

## Abdominal Actinomycosis Associated with a Sigmoid Colon Perforation in a Patient with a Ventriculoperitoneal Shunt

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Abdominal actinomycosis causing hydronephrosis in a patient with a ventriculoperitoneal shunt is very rare. A 27-year-old female patient was admitted complaining of lower abdominal pain. She had undergone ventriculoperitoneal shunt surgery 10 years ago. Abdominal Ultrasonography and a CT scan demonstrated an inflammatory mass in the lower left quadrant of the abdomen causing obstructive hydronephrosis and hydronephrosis. Laparotomy revealed a diffusely infiltrating mass involving the small bowel, mesentery, and sigmoid colon, and a 1 cm perforation in the sigmoid colon. Actinomycosis was diagnosed upon histological examination. After treatment with antibiotics and surgery, the patient's condition improved.

**Key Words:** Actinomycosis, hydronephrosis, ventriculoperitoneal shunt

### INTRODUCTION

Actinomycosis is a chronic granulomatous and suppurative disease caused by *Actinomyces israelii*.<sup>1,2</sup> This diagnosis is seldom made preoperatively due to the relative infrequency of the disease and the lack of reliable clinical manifestations. It is usually diagnosed by histological demonstration of sulfur granules in a postoperative surgical specimen and with culture for *Actinomyces israelii*.<sup>2,3</sup> Although intrauterine device (IUD)-related abdominal actinomycosis has been frequently reported,<sup>4-6</sup> abdominal actinomycosis by bowel perforation in the patient with a

ventriculoperitoneal shunt (VP shunt) has not been previously reported. Here, we report the case of abdominal actinomycosis causing hydronephrosis associated with spontaneous bowel perforation, secondary to the VP shunt.

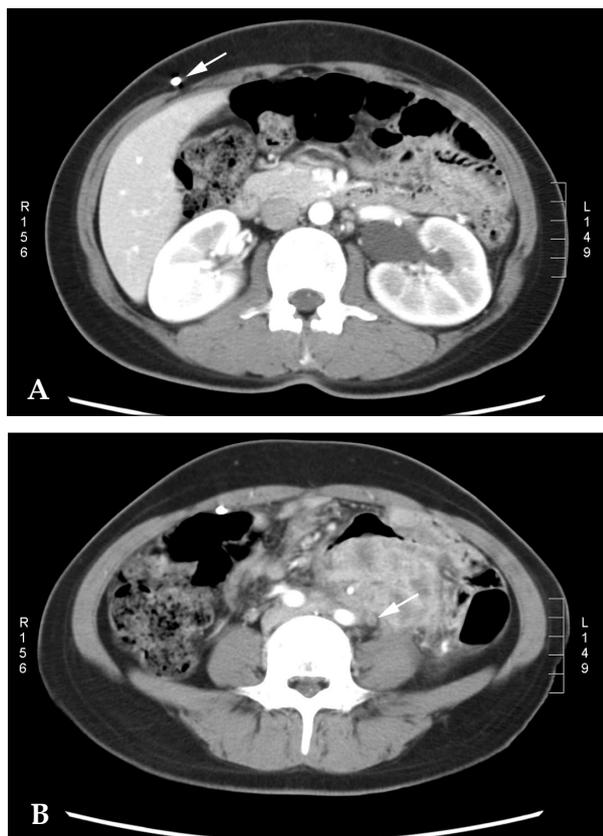
### CASE REPORT

A 27-year-old woman was admitted to our hospital with increasing lower abdominal pain, flank pain, and dysuria for three months. A VP shunt was implanted 10 years ago due to hydrocephalus caused by a traffic accident. Her body temperature was 36°C, heart rate was 88 bpm, respiration rate was 18 per minute, and blood pressure was 110/70 mmHg. Her mental status was clear. There was no abnormality upon neurological examination.

Upon physical examination, the abdomen was slightly rigid. There was tenderness and rebound tenderness in the lower left quadrant of the abdomen, and the VP shunt surgery scar was observed in the lower right quadrant of the abdomen. There was no abnormality upon gynecological examination. The WBC cell count was 18,300/ $\mu$ L, and the PMN was 87.3%. The C-reactive protein level was 91.8 mg/ $\mu$ L. An Abdominal computed tomography (CT) demonstrated a 6  $\times$  7 cm sized inflammatory mass in the lower left quadrant of the abdomen causing obstructive hydronephrosis and hydronephrosis (Fig. 1). Empirical antibiotics were administered immediately with the clinical impression of an intra-abdominal abscess. An explorative laparotomy was performed to determine the definite diagnosis. There was an extensive, diffusely infil-

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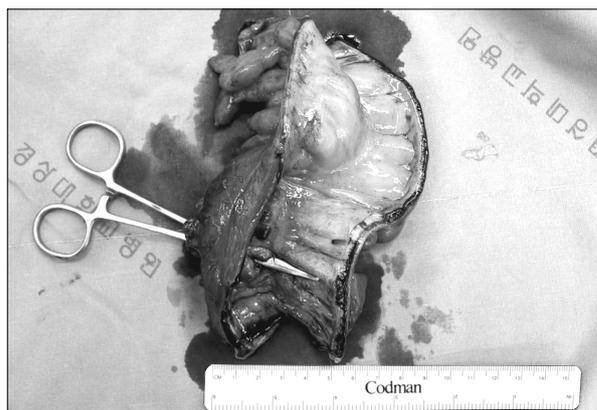


**Fig. 1.** (A) Abdominal computed tomography (CT) shows left hydronephrosis and hydroureter. VP shunt is shown (white arrow). (B) The approximately 6×7 cm multilobulated, poorly-margined mass in the lower left quadrant encases left ureter (white arrow).

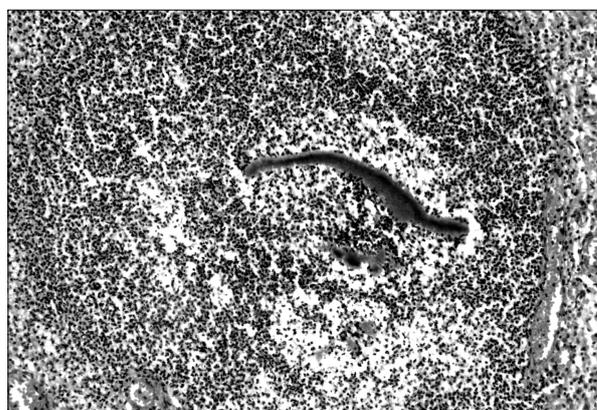
trating lesion-like mass involving the small bowel, mesentery, and sigmoid colon. A sigmoid colon perforation, approximately 1 cm in diameter, was observed (Fig. 2). Lysis of adhesions, pus drainage, and sigmoid colon segmentectomy were performed. Pathology revealed an intense chronic inflammatory reaction with sulfur granules (Fig. 3). After 12 weeks of penicillin use, the patient's clinical manifestations and radiologic findings were improved. She was discharged without sequelae. At a follow-up visit 6 months later, there were no signs of recurrence.

## DISCUSSION

The ventriculoperitoneal shunt is the most widely used procedure in the treatment of hydrocephalus, but complications resulting from the



**Fig. 2.** Sigmoid colon is thickened and perforated about 1 cm in diameter.



**Fig. 3.** Histological examination of the resected tissue shows the sulfur granules characteristic of actinomycosis (H&E, ×400).

shunts have been reported in 24-47% of patients. These include: mechanical malfunction, infection, cerebrospinal fluid collection, shunt migration, and bowel perforation.<sup>7,8</sup> Spontaneous bowel perforation is a rare complication of the VP shunt, occurring in only 0.1% of patients, and it is asymptomatic in 42% of patients.<sup>9,10</sup> This is the first report of actinomycosis related with a bowel perforation by a VP shunt. Furthermore, there have been no reports of hydronephrosis and hydroureter with complicated actinomycosis for a VP shunt patient.

Actinomycosis is an indolent and slowly progressive infection, which releases characteristic sulfur granules. In 1846, Bradshaw published the first description of a patient with abdominal actinomycosis. Harz named this bacteria *Actinomyces*

several years later.<sup>11</sup> Human actinomycosis is caused by *Actinomyces israelii*, a gram-positive microaerophilic organism that is normally found in the mouth, the gastrointestinal tract, and the female genital tract. Disease occurs following a disruption in the mucosal barrier.<sup>12,13</sup>

All tissues and organs can be infected, but four main clinical types of infection can be distinguished, depending on the primary site of infection: cervicofacial, thoracic, abdominopelvic, and disseminated disease.<sup>14</sup> Abdominal actinomycosis is a rare disease that is associated with appendicitis, diverticulitis, previous bowel surgery, foreign bodies, bowel perforation, and IUD-associated pelvic disease.<sup>15</sup> The diagnosis is seldom made preoperatively due to its relative infrequency and the lack of reliable or consistent clinical manifestations. The diagnosis is usually made during exploratory laparotomy by staining and culture of *Actinomyces israelii*, or by histological demonstration of sulfur granules in pus, or in the surgically-resected specimen.<sup>2,3</sup>

Treatment consists of surgical resection of the infected lesion and long-term antibiotic therapy. Although therapy should be individualized, typical treatment includes intravenous administration of 18 to 24 million units of Penicillin for 2 to 6 weeks, followed by oral therapy with Penicillin or Amoxicillin for 6 to 12 months. Antibiotic agents whose success has been reported anecdotally are: tetracycline, erythromycin, clindamycin, lincomycin, and rifampin.<sup>16</sup>

Recently, abdominal actinomycosis infections in IUD users have been frequently reported. However, VP shunt-associated abdominal actinomycosis has not yet been reported. In this case, it is assumed that the spontaneous sigmoid colon perforation occurred due to continuous friction at the sigmoid colon wall after the peritoneal tube was implanted. Abdominal actinomycosis, secondary to bowel perforation, might have then occurred. This abdominal actinomycosis was complicated with hydroureter and hydronephrosis by obstruction of the ureter.

In previously reported cases of bowel perforation by a VP shunt, most patients presented with the peritoneal tip of the shunt in the intestine. Moreover, the perforation was accompanied by severe complications such as intracranial sepsis,

ventriculitis, meningoencephalitis, subdural abscess, and pneumocephalus. Consequently, the VP shunt must be removed. However, in this case, the VP shunt was not removed because cerebrospinal fluid examination in the operating room did not suggest any evidence of intracranial infection, and the VP shunt was functioning properly.

In conclusion, a patient with a VP shunt for several years may develop a spontaneous bowel perforation due to continuous friction on the peritoneal tip. This could then be further complicated with an abdominal abscess and actinomycosis. Abdominal actinomycosis associated with bowel perforation should be considered if patients with a VP shunt present with chronic abdominal pain and an abdominal mass.

## REFERENCES

1. Chung JM, Choi YH, Kim DH, Lee CH, Kim SK, Kwon HM, et al. A case of abdominal actinomycosis. *Korean J Gastroenterol* 1998;31:558-61.
2. Weese WC, Smith IM. A study of 57 cases of actinomycosis over a 36 year period: a diagnostic 'failure' with good prognosis after treatment. *Arch Intern Med* 1975;135:1562-8.
3. Choi SH, Park SM, Kim YH, Kim IC. A case of abdominal actinomycosis. *Korean J Gastroenterol* 1992; 24:1463-7.
4. Kim MK, Sun BH. Clinical analysis of actinomycosis: 66 cases of Korean experience. *J Korean Surg Soc* 1997;52: 702-10.
5. Asuncion CM, Cinti DC, Hawkins HB. Abdominal manifestation of actinomycosis in IUD users. *J Clin Gastroenterol* 1984;6:343-8.
6. Laurent T, de Grandi P, Schnyder P. Abdominal actinomycosis associated with intrauterine device: CT features. *Eur Radiol* 1996;6:670-3.
7. Christoph CL, Poole CA, Kochan PS. Operative gastric perforation: a rare complication of ventriculoperitoneal shunt. *Pediatr Radiol* 1995;25 (Suppl 1):S173-4.
8. Choi JU, Kim DS, Kim SH. Endoscopic surgery for obstructive hydrocephalus. *Yonsei Med J* 1999;40:600-7.
9. Digray NC, Thappa DR, Arora M, Mengi Y, Goswamy HL. Silent bowel perforation and transanal prolapse of a ventriculoperitoneal shunt. *Pediatr Surg Int* 2000;16: 94-5.
10. Sathyanarayana S, Wylen EL, Baskaya MK, Nanda A. Spontaneous bowel perforation after ventriculoperitoneal shunt surgery: case report and a review of 45 cases. *Surg Neurol* 2000;54:388-96.
11. Harz CO. Actinomycosis bovis: Zinuer mould in that

- fabrics of the cattle. In: Broud AI, editor. Infectious disease and medical microbiology. 2nd ed. Philadelphia: W.B. Saunders Co.; 1986. p.391.
12. Hong KB, Choi SR, Park EH, Keum DJ, Kim KJ, Lee SR, et al. A case of pelvic actinomycosis invading the rectum. *Korean J Gastroenterol* 2002;40:343-7.
  13. Robbins TS, Scott SA: Actinomycosis: the disease and its treatment. *Drug Intell Clin Pharm* 1981;15:99-102.
  14. Son SH, Kim BS, Huh KC, Park SK. Abdominal actinomycosis initially diagnosed as a colorectal cancer or periappendiceal abscess. *Korean J Gastrointest Endosc* 2000;21:713-22.
  15. Kim H, Lee WK, Kim SH, Park SM, Kim YN, Choi SJ, et al. A case of abdominal actinomycosis. *Korean J Gastrointest Endosc* 2000;20:307-11.
  16. Park CH, Yune OJ, Lee HY, Kim YK, Ro HK, Lee BH. A case of abdomino-pelvic actinomycosis. *Korean J Intern Med* 1989;36:272-6.