Clinical Implications of Small Bowel Diverticula

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Abstract

Background: Small bowel diverticula are usually asymptomatic and rare. Their importance is based on the fact that they carry the risk of serious complications.

Objective: To study the implications and the therapeutic approach regarding small bowel diverticulosis.

Methods: The medical records of 54 patients with diverticular disease of the small bowel, including Meckel's and duodenum diverticula, were retrospectively reviewed. The mean age of the 32 male and 22 female patients was 53.2 years.

Results: Diverticula were found in the duodenum in 11 cases, in the jejunum and ileum in 21 cases, and with Meckel's diverticula in 22 cases. In 24% of the patients the diverticula were multiple. The most common clinical symptom was abdominal pain, in 44.4%. Most of the duodenum diverticula were asymptomatic; 47.6% of the patients with diverticular disease located in the jejunum and ileum presented with chronic symptoms. The overall diagnostic rate for symptomatic diverticula before surgery was 52.7%; in 33.3% diverticula were found incidentally during other diagnostic or therapeutic procedures. Forty-one patients were managed surgically: 15 patients were operated on urgently because of infection or rupture, 4 patients for bleeding, 5 patients for intestinal obstruction, and one patient for jaundice.

Conclusions: The incidence of asymptomatic small bowel diverticula is difficult to ascertain. Patients with Meckel's and duodenal diverticula are usually asymptomatic, while the majority of jejunal and ileal diverticula patients present with chronic symptoms. The preoperative diagnostic rate is higher for duodenal diverticula. Small bowel diverticula do not require surgical treatment unless refractory symptoms or complications occur.

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Small bowel diverticula may be congenital or acquired. The only congenital form is Meckel's diverticulum, which is a true diverticulum and is located on the antimesenteric border of the small bowel within 40–80 cm of the ileocecal valve [1]. In contrast, acquired or false diverticula of the small bowel are lesions consisting of mucosa, submucosa, and serosa without a tunica muscularis [2]. Soemmering and Baillie first described small bowel diverticula in 1794, and Cooper in 1907 was the first to report the same lesion at autopsy [3]. In 1920, Case succeeded in visualizing SBD radiographically, and one year later Hunt and Cook successfully resected their first diverticulum [4]. Diverticula are usually asymptomatic and rare, however when they become symptomatic they may appear with no specific symptoms. The management of these rare conditions is a challenge for clinicians.

SBD = small bowel diverticula

We report our retrospective study of 54 patients with diverticular disease of small intestine treated in our department.

Patients and Methods

The medical records of 54 patients with diverticular disease of the small bowel were retrospectively reviewed from 1980 to 2000. The study group included both acquired and congenital diverticula from the duodenum to the ileum. The mean age of the patients, 32 males and 22 females, was 53.2 years (range 16–87). The clinical presentation, diagnostic method, number and site of the diverticula, treatment, and postoperative complications were evaluated. Histopathologic examination revealed that all surgical specimens, except for Meckel's diverticulum, were composed only of mucosal and submucosal layers and lacked a muscular layer.

Results

The clinical data of patients with small bowel diverticular disease are shown in Table 1. There were 11 cases with diverticula located in the duodenum, 21 in the jejunum and ileum, and 22 Meckel's diverticula. In 13 of the 54 patients (24%) the diverticula were

Table 1. Clinical data of patients with small bowel diverticular disease

	Duodenum	Jejunum and ileum	Meckel's diverticula
Age (mean)	36–69 (58)	30–87 (67.2)	16–32 (22)
Gender			
Male	8	9	15
Female	3	12	7
Solitary	11	8	22
Multiple	–	13	–
Symptoms			
Abdominal pain	2	6	8
Fever	1	4	5
Abdominal discomfort and dyspepsia	–	9	–
Diarrhea	–	1	–
Obstruction	–	–	5
Bleeding	–	2	2
Jaundice	1	–	–
Asymptomatic	8	3	7
Surgical treatment			
Bowel resection	–	17	12
Diverticulectomy	2	–	10
Conservative	9	4	–
Total no. of cases	11	21	22

multiple and were located in the jejunum and ileum. The most common clinical presentation in patients with symptomatic diverticula was abdominal pain (44.4%), while 8 of 11 duodenal diverticulum cases (72.7%) were asymptomatic and revealed incidentally. Nine patients with diverticular disease located in the jejunum and ileum presented chronic symptoms such as abdominal discomfort and dyspepsia, and one patient had malabsorption due to blind loop syndrome. In this patient the diagnosis of malabsorption was made during evaluation of megaloblastic anemia due to vitamin B12 deficiency. His condition improved after treatment with broad-spectrum enteral antibiotics.

The accurate diagnostic rate for symptomatic diverticula before surgery was 52.7% [Table 2]. Eighteen cases of diverticula (33.3%) were found incidentally during other diagnostic or therapeutic procedures. Duodenal diverticula were diagnosed incidentally in most cases (72.7%); one case with obstructive jaundice was diagnosed by endoscopic retrograde cholangiopancreatography and two symptomatic cases by upper gastrointestinal barium study. Meckel's diverticulum that presented as intestinal obstruction was diagnosed by computerized tomography scan in four of five cases, and bleeding in two cases was diagnosed by a red blood cell nuclear scan. In 8 of 10 patients with diverticula in jejunum and ileum, enteroclysis proved the gold standard for preoperative diagnosis, with a diagnostic rate of 80% [Table 2].

In 11 cases diverticulosis was an incidental finding during laparotomy for other reasons and no surgical procedure was performed. One patient with duodenal diverticulitis and another with malabsorption were treated conservatively. Forty-one patients were managed surgically; all of the Meckel's diverticula were treated surgically. Twenty-five patients were operated on urgently for diverticulitis (11 cases), rupture (4 cases), lower gastrointestinal bleeding (4 cases), intestinal obstruction (5 cases), and jaundice (1 case). Meckel's diverticulum was the most common cause for emergency operation in 15 of 25 patients. Segmental small bowel resection and end-to-end anastomosis was performed in 29 cases, while diverticulectomy was performed in 12 cases [Table 1]. Wound infection and pneumonia were the only postoperative complications, and one patient died due to myocardial infarction. Patients treated for symptomatic diverticulosis by elective or emergency operation were symptom-free during a follow-up of 1–15 years. No problems of "short bowel" developed in patients who underwent significant resection of the small bowel.

Table 2. Preoperative and operative diagnosis of small bowel diverticular disease

	Duodenal	Jejunal	Ileal	Jejunal and Ileal	Meckel's
Incidental findings	8	2	–	1	7
Emergency operation	–	3	3	2	9
Enteroclysis	–	6	2	–	–
^{99m}Tc-bleeding scan	–	1	–	–	2
Arteriography	–	1	–	–	
CT scan	–	–	–	–	4
ERCP	1	–	–	–	–
Upper GI barium study	2	–	–	–	
Total	11	13	5	3	22

ERCP = endoscopic retrograde cholangiopancreatography, GI = gastrointestinal

Discussion

The actual incidence of small bowel diverticulosis is difficult to ascertain for several reasons. It is likely that many clinicians do not document the presence of these lesions simply because little clinical significance has been attributed to them. Their importance is based on the fact that they carry the risk of serious complications such as infection, hemorrhage or intestinal obstruction [5]. In our study, diverticula in the jejunum and the ileum usually presented in elderly patients as abdominal discomfort and dyspepsia, while abdominal pain was the most common symptom. In contrast, duodenal diverticula were usually revealed incidentally, and Meckel's diverticula usually presented in young patients as acute abdominal pain or intestinal obstruction and bleeding. All these findings are in accordance with other reports [6,7].

Since small bowel diverticula protrude through the entry points of the mesenteric veins, they lie between the leaves of the mesentery and are thus difficult to locate during abdominal exploration [8]. The predominance of small bowel diverticula in the jejunum is attributed to the greater diameter of the penetrating jejunal arteries [8]. In our study, 61.9% occurred in the jejunum, 23.8% in the ileum, and 14.3% in both. In 24% of our cases the SBD were multiple. Our findings regarding the age and gender of patients concurred with other reports [9].

The specific diagnosis of SBD is possible by radiologic contrast studies using various forms of barium [10–12]. The radiologic technique of enteroclysis is specific for the jejunum and the ileum, and the barium meal for the duodenum [12]. Preoperative diagnosis by enteroclysis was reached in 80% of patients with chronic symptoms. Lesions bleeding at the time of investigation can be identified either by a ^{99m}Tc-bleeding scan, or by arteriography if blood loss is greater than 1–2 ml/minute [13]. In our series, the diagnosis of hemorrhage was established by bleeding scan in three patients and by mesenteric arteriography in another. Even though the overall diagnostic rate preoperatively was 52.7%, the diagnostic rate in symptomatic cases with diverticula was 100% for duodenal diverticula, 55.5% for jejunal and ileal diverticula, and 40% for Meckel's diverticula.

Complications occur in 15% of SBD cases [14,15]. The most frequent complication is infection or perforation with clinical symptoms similar to those of other intraperitoneal infections. In our study, this occurred in jejunum and ileum (28.6%), duodenum (11.1%), and Meckel's diverticula (36.3%). All were successfully managed by surgery. Four of our patients (7.4%) presented with rectal bleeding. Surgical management is recommended for complications of SBD. When complications of jejunal or ileal diverticula occur, partial enterectomy and primary anastomosis should be performed [6,9]. It is reasonable to conclude that asymptomatic diverticula incidentally discovered on routine contrast studies or at laparotomy do not need resection [6]. However, other authors have suggested that surgical treatment is indicated for the incidental

large diverticula with dilated hypertrophied bowel loops that represent a progressive form of the disease [16]. We did not operate on asymptomatic diverticula of duodenum, jejunum and ileum that were incidentally discovered, but did resect Meckel's diverticula that were found incidentally during other surgical procedures. Diverticulectomy by wedge excision was the operative technique of choice and no complications or mortality occurred. This supports aggressive resection of Meckel's diverticulum when it is found incidentally during another operation.

In conclusion, the incidence of asymptomatic small bowel diverticula is difficult to ascertain. Most of Meckel's and duodenal diverticula are asymptomatic, while the majority of symptomatic patients with diverticula located in the jejunum and ileum present with abdominal discomfort and pain. The preoperative diagnostic rate in symptomatic patients is higher for duodenal diverticula. Enteroclysis is the preferred diagnostic method before surgery in jejunal and ileal diverticula. Surgical treatment is required for complications of small bowel diverticula and is recommended for refractory symptoms. With operative intervention the outcome is generally favorable.

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