

CASE REPORT

## Management of patients with stercoral perforation of the sigmoid colon: Report of five cases

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### Abstract

To our knowledge, stercoral perforation of the colon is rarely seen with fewer than 90 cases reported in the literature till date. We explored the principles of management to prevent impending mortality in five patients with this condition. Five patients, two males and three females, whose median age was 64 years, had sustained stercoral perforation of the sigmoid colon. Chronic constipation was the common symptom among these patients. Three patients underwent a Hartmann's procedure and another two were treated with segmental colectomy with anastomosis and diverting colostomy. There was one surgical mortality and the other patients had an uneventful hospital stay. Timely intervention to prevent and/or treat any associated sepsis along with extensive peritoneal lavage and surgical intervention to remove diseased colonic tissue at the primary stercoral ulceration site coupled with aggressive therapy for peritonitis are key treatment modalities in salvaging patients presenting with stercoral perforation of the colon.

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**Key words:** Stercoral perforation; Colon; Management

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### INTRODUCTION

Berry<sup>[1]</sup> presented the first case of stercoral perforation of the colon to the Pathological Society of London in 1894, and it is a rare event with fewer than 90 cases reported in the literature through 2002<sup>[2]</sup>. Stercoral perforation of the colon is an aggravating condition following successive bowel wall ischemic necrosis by fecal mass<sup>[3]</sup>, and dictates a rather poor clinical outcome in patients with a compromised general condition<sup>[4,5]</sup>. We reviewed the history of five patients of stercoral perforation of colon at our hospital, in order to elucidate the appropriate intraoperative procedures and obtain clinical results which will enhance the percentage of accurate preoperative diagnosis and clarify the most feasible perioperative management.

### CASE REPORTS

During the years 2001-2005, 22 patients with free perforation of the colon were hospitalized at Chang Gung Memorial Hospital in Chiayi. The etiology of perforation was cancer in nine patients, ruptured diverticulitis in five, iatrogenic colon perforation related to colonoscopy procedure in two, one patient with traumatic colon perforation, and the other five patients were diagnosed as stercoral perforation which fit the diagnostic criterion proposed by Maurer *et al*<sup>[3]</sup>.

These five patients formed the basis for this brief report (Tables 1 and 2). There were two men and three women aged between 4-84 years. All gave a long history of serious and chronic constipation except for a little girl. Four patients also had concomitant diseases that might have enhanced the development of chronic constipation such as diabetic enteropathy, hypothyroidism, and hemiparesis sequelae of stroke.

These five patients presented with sudden and severe abdominal pain. On physical examination, diffuse peritonitis was present in all the patients along with high fever and leukocytosis. Four patients were found to have sub-diaphragmatic free air on a standing chest roentgenogram, but only one showed localized extraluminal air on abdominal CT scanning. All patients underwent emergency laparotomy by a general surgeon with a preoperative diagnosis of hollow organ perforation. The colorectal surgeon was summoned during surgery to verify an intraoperative finding of colonic perforation. All perforation sites were found to be located at the

Table 1 Perioperative data on patients with stercoral perforation of the colon

Patient Number	Gender	Age	Interval (day) <sup>1</sup>	Case history	X-ray finding	Peritonitis	Localization	Perforation size (cm) and site	Fecaloma
A	F	4	1	Chronic constipation	Subdiaphragmatic free air	Generalized	Mid-sigmoid Colon	1×0.8 Anti-mesocolic	Within abdominal cavity
B	M	70	3	Chronic constipation, Cushing's syndrome	Subdiaphragmatic free air	Generalized	Rectosigmoid colon junction	5×3 Anti-mesocolic	Within the colon
C	F	84	2	Chronic constipation, D.M.	Subdiaphragmatic free air	Generalized	Sigmoid Colon	3×2, Anti-mesocolic	Protruding through perforation
D	F	79	1	Chronic constipation, stroke	Subdiaphragmatic free air	Lower abdomen	Mid-sigmoid Colon	2.5×1.5, Anti-mesocolic	Within the colon
E	M	64	2	Chronic constipation, D.M., hypothyroidism, gouty arthritis	Extraluminal free air	Generalized	Sigmoid Colon	4×2, Anti-mesocolic	Within the colon

<sup>1</sup> between symptom to operation.

Table 2 Perioperative data of patients with stercoral perforation of the colon

Patient number	Pathology	Ascites culture <sup>1</sup>	Colonoscopy <sup>2</sup>	Stercoral ulcer at proximal colon	Operation procedures	Peritoneal lavage <sup>3</sup>	Complication
A	Fecal peritonitis	<i>E. coli</i> , <i>Enterococcus faecalis</i> , <i>B. Fragilis</i>	No	Undetectable	Segmental colectomy+diverting enterostomy	Plenty	Nil
B	Purulent ascites	<i>Enterococcus faecalis</i> , <i>B. fragilis</i>	Yes (65, A-colon)	Four shallow stercoral ulceration diffusely	Hartmann's operation+rectal mucus fistula	Moderate	Mortality (overwhelming sepsis at post-op 21st d)
C	Fecal peritonitis	<i>E. coli</i>	Yes (50, proximal T-colon)	No ulceration	Hartmann's operation+rectal mucus fistula	Massive	Superficial wound infection
D	Purulent ascites	<i>E. coli</i> , <i>Kleb. pneumoniae</i> , <i>B. thetaiotaomicron</i>	Yes (75, A-colon)	No ulceration	Segmental colectomy+diverting enterostomy	Massive	Superficial wound infection
E	Purulent ascites	<i>E. coli</i> , <i>Enterococcus faecium</i> , <i>Bacteroides sp.</i>	Yes (80, A-colon)	No ulceration	Hartmann's operation+rectal mucus fistula	Massive	Fascial dehiscence

<sup>1</sup>Heavy flora cultured as. <sup>2</sup>(cm) distance at the most proximal to perforation and location. <sup>3</sup>Massive: >10 000 mL; moderate: <6 000 mL; plenty: 1 500 mL.

antimesenteric part of the sigmoid colon with perforations ranging in size from 2 to 5 cm. The perforation margins were well circumscribed with no local inflammation or any other chronic process. Three patients underwent a Hartmann's operative procedure with colostomy and rectal mucous fistula, another two patients were treated with segmental resection of the diseased colon with anastomosis and diverting enterostomy.

During the operation four patients, with the exception of the little girl, underwent colonoscopy to clarify the extent of the lesion of severe stercoral ulceration with impending colon perforation. Colon lavage was also performed as permitted by the proximity of the lesion.

Hemodynamic improvement and reversal of hypotensive status was noted immediately after colectomy was performed.

Intraperitoneal irrigation with massive amounts of warm normal saline solution and adequate placement of drainage tubes preceded the closure of the celiotomy incision.

All patients received broad-spectrum intravenous antibiotics and nutritional support for the duration of their hospital stay. Diverting enterostomy was closed in two patients 3 mo later. Hartmann's procedure was reversed in two patients after a minimum time of one and a half years. There were one surgical mortality due to overwhelming sepsis, morbidities due to superficial wound infection in two patients and fascial dehiscence in one patient, respectively.

## DISCUSSION

Colon perforation is a rather uncommon event usually caused by malignancy, amoebic colitis, diverticular disease, spontaneous perforation, stercoral ulceration, steroid therapy, trauma, and ulcerative colitis<sup>[4]</sup>. The usual definition of stercoral perforation is "Perforation of the large bowel due to pressure necrosis from a fecal mass"<sup>[6]</sup>, and represents a cause of colon perforation. Stercoral perforation of the colon was very rare for it was

first described in 1894 and less than 90 cases have been reported in the literature till date. We had five patients (22%) with this condition presenting as colonic perforation (22 patients) at our hospital, and it was said to be the largest series involving stercoral perforation of the colon in a single medical institute within a short-term interval.

Severe chronic constipation is considered to be the main causative factor in the development of stercoral perforation of the colon<sup>[4,6-8]</sup>. In our series, each patient had a long history of chronic constipation requiring medication for relief; the youngest female patient did not have congenital Hirshsprung's disease based on the pathologic examination of the colectomy specimen.

Long-standing constipation may enhance the formation of stone-hard fecalomas and maintain a persistent pressure over the bowel wall leading to pressure necrosis of the mucosa. Nevertheless, stercoral ulceration of colonic mucosa does not always occur among constipation cases, and not every stercoral ulceration results in colon perforation.

Multiple fecalomas can result in multiple stercoral ulcerations<sup>[6]</sup>. One of our five patients and 28% of the cases found in the literature showed this characteristic feature. There are several reasons why the perforation sites are located in the antimesenteric aspect and in the sigmoid colon: (1) Hypoperfusive status existing in the antimesenteric aspect other than the mesenteric border; (2) due to its more distal location and more solid consistency, fecalomas tend to form in more distal aspects of the large intestine such as the sigmoid colon; (3) being the most narrow region of the entire large intestine stool has difficulty passing through the sigmoid colon which increases the intraluminal pressure to the point where it can compress submucosal capillary vessels and reduce perfusion of the colonic wall; (4) prolonged localized pressure on the colon wall causing pressure ulcerations to appear<sup>[3,5,9]</sup>. In this series of patients perforation was only found in the anti-mesenteric margin of the sigmoid colon and not in other colonic site.

Treatment of intra-abdominal sepsis was achieved by massive saline irrigation and perforation control with the intention of decreasing the bacterial load in the abdominal cavity and deterring the development of overwhelming sepsis<sup>[10]</sup>.

The single mortality in this series differed from the other four cases in the reduced amount of peritoneal lavage received due to intraoperative hypothermia.

Broad spectrum antibiotics were initiated in all the patients after hospital admission for polymicrobial peritoneal cavity contamination resulting from intestinal perforation<sup>[11]</sup>.

In reviewing the literature, it was noted that intraoperative colonoscopy to inspect the remainder of the colon for stercoral ulceration was not undertaken in cases of stercoral perforation of the colon. To our knowledge, we are the first group to perform intraoperative colonoscopic examination.

The purpose of intraoperative colonoscopic examination was to ensure the adequacy of the colonic resection and rule out the presence of additional stercoral ulcerations that might lead to delayed colonic perforation.

Intraoperative colonoscopy was performed within 10 min after the colon was cleared of impacted stools.

Only one patient was found to have more than one stercoral ulceration of the entire colon. Colectomy was performed to remove all stercoral ulcerated lesions in this patient, unfortunately, due to an immuno-compromised state the patient expired after developing overwhelming sepsis.

Maurer *et al*<sup>[3]</sup> postulated that colonic dilation and the presence of multiple fecalomas may indicate such additional stercoral ulceration and carried the risk of a second perforation. We concur with this point of view based on the findings during intraoperative colonoscopy in our series and recommend removing pathologically altered or dilated colon segments to prevent another episode of colon stercoral perforation.

Mortality related to colon stercoral perforation was reported to be high<sup>[4,6,9]</sup>. Analysis of the reports in the literature revealed additionally that 28% of patients with stercoral perforation of the colon have multiple stercoral ulcers in the colon and that substantial mortality is encountered if only minor surgical procedures are employed as treatment such as simple exteriorization of the perforation site or closure of perforation hole with the addition of a diverting enterostomy<sup>[6,9]</sup>.

Two review articles<sup>[6,9]</sup> and one series<sup>[3]</sup> with optimal clinical outcome in relation to the treatment of colonic stercoral perforation recommended that resection of the colon segment with an end colostomy and either mucous fistula or Hartmann's closure of the rectum would encounter comparatively low mortality. In our series, we took surgery of resection of colon with anastomosis and loop diverting colostomy in two patients (case 1 and case 4) with limited intraperitoneal septic condition and acceptable general condition. There were some advantages doing this procedure such as simple closure of colostomy someday. The other three patients were performed Hartmann's procedure with rectal mucous fistula.

In our series, we undertook surgical colonic resection with anastomosis and loop diverting colostomy in two patients (case 1 and case 4) with limited intraperitoneal sepsis and an acceptable general medical condition. The advantage of performing this procedure resides in the possibility of performing a simple closure of the colostomy in the future. The other three patients underwent Hartmann's procedure with rectal mucous fistula.

Stercoral perforation of the colon is not purely a surgical condition as it is usually complicated by a medical illness such as a superimposed immuno-compromised state which imparts a poor prognosis. Despite efforts to correct Cushing's syndrome, sufficient nutritional support and aggressive antibiotics therapy, it was not possible to prevent the systemic sepsis in case 2.

In conclusion, a favorable outcome in the treatment of stercoral perforation depends upon: (1) immediate treatment of any underlying sepsis; (2) removal of all stercoral ulcerated diseased colonic tissue; (3) extensive peritoneal lavage; (4) aggressive therapy to counteract colonic perforation peritonitis and (5) appropriate treatment of any co-morbid medical conditions. Prompt

institution of these measures will enhance survival of the patient and contribute to achieving a low mortality rate in stercoral perforation of the colon.

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