

## A Case of a Cecal Hernia Accompanied by Portal Venous Gas

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An internal hernia is a relatively rare disease in which a peritoneal organ protrudes through an abnormal opening within the confines of the abdominal cavity. Of the various forms of internal hernia, cecal hernia is even rarer. The patient in the present report was a 74-year-old woman with abdominal pain and vomiting as the chief complaints. X-rays confirmed gas in the small intestine, and CT scans showed portal venous gas and intestinal pneumatosis. Furthermore, angiography revealed poor blood circulation at the end of the ileum. As a result, cecal hernia was suspected, and an emergency operation was performed. Even though a moderate quantity of ascites fluid was confirmed, it was transparent with a yellow tint. Since the end (20 cm) of the ileum was incarcerated into the superior ileocecal fossa, the patient was diagnosed as having cecal hernia. The hernia was surgically relieved, but a part of the ileum had turned dark red and the blood circulation did not improve, thus the necrotic area was excised. Although the patient had postoperative acute respiratory distress syndrome (ARDS), the patient's life was spared by respiratory management and drug therapy. The present report describes the treatment of this patient while citing some relevant references.

### Introduction

An internal hernia is the protrusion of a peritoneal organ through an abnormal opening within the confines of the abdominal cavity. There are various forms of internal hernia, and cecal hernia is rare. In addition, portal venous gas often accompanies intestinal necrosis, and portal venous gas accompanying ileus is considered a sign of a poor prognosis. The present report deals with a patient with cecal hernia-induced strangulated ileus accompanied by portal venous gas.

### Case

**Patient:** a 74-year-old woman

**Chief complaints:** Abdominal pains and vomiting

**Past medical history:** Appendectomy, diabetes and hypertension

**Present illness:** Starting in 1994, the patient began to visit a neighborhood physician for right lower abdominal pains, but no abnormalities were found. However, at about 15:00 hours on September 4, 1997, the patient had an onset of pain in the right lower abdomen and vomited several times. Since these conditions did not alleviate, the patient visited our hospital at 23:00 on the same day.

**Illness and laboratory test results at the time of admission:** Her body temperature was slightly high at 37.6°C, and she had spontaneous pain and pain on pressure in the right lower abdomen. The

**Table** Blood test at the time of admission

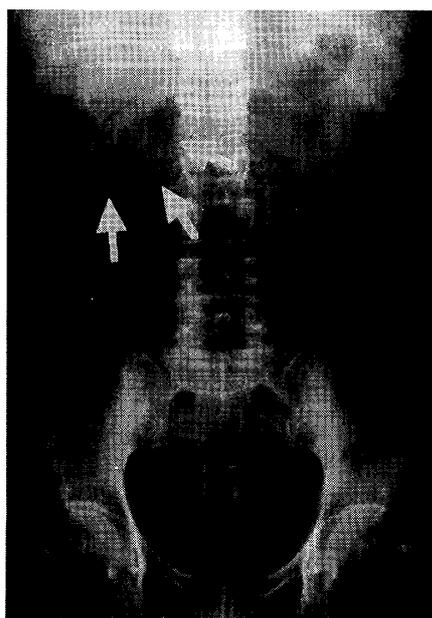
|                    |                            |
|--------------------|----------------------------|
| WBC                | 10.3 × 10 <sup>3</sup> /μl |
| RBC                | 4.24 × 10 <sup>3</sup> /μl |
| Hb                 | 12.6 g/dl                  |
| Ht                 | 38.0 %                     |
| Plt                | 250 × 10 <sup>3</sup> /μl  |
| TP                 | 6.1 g/dl                   |
| Alb                | 3.7 g/dl                   |
| ZTT                | 4.0 U                      |
| TTT                | 0.7 U                      |
| BUN                | 16 mg/dl                   |
| Cr                 | 0.7 mg/dl                  |
| Na                 | 144 mEq/l                  |
| K                  | 3.3 mEq/l                  |
| Cl                 | 105 mEq/l                  |
| Ca                 | 4.5 mEq/l                  |
| GOT                | 30 IU/l                    |
| GPT                | 20 IU/l                    |
| LDH                | 575 IU/l                   |
| CPK                | 157 IU/l                   |
| Amy                | 148 IU/l                   |
| BS                 | 170 mg/d                   |
| *pH                | 7.498                      |
| pCO <sub>2</sub>   | 36.2 mmHg                  |
| pO <sub>2</sub>    | 74 mmHg                    |
| HCO <sub>3</sub>   | 28 mmol/l                  |
| BE                 | 5 mmol/l                   |
| O <sub>2</sub> sat | 96 %                       |

\*Condition of arterial gas analysis is in room air

results of a blood test showed a slightly elevated leukocyte count (10,300/μl), LDH (575 IU/l) and blood sugar (170 mg/dl) (Table). A chest X-ray showed cardiac dilatation (CTR: 58.4%), but no other abnormalities were found. An abdominal X-ray showed gas in the small intestine in the right lower abdomen (Fig. 1). An abdominal CT scan showed ascites fluid, and portal venous gas in the posterior segment of the right hepatic lobe. In addition, dilatation of the ileum and gas in the ileal wall were observed (Fig. 2).

Based on these findings, the patient was diagnosed as having portal venous gas caused by mesenteric artery occlusion. Consequently, angiography was performed, but findings indicative of mesenteric artery occlusion were not found. However, the ileocolic artery was seen along the ascending colon (Fig. 3), which suggested cecal hernia.

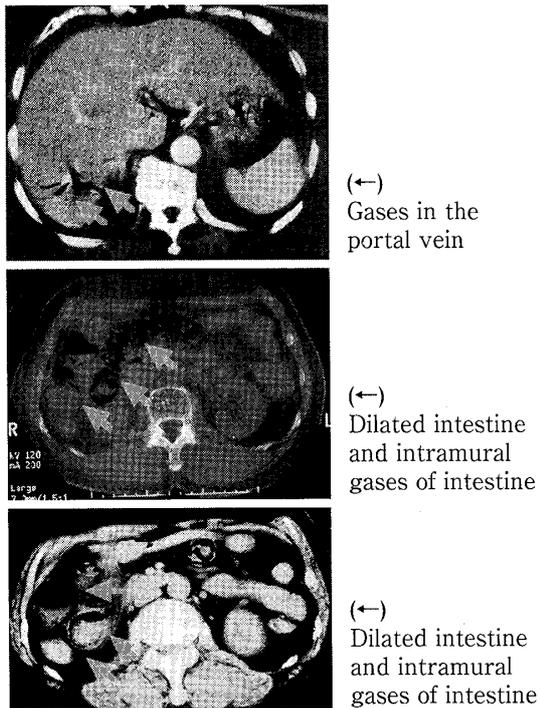
**Treatment course:** An emergency operation was performed with a tentative diagnosis of strangulated ileus caused by cecal hernia. Although a moderate quantity of ascites fluid was detected, it was transparent with a yellow tint.



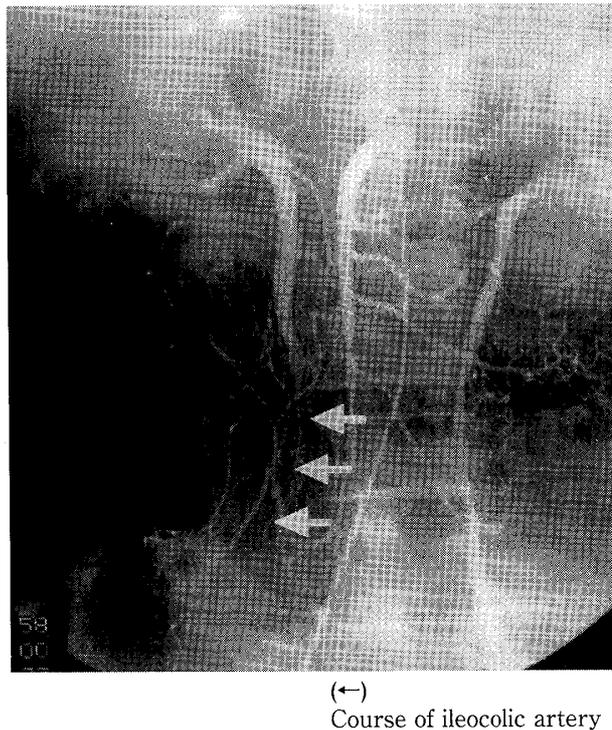
(←)

Figure of dilated intestine and intestinal pneumatosis

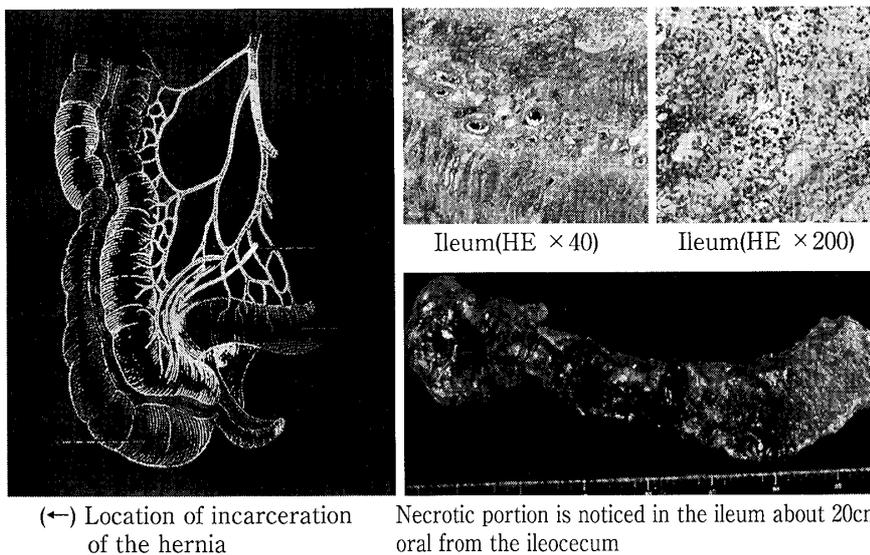
**Fig. 1** X-ray at the time of admission



**Fig. 2** Abdominal CT at the time of admission. Accumulation of ascites fluid in the abdominal cavity and gas in the portal vein were confirmed. Dilatation of the ileum and intramural gas were observed.

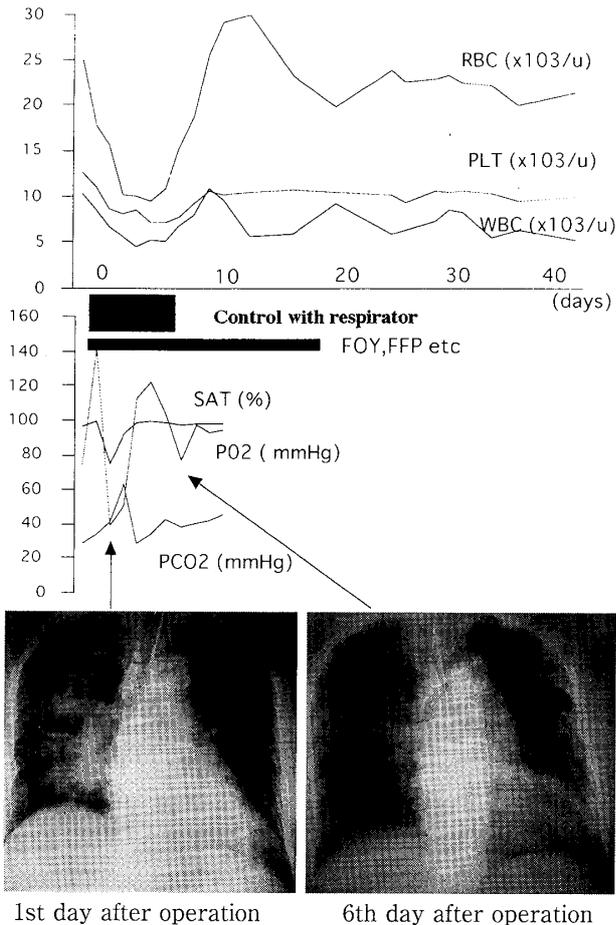


**Fig. 3** Angiography. Findings indicative of mesenteric artery occlusion were not found, but the ileocolic artery was seen along the ascending colon.



**Fig. 4** Surgical specimens

Even though perforations were not found, the mucosal membrane of the ileum had turned dark red, and the results of histological tests showed necrotic aspects in all layer from the mucosa to serosa. In other sites, formation of ulceration and aspect of pneumatosis cystoides intestinalis, finding vacuoles in the submucous layer, were noticed.



**Fig. 5** Treatment course

On 1st day postoperatively, respiration aggravated and ARDS originated in sepsis was suspected from blood data and breast X-P. But, as a result of treatment in intensive care unit the patient recovered on 6th day.

The end of the ileum (20 cm) was incarcerated into the superior ileocecal fossa, thus the patient was diagnosed as having a cecal hernia (Fig. 4). The hernia was surgically relieved, but since a part of the ileum had turned dark red and the blood circulation did not improve, the necrotic area was excised.

On the day after surgery, her respiratory condition exacerbated ( $PCO_2$ : 45.9 mmHg, and  $PO_2$ : 37.7 mmHg). A chest X-ray showed intense diffuse infiltrate shadows in both lungs, and the patient was diagnosed as having ARDS caused by sepsis. Even though a respirator was required, a chest X-ray taken six days after surgery con-

firmed recovery. The tubes were removed the next day, and the patient's recovery was uneventful (Fig. 5).

### Discussion

An internal hernia is the protrusion of a peritoneal organ through an abnormal opening within the confines of the abdominal cavity. According to Steinke<sup>1)</sup>, internal hernias can be classified into peritoneal hernias (duodenojejunal hernia, cecal hernia, etc) and hiatal hernias (mesenteric hernia, omental hernia, etc)<sup>1)~7)</sup>. According to a report by Nozaki and colleagues on 56 Japanese patients<sup>2)</sup>, peritoneal hernias accounted for only 14% (8 cases), and cecal hernias were even rarer.

Internal hernias and malignant tumors are the common causes of ileus in people who have not undergone surgery, and internal hernia is an important causative factor underlying development of a strangulated ileus. As far as the timing of surgery is concerned, rapid increases in ascites fluid detected by CT or ultrasonography and exacerbating abdominal findings are considered important<sup>8)</sup>. Nonetheless, as was the case with the present patient, clear abdominal findings are not often obtained in patients who have undergone laparotomy nor in the elderly, thus making it difficult to distinguish strangulated ileus from adhesive ileus.

The following factors can cause portal venous gas: 1) mucosal damage such as, intestinal necrosis or severe ulcerative colitis, 2) severe bowel distension, and 3) gas-producing bacteria infection or sepsis (intraperitoneal abscess)<sup>9)~15)</sup>. The most common cause of portal venous gas is intestinal necrosis which is considered to be one of the signs of poor prognoses. Liebman and colleagues<sup>9)</sup> reported that the mortality rate of portal venous gas was 75%, and Bloom and colleagues<sup>10)</sup> found that the mortality rate of portal venous gas caused by intestinal necrosis exceeded 90%. Needless to say, early diagnosis and elimination of

pathogenic bacteria are important. Morikage and colleagues<sup>11)</sup> stated that when portal venous gas is confirmed, it is important to identify the primary disease as soon as possible and promptly perform exploratory laparotomy under the tentative diagnosis of intestinal necrosis even if a definite diagnosis cannot be made. The present patient also had pneumatosis cystoides intestinalis. Even though the etiology of this condition has not been clarified, it is generally accepted that pneumatosis cystoides intestinalis is formed when the internal pressure of the digestive tract is increased by obstruction of the intestine which causes gas in the intestine to penetrate through the serous membrane<sup>16)</sup>. This partially explains why pneumatosis cystoides intestinalis sometimes accompanies portal venous gas caused by mucosal damage or severe bowel distension<sup>12)17)</sup>.

In the present patient, subserous pneumatosis was observed on the oral side of the strangulated small intestine, thus suggesting that portal venous gas was attributable to an increased internal pressure and severe mucosal damage to the intestine which were caused by an internal hernia-induced strangulated ileus. The present patient also suffered from postoperative acute respiratory distress syndrome (ARDS) caused by sepsis, but her life was spared by respiratory management using a respirator and drug therapy using protease inhibitors.

### Conclusions

1. We successfully treated a patient with cecal hernia accompanied by portal venous gas.

2. Since the patient had undergone surgery in the past and had portal venous gas, a definite diagnosis could not be made. Nevertheless, the results of angiography suggested cecal hernia and an emergency operation was performed, thereby saving the patient's life.

### References

1) **Steinke CR**: Internal hernia. *Arch Surg* **25**: 909-

- 925, 1932
- 2) **Nozaki H, Yanada K, Obata T et al**: Two cases of strangulated ileus caused by internal hernia. *St. Mary's Med J* **25**: 81-86, 1997 (in Japanese)
- 3) **Ogino A, Inaba S, Kondo Y et al**: A case of internal hernia through an abnormal defect in the broad ligament. *J Jpn Surg Assoc* **55** (5) : 1301-1304, 1994
- 4) **Imazato M, Hayashi T, Tanaka S et al**: A case report of intersigmoid hernia. *Geka* **58** (4) : 493-495, 1996
- 5) **Kikuno T, Kubochi K, Okuda M et al**: Two case of paraduodenal hernia. *IRYO* **47** (5) : 348-352, 1993
- 6) **Tada M, Kanamaru H, Horie Y et al**: A case report of intrasigmoid hernia. *Jpn J Gastroenterol Surg* **27** (12) : 2605-2608, 1994
- 7) **Deguchi H, Hattori M, Goshima M et al**: A case of small bowel obstruction due to incarcerated internal hernia through a defect in the falciform ligament. *Jpn J Gastroenterol Surg* **30** (5) : 1013-1017, 1997
- 8) **Suga H, Nakagawa T, Hamano K et al**: Three cases of strangulated ileus without history of laparotomy. *J Tokyo Wom Med Coll* **65** (Suppl) : 118-123, 1995
- 9) **Liebman PR, Patten MT, Mnny J et al**: Hepatic portal venous gas in adults. *Ann Surg* **187**: 281-287, 1978
- 10) **Bloom RA, Lebesart PD, Levy P et al**: Survival after ultrasonographic demonstration of portal venous gas due to mesenteric artery occlusion. *Postgrad Med J* **66**: 137-139, 1990
- 11) **Morikage N, Morita N, Esato K et al**: A case of small intestinal necrosis associated with portal venous gas. *J Jpn Surg Assoc* **57** (4) : 904-907, 1996
- 12) **Oshima I, Ozaki M, Ariga T et al**: A case of survival of necrotizing enteritis with hepatic portal venous gas and pneumatosis cystoides intestinalis. *J Jpn Surg Assoc* **59** (11) : 2859-2863, 1998
- 13) **Fukuda Y, Tsukioka K, Kawasaki F et al**: Gas in the portal venous system-A report of 4 cases. *Jpn J Gastroenterol Surg* **29** (7) : 1697-1701, 1996
- 14) **Higashida T, Nishida S, Wakasa M et al**: Hepatic portal venous gas. *JJAAM* **7**: 297-301, 1996
- 15) **Fukuchi M, Ishikawa I, Furuta Y et al**: A case of colonic carcinoma accompanied by hepatic portal venous gas. *JAEM* **16** (2) : 467-470, 1996
- 16) **Galandink S, Fazio VW**: Pneumatosis cystoides intestinalis. *Dis Colon Rectum* **29**: 358-363, 1986
- 17) **Fisher JK**: Computed tomography of colonic pneumatosis intestinalis with mesenteric and portal venous air. *J Comput Assist Tomogr* **8**: 269-275, 1984

## 門脈ガス血症を伴った盲腸窩ヘルニアの1例

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内ヘルニアは、異常な間隙を通して、腹腔内臓器が本来の正常な部位から腹腔内の他の部位に脱出する状態で比較的稀な疾患であるが、とりわけ盲腸窩に生じた内ヘルニアは稀である。症例は74歳、女性で、主訴は腹痛、嘔吐である。レントゲン検査で小腸ガスを認め、CTで門脈ガス血症、腸管気腫症を認め、血管造影では回腸末端の血流が不良であった。血管造影所見から盲腸窩ヘルニアを疑い緊急手術を施行した。手術所見は、腹水を中等量認めたが、性状は黄色透明であった。回腸末端の腸管20cmが上回盲窩に入り込み嵌頓しており盲腸窩ヘルニアと診断した。用手的にヘルニアを解除したが、回腸の一部は血流の改善を認めなかったため、同部の切除を行った。術後はARDSを合併したが、呼吸管理と薬物療法により救命した。若干の文献的考察を加えて報告する。