluminal air. We performed colonoscopy and placed the metallic stent. The patient was then improved. After 1 week, the patient underwent elective hand-assisted laparoscopic sigmoidectomy and was discharged 5 days later. Pathological report showed stage IIa sigmoid cancer. The patient had no local recurrence or distant metastasis in 1 year follow up.

CONCLUSION: In obstructing colonic patient with pneumatosis intestinalis, nonsurgical treatment by colonic stenting can be used in selected patient as a bridge to definitive surgery. This will result in decreased morbidity and mortality and lower rate of stoma formation.

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1. Introduction

Pneumatosis intestinalis (PI) is defined as the presence of air within the submucosa and subserosa of the bowel wall [1]. Small intestine is the most common involved area (42%), followed by colon (36%) and both of them (22%) [2]. When arising in the colon, it may be termed pneumatosis coli. PI is divided into two groups: primary PI, which is usually termed pneumatosis cystoides intestinalis, found 15% of cases and about 85% of cases are secondary and mostly required surgical intervention [3]. Secondary PI may be caused by mechanical bowel obstruction and then progress to bowel ischemia and perforation eventually. Nowadays, one of common causes of obstruction is colorectal cancer. Approximately 10% to 30% of colorectal cancer cases present with complete or partial

colonic obstruction. Almost 80% of those, tumors locate distal to the splenic flexure [4]. Emergency surgery is the preferred treatment in these patients with acute colonic obstruction. However, the operation in emergency setting is associated with high morbidity and mortality, including rate of stoma formation [5]. In such cases, the use of metallic stent prior to definitive surgery resulted in favorable outcomes with the decreased morbidity and mortality rate [6–8]. Colonic stenting was also investigated as a possible option in the more complicated cases that developed PI. However, due to the higher risk of bowel perforation, the use of metallic stent is still challenging. Until now, colonic stenting has been reported as a palliative treatment in a patient with acute colonic obstruction with PI [16]. Herein, we report the successful emergency colonic stenting as a bridge to definitive surgery in an obstructing sigmoid cancer with PI patient.

2. Presentation of case

A 50-year-old female with no underlying disease presented with 3-day history of abdominal pain and obstipation. On examination,

Abbreviations: PI, Pneumatosis intestinalis; SEMS, Self-expandable metallic stent; CT, Computed tomography; WBC, White blood cell.

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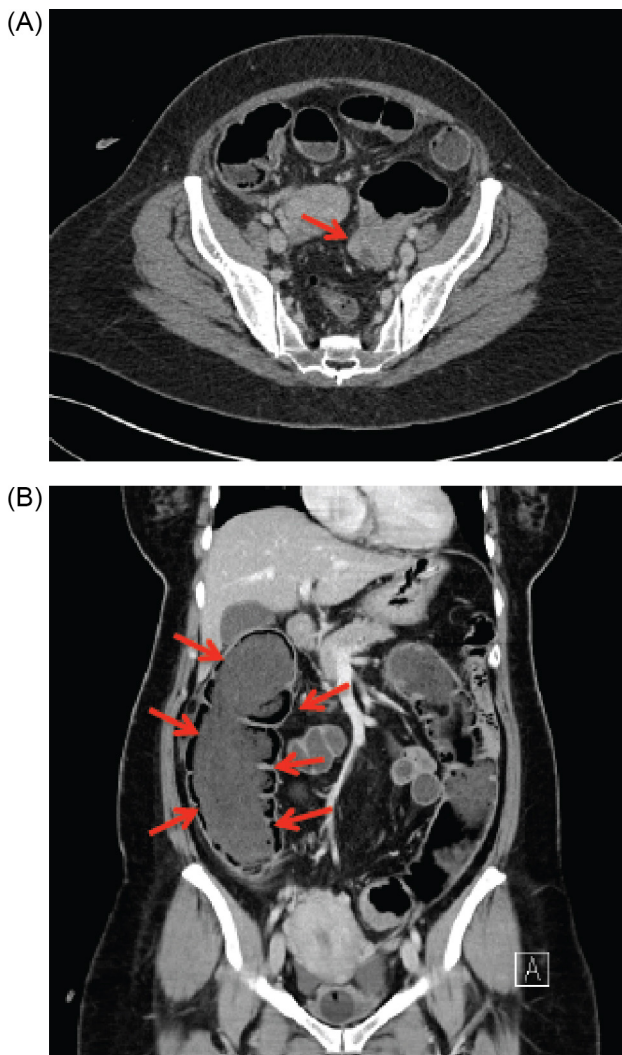


Fig. 1. Computed tomography of abdomen. A: Abdominal computed tomography showed the segment of thickening wall at sigmoid colon with nearly obstruction (red arrow); B: Intramural gas along the colonic mucosa in cecum and ascending colon was seen (red arrows).

she had mild dehydration with no fever. Abdominal examination showed distention, normal bowel sound, generalized mild tenderness with no guarding. Digital rectal examination was normal. Laboratory test revealed elevated white blood cell (WBC) count (14,710/ μ L). Abdominal X-ray revealed generalized dilatation of small bowel and markedly dilatation of colon from cecum to descending colon. Abdominal computed tomography (CT) demonstrated short segment of circumferential luminal narrowing at sigmoid colon, measured about 4.4 cm in length and 2.3 cm in wall-to-wall diameter, with a few of subcentimeter pericolic nodes (Fig. 1A). Dilatation of bowel loops above this lesion and collapsed distal bowel loops were noted. Furthermore, there was the presence of pneumatosis coli at cecum and ascending colon (Fig. 1B). Extraluminal gas, which is the contraindication for colonic stenting, was not demonstrated. There was neither local invasion nor distant metastasis (liver, peritoneum, ascites, paraaortic lymph node). The patient was stable with normal vital signs. We gave the fluid resuscitation, placed the nasogastric tube for decompression and inserted the Foley's catheter in order to monitor the urine output. After discussion, the patient was considered to perform colonoscopy with metallic stent placement for bridging to surgery. At colonoscopy, we found 50% circumferential ulceropro-

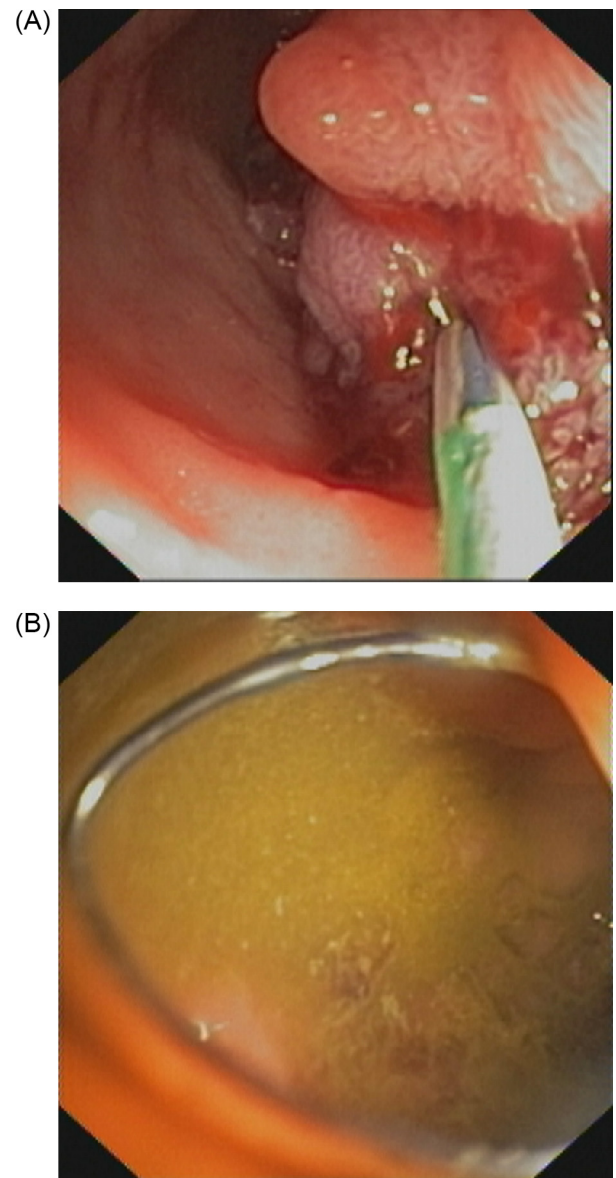


Fig. 2. Endoscopic finding. A: A guide-wire was passed through the lesion; B: Fluid content was flowed out after fully deployment of the stent.

liferative mass at 40 cm from anal verge, about 4 cm in total length, with nearly complete obstruction (Fig. 2A). Thereafter, Wallflex[®] metallic stent (Boston Scientific, MA, USA) 25 mm \times 90 mm was successfully placed to cover the point of obstruction (Fig. 3A and B). Massive liquid stool was drained out (Fig. 2B). The patient was improved in clinical. After 1 week, the patient was finally operated with elective hand-assisted laparoscopic sigmoidectomy and discharged 5 days later. Pathological report revealed moderately differentiated adenocarcinoma with no regional lymph node metastasis (26 nodes examined) (T3, N0). The patient was followed at three-month intervals for 1 year that showed no local recurrence and distant metastasis at this time.

3. Discussion

PI is a rare condition (occurrence, 0.03%). It is characterized by the presence of air localizing in the submucosa and subserosa layers of the bowel wall [1,9]. The pathophysiology of PI has been unclear, however, the setting of increased intraluminal pressure may cause the breakdown of the mucosa of the bowel. This condition, espe-

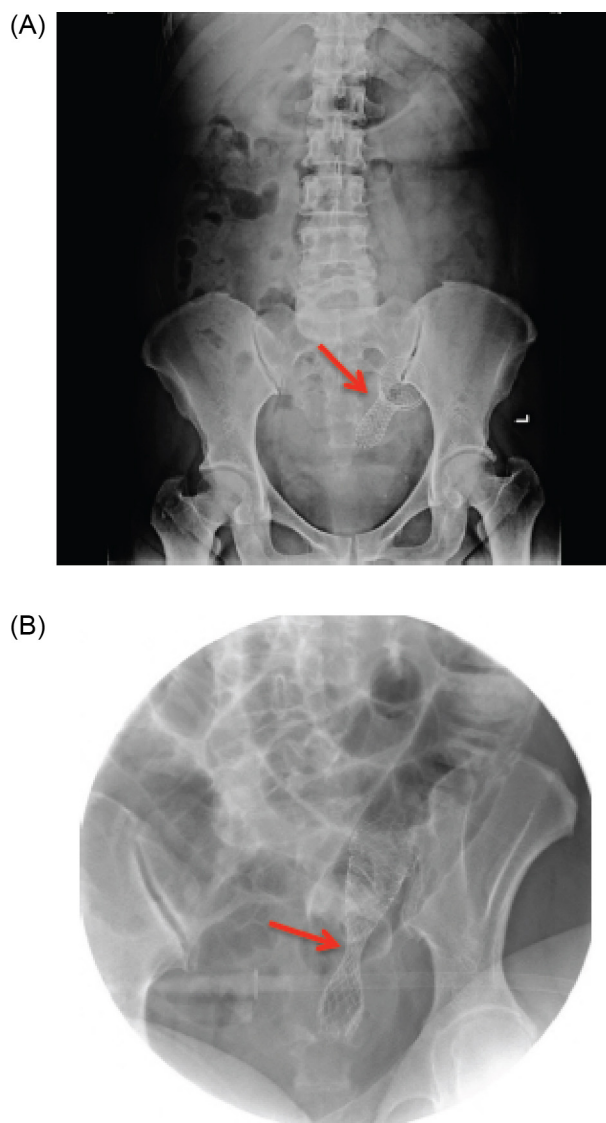


Fig. 3. Abdominal x-ray. A: and B: After SEMS placement, plain abdominal film showed dumbbell-shaped metallic stent after deployment with no abnormal dilatation of the bowel (red arrow).

cially in the presence of colonic obstruction, has been suggested to be a sign of transmural necrosis and impending rupture of the bowel wall. Patients with colonic PI most typically present with symptoms of diarrhea (56%), hematochezia (50%), abdominal discomfort (32%) and abdominal distension (28%) [10]. CT with or without intravenous contrast is more sensitive than plain film in diagnosing of PI [1].

Obstructing colorectal cancer patients, particularly in patients with PI, are required surgical management around 66% of cases. Nevertheless, the operation of unprepared colon in emergency setting was associated with a higher morbidity of 45% to 50% and mortality of 15% to 20% than elective surgery of 0.9% to 6% [5,11]. Furthermore, up to 40% of these patients need a permanent colostomy after emergency surgery. These drawbacks result in the high cost of colostomy care and low health-related quality of life [12]. Since Dohmoto et al. [13] had described the use of metallic stents in the early 1991s, the self-expandable metallic stent (SEMS) is widely used as palliative treatment for malignant colorectal obstruction in patients with incurable disease. Additionally, SEMS can be used in curable obstructing colorectal cancer as a bridge to surgery to permit one-stage surgery [14]. Consequently,

many reports of endoscopic treatment with SEMS placement in obstructing colorectal cancer patients both as a bridge to surgery and palliative care were published. A systematic review of SEMS for malignant colorectal obstruction reported a technical success rate of 96.2% and a clinical success rate of 92% with benefits of SEMS placement including shorter hospital stay, lower stoma-rate and lower rates of adverse outcomes [15]. Among these previous studies, there is only one case report that demonstrated the use of SEMS for a patient of obstructing colon cancer with PI in order to decrease risk of emergency surgery. In 2014, Fong et al. [16] reported a case report of cecal PI in obstructing sigmoid cancer treated by metallic stent placement for palliative care. The patient was discharged a week after stent placement and survived for the 9-month without surgical treatment. In 2015, there was a case report from Tahiri et al. [17] They reported a 77 year-old woman diagnosed small bowel obstruction with PI. She was underwent exploratory laparotomy because of unexplained persistent abdominal pain. Intraoperative finding showed extensive mesenteric emphysema in a large part of the small bowel without compromised small bowel and point of obstruction. Hence, small bowel resection was not performed and incision was closed. This patient was deteriorated and then she passed away about 6-week post-operatively. From these previous case reports, there is only one report using colonic stent as a palliative treatment. Thus, stenting for bridging to curative surgery has been disputed and required more evidence for clinicians.

In our case report, we demonstrated using SEMS placement to manage a case of obstructing sigmoid cancer with PI involving cecum and ascending colon without pneumoperitoneum as a bridge to definitive surgery. The patient was improved and then underwent elective hand-assisted laparoscopic sigmoidectomy as a definite surgery successfully. Oncologic outcome in the first year after surgery was satisfactory.

Also, there has been the question from previous case reports and our data about what proper management we should do for the patient with PI, emergency surgery or not. In 2007, Greenstein et al. [18] reviewed a series of 40 patients of PI to identify associated factors for surgical intervention and mortality rate. In multivariable analysis, they found that age ≥ 60 years, a WBC $>12,000/\mu\text{L}$ and the presence of emesis were significant factors associated with surgical intervention. Additionally, sepsis was the only characteristic independently associated with death. In 2012, Lee et al. [19] reported a retrospective review of clinically worrisome and benign PI in patients with cancer to evaluate risk factors and CT features for both groups. In this study, CT features for worrisome PI consisted of mesenteric fat stranding, bowel wall thickening and dilatation, ascites and confinement of PI to the small bowel. Meanwhile, PI limited to the colon was more often benign. Surprisingly, the presence of pneumoperitoneum did not associated with worrisome PI significantly; in spite of most cecal necrosis require surgical treatment. In 2013, there was a large retrospective multicenter study from the Eastern Association for the Surgery of Trauma [20]. They included 500 patients with PI both benign disease and pathologic PI to identify the risk factors for life threatening pathologic PI. These risk factors included the presence of hypotension or vasopressor usage, peritonitis, acute renal failure, active mechanical ventilation and the strongest independent predictor, which was a lactate level >2 mmol/L. Accordingly, we must consider these associated factors to determine which suitable managements may benefit for patients with PI.

4. Conclusion

Pathologic PI is a sign of transmural necrosis and impending perforation of the bowel wall that may be required emergency surgery. We demonstrated successful using of SEMS placement as a safe

alternative procedure in the patient of obstructing sigmoid cancer with colonic PI for bridging to definitive surgery. However, well-designed study with large numbers of the patient and also clinical examination and risk factors assessment are the best way to assess and to determine the proper management for favorable outcomes in each patient confidently.

Conflicts of interest

All authors have no competing interests or financial ties to disclose.

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Ethical approval

The study was approved by Siriraj Hospital Institutional Review Board by standard guideline.

Consent

The written consent was given by the patient and keep with the corresponding author.

Author contribution

Atthaphorn Trakarnsanga conceived of the study, and participated in the coordination. Jirawat Swangsri, Thawatchai Akaraviputh, Vitoon Chinswangwatanakul and Atthaphorn Trakarnsanga supervised the treatment of our patient. Natthawut Phothong participated in the database collection and drafted the manuscript. All authors read and approved the final manuscript.

Guarantor

Atthaphorn Trakarnsanga MD.

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