

## Polymicrobial Solitary Retroperitoneal Abscess Due to Sigmoid Colon Perforation

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We treated an 85-year-old man with an abscess perforating into the retroperitoneal space from the sigmoid colon, with retroperitoneal drainage combined with antibiotics. CT showed no abscess formation in the intraperitoneal space. The patient consulted a doctor with a chief complaint of left-side low back pain and fever. He was first diagnosed with bacteremia due to *Escherichia coli* and close examination by CT revealed a retroperitoneal abscess. On referral to our hospital, we determined by CT that the cause of abscess formation was perforation of the intestine into the retroperitoneal space and spreading into the psoas muscle compartment. We then performed colostomy and abscess drainage through the retroperitoneal space to prevent the abscess disseminating into the intraperitoneal space. The abscess and necrotic tissue cultures were polymicrobial, including *Enterobacteriaceae* and *Bacteroides* spp. The abscess almost disappeared after drainage, and the patient's general condition gradually improved. The retroperitoneal abscess did not relapse by follow-up CT. In conclusion, this rare case presented with perforation of the intestine (Sigmoid colon) disseminated only to the retroperitoneal space without no intraperitoneal space abscess formation. We performed drainage only by a retroperitoneal approach without entering the intraperitoneal space.

### INTRODUCTION

Retroperitoneal abscess is usually secondary to some form of primary disease or is due to trauma or organ damage in the gastrointestinal tract, kidney, or urinary system. Retroperitoneal infections are associated with a 1.5-20% mortality rate (1). Though retroperitoneal colonic perforation rarely causes a retroperitoneal abscess, such perforations are relatively frequent in frail elderly patients (2). In this case, an abscess formed only in the retroperitoneal space with no intraperitoneal involvement, which is a rare finding.

Formerly, open surgery and ablation of the intraperitoneal or retroperitoneal infected space were the common treatments for such abscesses, but minimally invasive percutaneous drainage, usually accompanied by antibiotic administration, has now become the first choice for treatment in cases that are not severe. Pneumoretroperitoneum, pneumomediastinum, and abscess of the iliopsoas are rare manifestations of retroperitoneal colonic perforation for which diagnosis is often delayed due to the absence of peritoneal irritation. Computed tomography (CT) is useful for imaging the spread and range of such abscess and uncovering their origins.

We experienced a rare case with the intestine-perforation-related abscess reaching only retroperitoneal space diagnosed by CT and confirmed in the surgical findings. We initially attempted percutaneous drainage, but because the abscess was due to intestinal perforation, complete drainage was difficult until the source was isolated. Therefore, open surgery was considered necessary.

### CLINICAL CASE

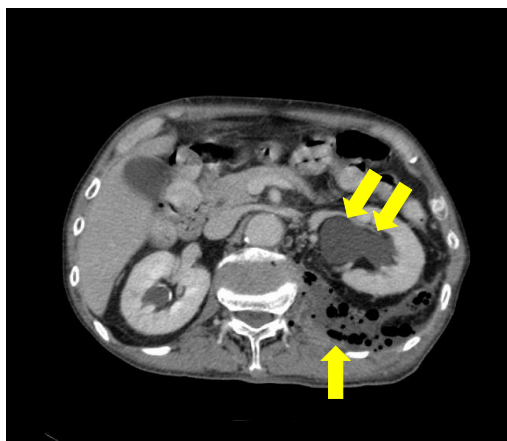
An 85-year-old man was admitted to hospital three weeks previous with aggravated lumbar pain, diagnosed with left retroperitoneal abscess and left hydronephrosis on CT, and then transferred to our hospital. He had no history of colon cancer. Laboratory data revealed a high white blood cell count (14000/ $\mu$ L) and high C- reactive protein (30.0 mg/dL). Importantly low-albuminemia (1.8g/dL) due to poor food intake was seen, which may be

the reason for ineffective antibiotic therapy. He had bacteremia due to *Escherichia coli* with good susceptibility to antibiotics and urine culture was negative.

We diagnosed that abscess formation in the retroperitoneal space was due to perforation of the sigmoid colon and found that the abscess compressed the left ureter, causing left hydronephrosis. The abscess spread to the left side iliopsoas muscle from below the diaphragm (Figure 1). Since abscess formation due to perforation of the sigmoid colon was diagnosed from CT, we determined that 1) inspection of the intraperitoneal space for abscess formation, 2) open-surgical drainage of the retroperitoneal space including psoas muscle abscess, and 3) colostomy was necessary for radical treatment. Our team of general surgeons and urologists performed drainage of the retroperitoneal abscess by way of the retroperitoneum cavity under abdominal CT finding. Antibiotic therapy with 12 g per day ampicillin/sulbactam under the diagnosis of retroperitoneal abscess, selected for its specificity to *Escherichia coli* detected from culture results taken during the initial percutaneous drainage, was initiated. We chose open surgery because the abscess was widespread and drainage at multiple locations in the retroperitoneal space, including the psoas muscle, was necessary.

Surgical findings in the first stage of the surgery confirmed that there was no abscess in the intraperitoneal space. We decided to resect the perforated part of the sigmoid colon once the infection was resolved to avoid disseminating the retroperitoneal abscess into the intraperitoneal cavity. A transverse colon stoma was constructed after retroperitoneal drainage. On palpation of the suspected perforated parts of the sigmoid colon, a hard and solid substance was found inside, raising the possibility of a tumor though there was no rise in tumor markers before surgery. The pus and resected tissue (muscle and subcutaneous tissue) cultures were positive and revealed *E. coli*, *Enterococcus faecalis*, *Bacteroides thetaiotaomicron*, *Bacteroides salyersiae* and *Parvimonas micra*. The *E. coli* and *E. faecalis* were susceptible to antibiotics but two kinds of *Bacteroides spp.* were less sensitive to ampicillin.

After surgical drainage, the patient's general condition and inflammatory reaction improved. However, fever recurred 22 days after surgery. CT revealed that most of the retroperitoneal abscess and left hydronephrosis had disappeared (Figure 2) but the patient was diagnosed with pneumonia after lung CT (data not shown).



**Figure 1.** An abscess was found in the retroperitoneal space (single arrow) along with lt. hydronephrosis (double arrows).



**Figure 2.** Hydrobephrosis was disappeared, and retroperitoneal abscess was diminished after surgical drainage (single arrow).

## DISCUSSION

Retroperitoneal abscesses develop posterior to the peritoneum. Patients generally present with insidious symptoms and subtle clinical signs, often resulting in delayed diagnosis with high morbidity and mortality rates (3). Retroperitoneal abscess due to colon perforation is a rare occurrence (4). Palop et al. reported 3 cases of retroperitoneal abscess due to intestinal perforation. Such cases are rare but cause severe complications with overall mortality about 17% (5). In these cases, the diagnosis is often delayed because retroperitoneal abscesses are less likely to develop symptoms than intraperitoneal abscesses (6, 7).

The common cause of retroperitoneal perforation of the colon is diverticulitis and colon cancer. Based on intraoperative findings, there was a high possibility of perforation by cancer. We did not perform enterectomy, instead constructing a transverse colon stoma (colostomy) was constructed in order to prevent intraperitoneal abscess dissemination. When an abscess forms in the intraperitoneal cavity, the peritoneum often senses infection rapidly and exhibits peritoneal irritation symptoms such as rebound tenderness or muscular defense. However, when an abscess forms only in the retroperitoneal space, the symptoms are slight and atypical. In this case, bacterial culture of the retroperitoneal abscess showed 5 kinds of positive culture including *Enterobacteriaceae* and *Bacteroides*. As we previously reported in another case where a retroperitoneal abscess perforated into the thoracic cavity, the representative causative bacteria was *E. coli* (8). In such cases, the pathogens are often polymicrobial (9), and Gram-negative bacilli in association with others are the most common pathogens (44.1%), followed by *Proteus mirabilis* (20.5%), *E. coli* (14.7%), and Gram-positive bacteria such as *Staphylococcus aureus* (8.82%) (2).

The recommended antibiotic therapies for intraperitoneal abscess in the guidelines of the Surgical Infection Society and the Infectious Diseases Society of America (10) are carbapenem or piperacillin-tazobactam for 4-7 days. In our case, where an abscess derived from an abdominal organ spread to the retroperitoneum, multidisciplinary measures including drainage were necessary. We used ampicillin/sulbactam for 14 days. The guidelines for decision-making on antibiotic therapies need to be reviewed.

Regarding the diagnostic modality, CT demonstrates good performance in the range of 90 to 100% and is useful for deciding the best approach, including percutaneous, laparoscopic, and open-surgical drainage (2, 4).

The limitations of this study include no pathological evidence from colectomy due to the patients' age and general condition, which made construction of a transverse colon stoma the best option. We also have no photographic illustration that the abscess was caused by sigmoid colon perforation since we relied on CT examination and not a barium enema examination.

In conclusion, we report a case of retroperitoneal abscess caused by *Enterobacteriaceae* and *Bacteroides* in which the sigmoid colon perforated only into the retroperitoneal space, with no intraperitoneal involvement. The patient was successfully treated by retroperitoneal open-surgical drainage. CT was effective for diagnosis and surgical decision-. This case may be informative for physicians, since it illustrates an approach preventing the dissemination of abscess into the intraperitoneal space even the origin of the abscess was an intraperitoneal organ (sigmoid colon) as diagnosed by CT.

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All authors have no competing interest to declare.

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