

Diverticular Disease of the Colon in Korea

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This study is designed to determine the relative prevalence and characteristics of diverticular disease of the colon in Korea. We did a retrospective evaluation of 16,964 consecutive barium enemas performed at Koryo General Hospital between January 1971 and October 1986, and found 100 patients with diverticular disease of the colon.

The results are as follows;

1) Colonic diverticula were found in 100 patients, and incidence of 0.59% in 16,964 consecutive barium enemas. The male to female ratio was 2.1 : 1.

2) Incidence rose with advancing age from 0.45% in the second decade to 2.5% in the seventh decade.

3) Patient age ranged from 19 to 77 years with more than 70% of the patients in the 5th, 6th and 7th decades.

4) The greater majority (81%) of the diverticular disease the right colon.

5) Fifty percent of the cases were classified as multiple diverticula.

6) The mean age of patients with right sided diverticula was 47.5 years and that of patients with left sided diverticula was 57.7 years. The mean age of single diverticular patients was 50.4 years and that of multiple diverticular patients was 48.4 year.

7) Associated diseases were hemorrhoids (18%), gall stones (12%) and previous appendectomy (11%). Among the 29 patients who had hemorrhoids and or a previous appendectomy, 28 of those had right sided diverticula.

Key Words: Colon, Diverticula, Barium enema

INTRODUCTION

Diverticular disease of the colon is seldom encountered in Korea: when it occurs, the site more often is in the proximal rather than the distal segments of the colon.

Two types of diverticula of the colon are generally recognized acquired and congenital.

The acquired type is a pseudodiverticulum containing only mucosa and submucosa in the walls¹⁻⁴⁾. It is extremely common in developed Western societies, wherein its prevalence is strikingly correlated with age^{5,6)}, and it may be thought of as a result of the degenerative process. These diverticula involve mainly in sigmoid and descend-

ing colons.

Congenital, or true, diverticula contain all of the layers of bowel wall. This type occurs most frequently in the cecum and ascending colon and is usually solitary. The fact that there is no increase in the incidence of these diverticula as age increases tends to confirm the opinion that they are congenital in origin. These diverticula may be encountered in the Orient including Korea and Japan⁷⁻¹¹⁾.

This study is designed to determine the relative prevalence and characteristics of diverticular disease of the colon in Korea. In this context we reviewed the patients who presented with colonic diverticular disease at the Koryo General hospital between January 1971 and October 1986 inclusive.

METHODS AND MATERIALS

We did a retrospective evaluation of 16,964 consecutive barium enemas performed at Koryo

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General Hospital between January 1971 and October 1986 and found 100 patients with diverticular disease of the colon. We grouped these patients according to single or multiple diverticula: Fifty patients exhibited only one diverticulum, while the other 50 patients had two or more. The patients were also classified into 85 patients with right sided diverticula and 19 patients with left sided diverticula. The right sided diverticula involved the cecum, ascending colon, and transverse colon, whereas the left sided diverticula affected the sigmoid and descending colon.

Patients with multiple diverticula in the cecum and descending colon (1 case), in the ascending and descending colon (1 case), and the entire colon (2 cases) were included both right and left sided diverticular categories.

RESULTS

1. Incidence

Colonic diverticula were found in 100 patients, an incidence of 0.59% in 16,964 consecutive barium enemas. The incidence of diverticular disease of the colon was 0.24% between 1971 and 1975, 0.6% between 1976 and 1980, and 0.67% between 1981 and 1985.

The rate of incidence has tended to rise recently, especially in 1983, 1985 and 1986 when the incidence was greater than 1% (Table 1).

Incidence also rose according with advancing age from 0.45% in the second decade to 2.5% in the seventh decade. But the incidence in the eighth decade was only 0.61% (Fig. 1).

2. Age and Sex (Table 2)

Of the 100 patients 68 were male and 32 female (an approximate ratio 2.1:1). The youngest man to present with diverticular disease was 19, and the

eldest was 68 years. The youngest woman was 27, and the eldest was 77 years. Over 70% of the patients were more than 40 years of age when they were first detected as patients with diverticular disease of the colon by barium enema.

3. Distribution of Colonic Diverticula

(Table 3 and Fig. 2)

Right sided diverticula of the colon were involved in 85 (81.7%) cases (cecum 27, ascending colon 41, transverse colon 2, cecum and ascending colon 11, cecum and descending colon 1, ascending and descending colon 1 and entire colon 2). There were 19 cases (18.3%) of left side diverticula including 9 cases of sigmoid colon, 6 of descending colon, 2 of the entire colon, 1 of cecum and descending colon, and 1 of both ascending and descending colon. The ratio of

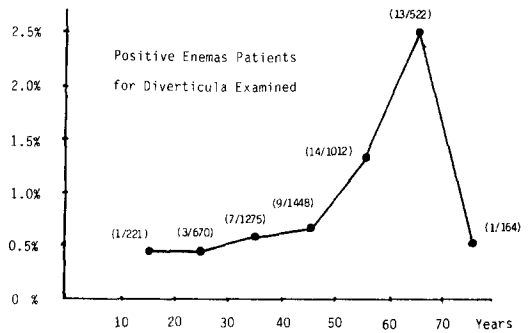


Fig. 1. The incidence of diverticular disease of the colon as diagnosed by a barium enema series according to age group between January 1982 and October 1986.

Table 1. The Incidence of Colonic Diverticular Disease by Year Groups

Year groups	Mean patient age	Number of patients	Number of barium enemas	%
1971 - 1975	49.0	10	4,197	0.24%
1976 - 1980	46.0	38	6,437	0.60%
1981 - 1985	52.5	35	5,212	0.67%
1986 -	50.1	17	1,118	1.52%
Total	49.4	100	16,964	0.59%

Table 2. Age and Sex Distribution of Colonic Diverticular Disease

Age-group (years)	Number of patients		
	Male	Female	Total (%)
Under 19	1	0	1 (1)
20 - 29	5	1	6 (6)
30 - 39	12	3	15 (15)
40 - 49	21	3	24 (24)
50 - 59	20	11	31 (31)
60 - 69	9	12	21 (21)
Over 70	0	2	2 (2)
Total	68	32	100 (100)

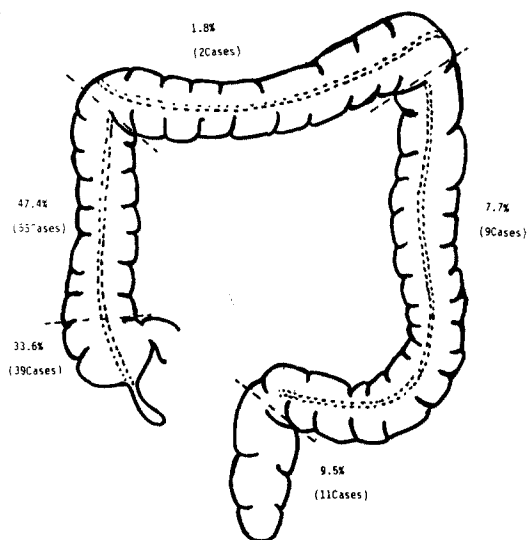


Fig. 2. The approximate distribution of diverticula in the colons of 100 patients.

Table 3. Anatomic Distribution of Colonic Diverticula in 100 Patients

Site	Number of patients (%)
Cecum	27 (27)
Ascending colon	41 (41)
Transverse colon	2 (2)
Cecum and ascending colon	11 (11)
Sigmoid	9 (9)
Descending colon	6 (6)
Cecum and descending colon	1 (1)
Ascending and descending colon	1 (1)
Entire colon	2 (2)
Total	100 (100)

right to left sided diverticula was approximately 4:7:1. The mean age of patients presenting a right sided diverticula was 48.1 and that of left sided diverticula was 57.7 years. The patients with left sided diverticula were older than patients with diverticula of the right colon by 9.6 years.

4. Patient's Age in Relation to Number of Diverticulum (Table 4)

Fifty percent of the patients (50 cases) presented with multiple diverticula. The average age of the patients with single diverticulum was 50.4 years and that of patients with multiple diverticula was 48.4 years. There was no significant difference.

5. Associated Disease in Patients with Colonic Diverticula (Tables 5 and 6)

There were 18 patients associated with hemorrhoids, 12 with gall stones, 11 with previous appendectomies, 3 with ischemic heart disease, and 3 with colon cancer. Five patients (5%) presented a diverticulum other than colon (duodenum 4, urinary bladder 1, renal calyx 1) and 5 patients (5%) had a polyp (stomach 1, rectum 2, larynx 1, vocal cord 1).

Of the 18 patients associated with hemorrhoids, 17 of those had right sided diverticula of the colon. All 11 patients associated with a previous appendectomy had right sided diverticula. In the 12 patients associated with gall stones, 6 presented with right sided diverticula, and 6 with left sided diverticula.

DISCUSSION

Some of the first observations of diverticulosis date back to Friend¹²⁾ in 1731 and Matthew Baillie¹³⁾ in 1793.

The frequency of diverticular disease of the

Table 4. Age and Site of Colonic Involvement according to the Number of Diverticula

	Right colon (n=85) ¹⁾		Left colon (n=19) ²⁾	
	Single diverticulum	Multiple diverticula	Single diverticulum	Multiple diverticula
Mean age (years)	48.8	47.4	57.8	57.6
Number of patients (%)	41 (39.4)	44 (42.3)	9 (8.7)	10 (9.6)

1) Cecum 27, ascending colon 41, transverse colon 2, cecum and ascending colon 11, cecum and descending colon 1, ascending and descending colon 1, entire colon 2

2) Sigmoid 9, descending colon 6, cecum and descending colon 1, ascending and descending colon 1, entire colon 2

Table 5. Associated Diseases in 100 Patients with Colonic Diverticula

Associated disease	Number of patients (%)
Hemorrhoids	18 (18)
GB stone	12 (12)
Previous appendectomy	11 (11)
Ischemic heart disease	3 (3)
Colon cancer	3 (3)
Other site diverticulum ¹⁾	5 (5)
Others ²⁾	8 (8)

1) : Duodenum 4, urinary bladder 1, renal calyx 1

2) : Polyp 5 (stomach 1, rectum 2, larynx 1, vocal cord 1), hepatoma 1, aortic aneurysm 1, bronchogenic cancer 1

Table 6. Sites of Diverticula according to Associated Diseases

Associates disease	Right colon	Left colon	Total number
Hemorrhoids	17	1	18
Appendectomy	11	0	11
GB stone	6	6	12
Polyp	4	1	5
Other site diverticulum	3	2	5

colon is strikingly correlated to advancing age,^{5,6)} also varies by time cohort and by national origin or cultural background. In the United Kingdom, the United States, and Australia, its prevalence in autopsy has risen since 1910 from 5 percent to 59 percent^{4,5)}.

Mayo et al.¹⁴⁾ reported that the incidence of diverticular disease of the colon was 5.7% in the barium enema series in 1930. In 1967 Manousos et al.¹⁵⁾ reported the incidence of diverticular disease in patients under the age of 60 years as 7.6% and over the age of 60 years as 35% as determined by a barium enema series.

According to several reports, diverticular disease of the colon is very rare disease in Korea. Recently the incidence of diverticular disease in Korea was reported to be 2.5% by Chung et al.¹⁰⁾, 3.2% by Sohn et al.¹⁶⁾, and 5.5% by Kim et al.⁹⁾, with an ever increasing rate.

In this study of 16,964 consecutive barium enemas, the incidence of diverticular disease was 0.55%, which was even lower than other previous-

ly reported Korean results^{9,10,16)}. But in 1983, 1985 and 1986 the incidence increased to greater than 1% which was much higher than the 0.55% over all rate of our results. Between 1982 and 1986 the rate of incidence with age from 0.45% in the second decade to 2.5% in the seventh. However the incidence in the eighth decade was 0.61%, although there were not enough cases to accurately analyze the exact incidence. Data prior to 1982 was not available for evaluation of incidence according to age group.

There are two types of diverticula of the colon. The acquired type is defined as false diverticulum containing only mucosa and submucosa in the wall¹⁻⁴⁾. Its prevalence is strikingly correlated with age, and it may be thought of as a result of the degenerative process^{5,6)}. These diverticula are involved mainly in sigmoid and descending colon.

The congenital, or true, diverticula contain all of the layers of bowel wall. This type occurs most frequently in the cecum and ascending colon. The average age of patients with right sided diverticular is less than that of patients with diverticula of the left colon.

The average age of the patients with diverticulosis of left colon was reported by Pemberton and his associates¹⁷⁾ as 54 years and Rodkey and Welch¹⁸⁾ as 63 years. In Korea the average age of patients with diverticular disease of the colon was documented by Chung et al.¹⁰⁾ as 49.5 years, and by Kim et al.⁹⁾ as 46.5 years.

In this study the average ages of the patients with right and left sided diverticula were 48.1 and 57.7 years respectively (the over all mean age:49.4 years). The average age of the patients with right sided diverticula was less than that of patients with diverticula of the left colon by 9.6 years. The ratio of right to left sided diverticula in this study was 4.7:1. This result suggests that left side diverticula are developed due to degenerative process, but right sided diverticula, which is more common in Korea is due to a congenital origin. The average age of patients with single diverticulum was 50.4 years and that of patients with multiple diverticula of the colon was 49.4 years. There was no age difference between single and multiple diverticula of the colon.

The location of colonic diverticula in developed Western countries is largely in the distal colon, especially the sigmoid colon, but in the Orient where the right sided diverticula accounts for more than 60% of the cases¹⁹⁻²²⁾, it is in the

proximal colon. Right sided diverticula accounted for 81% of this study. The differences between Western countries and Korea are thought to be due to national origin, cultural background, or other factors not yet elucidated.

Patients with colonic diverticula disease have a statistically significant increase in the frequency of gall stones, ischemic heart disease, varicose veins, hemorrhoids, colon cancer and previous appendectomy²³⁻²⁵. In our study the associated diseases were hemorrhoids (18%), gall stones (12%), previous appendectomy (11%), diverticulum other than colon (5%), and others (8%), but none were associated with varicose veins or hiatal hernias. All 11 patients with a previous appendectomy had right sided diverticula, and the average age of the patients was 51.6 years.

Of the 18 patients associated with hemorrhoids, 17 had right sided diverticula and an average age of 50.2 years. It is thought that a prior appendectomy and hemorrhoids are strongly related to the development of right sided diverticula of the colon in Korea. 12 patients with gall stones had both right and left sided diverticula.

Diverticulosis in Korea is quite different from that of the developed Western countries, but that there was a significantly high frequency of right sided diverticula in Korea. Thus it is necessary to further study and elucidate the differences between Western countries and Korea.

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