

Vesico-ileosigmoidal Fistula Caused by Diverticulitis: Report of a Case and Literature Review in Japan

Enterovesical fistula is a relatively uncommon complication of colorectal and pelvic malignancies, diverticulitis, inflammatory bowel disease, radiotherapy, and trauma in Asian countries. A case of vesico-ileosigmoidal fistula and a literature review of this disease in Japan are presented. A 70-yr-old male was referred with complaints of urinary pain and pneumaturia. On admission, urinary tract infection and pneumaturia were presented. A barium enema demonstrated multiple diverticulum in his sigmoid colon and the passage of contrast medium into the bladder and ileum. Under the diagnosis of vesico-ileosigmoidal fistula due to suspected diverticulitis of the sigmoid colon, sigmoidectomy and partial resection of the ileum with partial cystectomy were performed. The histopathology revealed diverticulosis of the sigmoid colon with diverticulitis and development of a vesico-ileosigmoidal fistula. No malignant findings were observed. Until the year 2000, a total of 173 cases of vesico-sigmoidal fistula caused by diverticulitis had been reported in Japan. Pneumaturia and fecaluria are the most common types, presenting symptoms in 63% of the cases. Computed tomography, with a sensitivity of 40% to 100%, is the most commonly used diagnostic study. For patients with vesico-sigmoidal fistula, resection of the diseased sigmoid colon and partial cystectomy with primary anastomosis are the safest and most acceptable procedures, leading to the best results.

Key Words : *Digestive System Fistula; Diverticulitis*

Hidefumi Nishimori^{*†}, Koichi Hirata^{*},
Rika Fukui^{*†}, Mayumi Sasaki[‡],
Takahiro Yasoshima^{*§},
Futoshi Nakajima^{*†}, Fumitake Hata^{*},
Kenji Kobayashi[¶]

^{*}Department of Surgery 1, Sapporo Medical
University School of Medicine, Sapporo;
[†]Departments of Surgery and Pathology, Sapporo
Hospital of Hokkaido Railway Company, Sapporo;
[‡]Koshin Hospital, Sapporo, Japan

Received : 24 May 2002
Accepted : 14 August 2002

Address for correspondence

Hidefumi Nishimori, M.D.
Department of Surgery 1, Sapporo Medical
University School of Medicine, Minami-1, Nishi-16,
Chuo-ku, Sapporo 060-8543, Japan
Tel : +81.11-611-2111 (ext. 3281),
Fax : +81.11-613-1678
E-mail : hidefumi@sapmed.ac.jp

INTRODUCTION

Enterovesical fistula is a relatively uncommon complication of colorectal and pelvic malignancies, diverticulitis, inflammatory bowel disease, radiotherapy, and trauma (1). The major cause of this entity is malignancy, followed by diverticulitis, especially sigmoidal diverticulitis (1). In Western countries, as diverticulitis is relatively common, there are frequent reports of enterovesical fistula followed by those dealing with diverticulitis (2-4). In Asian countries, however, enterovesical fistula is rarely observed (5). Because of the increasing age of the Japanese population and the increased consumption of foods that are popular in the West, the morbidity of diverticulitis and complications from it are expected to increase (6).

A case of vesico-ileosigmoidal fistula and an investigation of the literature on this disease in Japan are reported here.

CASE REPORT

A 70-yr-old male was referred by a local hospital with complaints of urinary pain and pneumaturia. For approximately six months before admittance, the patient had noticed the same symptoms accompanied by moderate fever. He experi-

enced some lower abdominal pain, but his bowel habits had not changed. The patient had already been diagnosed with vesico-ileosigmoidal fistula as a result of a barium enema procedure. However, life-threatening ischemic heart disease did not permit surgical treatment at the time of diagnosis at a local hospital. During his first hospitalization, the patient had experienced the above-mentioned symptoms frequently, even as he was receiving conservative therapies. After treatment and recovery from his heart condition, he was admitted to our hospital for surgical treatment.

On admission, urinary tract infection and pneumaturia were presented. Except for heart disease, there were no abnormal findings during physical and blood examinations. A barium enema demonstrated the passage of contrast medium into the bladder and the small intestine. Furthermore, there were multiple diverticula in his sigmoid colon and poor dilatation of the sigmoid colon, which were assumed to be due to diverticulitis (Fig. 1). A colonoscopy revealed multiple diverticula in the sigmoid colon, however, there were no fistula, malignant tumors, or other abnormal findings. Retrograde cystography revealed neither the fistula from the bladder nor a bladder deformity. Cystoscopy revealed inflammation on the mucosal surface of the bladder; however, the fistula was not confirmed. Enhanced computed tomography did not enable to detect any

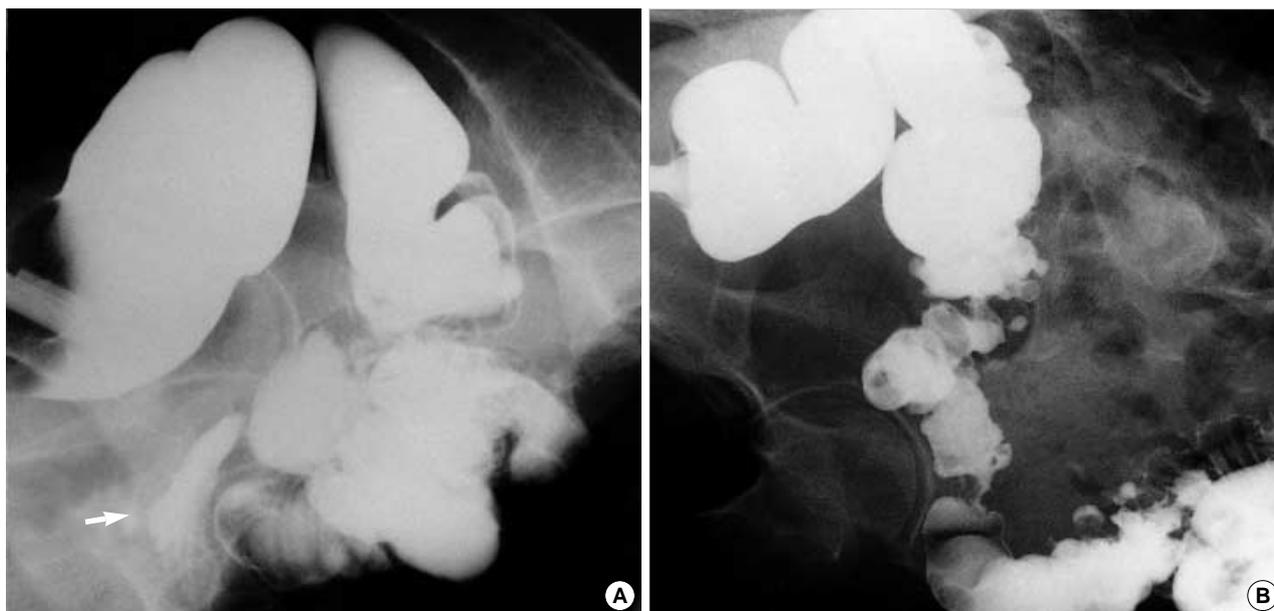


Fig. 1. (A) Barium enema examination shows a presence of barium in the bladder (arrow), but did not recognized in the small intestine. (B) Multiple diverticulum are shown in the sigmoid colon.

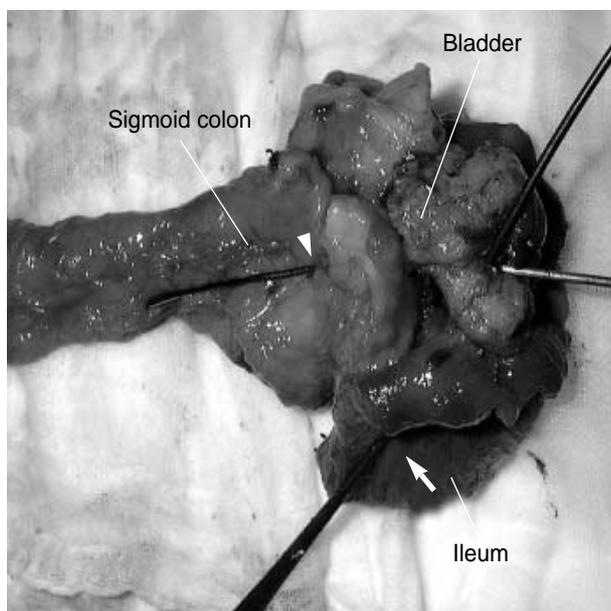


Fig. 2. Macroscopic finding of the resected specimen. Two fistulae are presented with probes, one is vesicosigmoidal fistula (arrow head) and the other is vesicoenteral fistula (arrow).

evidence of enterovesical fistula.

The diagnosis of a vesico-ileosigmoidal fistula due to diverticulitis of the sigmoid colon led to a surgical procedure. The sigmoid colon and ileum tightly adhered to the bladder and could not be safely dissected; however, a sigmoidectomy and partial resection of the ileum with partial cystectomy were performed. All of the diverticula were removed to protect the patient from a recurrence of the disease. The surgical speci-

men revealed two fistulas from the colon and ileum into the bladder (Fig. 2).

A histopathology revealed diverticulosis of the sigmoid colon with diverticulitis and development of a vesico-ileosigmoidal fistula. No malignant findings were recognized.

Following the surgery, the patient had no urinary tract symptoms and was discharged from the hospital in good condition. There have been no signs of recurrence in two years.

DISCUSSION

Diverticulosis of the colon, a common condition that occurs in 40% persons of age 60 yr and over, is primarily considered to be a disease of Western countries (7). Although the diet in Japan is becoming more westernized, i.e., with less fiber, diverticulosis is still relatively uncommon in Japan and other Asian countries (5). According to a recent report, the incidence of this disease in Japan is increasing at a remarkable rate, namely, 5.4% in 1970, 10.7% in 1985, and 29.4% in 1993-1997 (8-10). There is, however, a slight difference between the incidence of this disease in urban and suburban regions of Japan (9).

A large majority of patients with diverticulosis remain entirely asymptomatic. Complications of diverticulosis are diverticulitis, abscess formation, fistulas, massive bleeding, perforation, and obstruction. Colovesical fistula is known as one of the major complications of diverticulosis (11).

The actual cause of colovesical fistula is difficult to determine. Young-Fadok *et al.* reported that fistulas occur in 2% of patients with diverticular disease; however, among the patients receiving operation for diverticular disease, 20% have

Table 1. Presenting symptoms and signs in 173 patients with sigmoidovesical fistula

Symptoms/Signs	No. of patients (%)
Pneumaturia/Fecaluria	63.0%
Urinary tract infection	39.9%
Abdominal pain/fever	20.2%

Table 2. Diagnostic examination

Examination	No. of patients (%)
Barium enema	45.3%
Cystoscopy	23.2%
Retrograde cystography	11.6%
CT	8.4%
MRI	3.2%
Others	11.6%

CT: Computed tomography, MRI: Magnetic Resonance Imaging.

fistulas, 65% of which are colovesical (7). Most of the fistulas originate in the sigmoid colon, largely because of the high incidence of diverticulitis and carcinoma frequently found in the sigmoid colon. The major cause of the vesico-sigmoidal fistula is malignancy, followed by diverticulitis (1). In this series, literature was reviewed through 2000. A total of 173 cases of vesico-sigmoidal fistula caused by diverticulitis had been reported in Japan. The male-to-female ratio was 4.1:1, the same as that described in other studies. It has been suggested that the presence of the uterus affords protection against the development of colovesical fistulas in females. This condition occurs mainly in the sixth and seventh decades of life (average 61.2 yr), when it is related to the development of malignancy and diverticulitis, as it was in the case presented here. Reports indicate that the frequency of complicated diverticulitis ranges from 2.4% to 12.3% and only 1% of them undergo surgery in Japan (12, 13).

Pneumaturia and fecaluria are the most common symptoms (63.0% of the cases), which are distinct to this disease. They are followed by urinary tract infection, abdominal pain, and fever. Reports indicate that urologic symptoms are predominant because higher pressure in the colon explains the higher incidence of pneumaturia and fecaluria, rather than rectal micturition (2) (Table 1).

The consensus is that computed tomography is the best diagnostic study, with a sensitivity of 40% to 100% (4, 7). The procedure easily demonstrates a fistula by the presence of air in the bladder. The barium enema, also useful with a sensitivity of 20% to 62.5%, is important for the discovery of the underlying disease, such as diverticulosis, neoplasma, or fistulas. Cystoscopy, cystography, and magnetic resonance imaging are also useful. A colonoscopy is not very effective for revealing fistulas; however, the procedure is valuable for the detection of diverticulosis or a neoplasm. Although diverticulitis is one of the most common causes of enterovesical fis-

Table 3. Management of vesico-sigmoidal fistula

Therapeutic procedure	No. of patients (%)
Surgical procedure	
sigmoidectomy+partial cystectomy	70.0%
sigmoidectomy	7.0%
sigmoidectomy+partial resection of ileum+partial cystectomy	5.3%
two-stage operation	8.8%
others	3.5%
Conservative therapy	3.5%

tulas, colon malignancies and Crohn's disease can also cause the condition. A barium enema was useful for diagnosis in 45.3% of the cases, followed by cystoscopy (23.2%) and cystography (11.6%) (Table 2). When general surgeons encounter a patient with pneumaturia and/or fecaluria, a barium enema and computed tomography should be performed, and subsequent urological examinations are critical.

Treatment was undertaken depending on the etiology and clinical and general condition of the patient. Since a vesico-sigmoidal fistula seldom closes spontaneously (1), a surgical procedure is generally necessary. Recently, most patients have been treated by resection and primary anastomosis without a protective colostomy (single-stage operation) (14). Resection and primary anastomosis with colostomy and/or the Hartmann procedure (two-stage operation) are performed for patients in poor condition. The traditional three-stage operation is now seldom undertaken due to advances in intensive care and the development of antibiotics (4). Since the fistula tract is not obvious or associated with an abscess in most cases, surgical management of the bladder varies considerably. Urinary drainage alone, simple closure of the fistula, and partial or total cystectomy are undertaken depending on the condition of the fistula. Actually, partial cystectomy is sufficient to remove the fistula. In this series, 70% of patients with this disease received sigmoidectomy with partial cystectomy (Table 3).

In summary, a case of vesico-sigmoidal fistula due to diverticulitis of the sigmoid colon was presented along with a review of the literature in Japan. Depending on the condition of the patient, resection of the diseased sigmoid colon and partial cystectomy with primary anastomosis are the safest and most acceptable procedures leading to optimal results.

REFERENCES

1. Hsieh JH, Chen WS, Jiang JK, Lin TC, Hsu H. *Enterovesical fistula: 10 years experience. Clin Med J* 1997; 59: 283-8.
2. Vidal Sans J, Pradell Teigell J, Palou Redorta J, Villagrasa Serrano M, Banus Gassol JM. *Review of vesicointestinal fistulas: Diagnosis and management. Eur Urol* 1986; 12: 21-7.
3. Stollman NH, Raskin JB, AD Hoc. *Practice parameters committee of the American College of Gastroenterology: diagnosis and manage-*

- ment of diverticular disease of the colon in adults. *Am J Gastroenterol* 1999; 94: 3110-21.
4. Vasilevsky CA, Belliveau P, Trudel JL, Stein BL, Gordon PH. *Fistulas complicating diverticulitis. Int J Colorect Dis* 1998; 13: 57-60.
 5. Kanda H, Kise H, Hayashi N, Arima K, Yanagawa M, Kawamura J. *Vesicosigmoidal fistula possibly caused by colon diverticulitis: report of 2 cases. Jpn J Urol Surg* 2000; 13: 55-8. (in Japanese with English abstract)
 6. Rahman M, Tokunaga S, Ikeda D, Yokoyama O, Ohkawa M, Fujita H, Nishimura G. *Colo-vesical fistula due to sigmoid colon diverticulitis: a case report. Acta Urol Jpn* 1995; 41: 231-4.
 7. Young-Fadok TM, Roberts PL, Spencer MP, Wolff BG. *Colonic diverticular disease. Curr Probl Surg* 2000; 37: 457-514.
 8. Kudo A, Ishikawa J, Maeda Y, Kida T, Yamada K, Shimosegawa T. *Clinical studies on diverticular disease of the colon. Jpn J Med* 1983; 22: 185-9.
 9. Nakada I, Ubukata H, Goto Y, Watanabe Y, Sato S, Tabuchi T, Soma T, Umeda K. *Diverticular disease of the colon at a regional general hospital in Japan. Dis Colon Rectum* 1995; 38: 755-9.
 10. Miura S, Kodaira S, Shatari T, Nishioka M, Hosoda Y, Hisa TK. *Recent trends in diverticulosis of the right colon in Japan: retrospective review in a regional hospital. Dis Colon Rectum* 2000; 43: 1383-9.
 11. Wong SK, Ho YH, Leong AP, Seow-Choen F. *Clinical behavior of complicated right-sided and left-sided diverticulosis. Dis Colon Rectum* 1997; 40: 344-8.
 12. Kubo A, Kagaya T, Nakagawa H. *Studies on complications of diverticular disease of the colon. Jpn J Med* 1985; 24: 39-43.
 13. Sugihara K. *Diverticular disease of the colon in Japan. Ann Acad Med Singapore* 1987; 16: 504-8.
 14. Wedell J, Banzhaf G, Chaoui R, Fischer R, Reichmann J. *Surgical management of complicated colonic diverticulitis. Br J Surg* 1997; 84: 380-3.