Three decades of gastroenterology in Soweto South Africa: from descriptive to scientific observations

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Chapter 3

The Distributional Pattern of Diverticular Disease

Segal I, Leibowitz B

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Summary
In Western communities diverticular disease occurs mainly in the sigmoid colon. This contrasts with Oriental populations, in which diverticula occur mainly in the right colon. Diverticular disease has recently emerged in black South Africans. This study shows that diverticula in this population occurs predominantly in the descending colon. The variable anatomic distribution of diverticula in different ethnic groups implies that fiber deficiency is not the only factor responsible for this condition. It is suggested that diverticular disease may comprise several entities with different causes.

Introduction
Diverticular disease has recently emerged as a definite entity among black South Africans. The sex and age distribution is similar to that of Western series. The major clinical presentation is rectal bleeding. Recent reports on the anatomic distribution of diverticula in Orientals, prompted the authors to study the sites of diverticula in blacks.

Background
Baragwanath Hospital, with 2740 beds, is the largest in the southern hemisphere. It serves the population of Soweto (approximately 2.5 million).

Definition
Because symptoms and radiographic findings do not always distinguish between diverticulosis and diverticulitis, the more general term, diverticular disease of the colon, is used.

Patients and Methods
Diverticular disease was diagnosed by barium-enema studies in 94 patients during a nine-year period. In addition, sigmoidoscopy, colonoscopy, or both were done as part of the routine work-up of the patients. The major indications for barium studies were: rectal bleeding, 36 percent; abdominal pain, 14 percent; abdominal mass, 14 percent; and iron-deficiency anemia, 8.5 percent (Table 1). Acute diverticulitis with pericolic abscess occurred in four patients.
The barium enemas of the patients were reviewed to determine the anatomic distribution of the diverticula. Isolated diverticula, i.e., less than three diverticula per patient were excluded from the assessment. Regions were divided into cecum, ascending colon, transverse colon, descending colon, and sigmoid colon. The splenic flexure was used as a dividing point between the left and right colons. Right-sided diverticulosis therefore refers to diverticular disease affecting the cecum, ascending colon, and transverse colon, either singly or in combination. Left-sided diverticulosis refers to diverticular disease affecting the descending colon and sigmoid colon.

**Result**

There were 53 women and 41 men studied (F:M = 1.3:1). The mean age was 58.9 years (range, 32 to 90 years). The distributional pattern of diverticular disease in the 94 patients showed that the descending colon was the site of predilection (Table 2).

In 19 patients (20.2 percent) it was the only site and in a further 45 patients (47.9 percent) diverticula occurred in the descending colon in combination with other subsites. Thus, 64 patients (68.1 percent) had diverticula in this region. The next most common site was the sigmoid colon. Forty-five patients (47.9 percent) had diverticula in this area (Table 1). The difference between the two sites was statistically significant (P < .01).

Left-sided diverticular disease (43.6 percent) was significantly more common than right-sided disease (12.8 percent) (P < .01) (Table 3). Total colonic involvement was present in 12 patients (12.8 percent).
Table 2: Diverticular Disease: Common Subsite and Subsites

<table>
<thead>
<tr>
<th>Subsites</th>
<th>No. Patients</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descending colon only</td>
<td>19</td>
<td>20.2</td>
</tr>
<tr>
<td>Sigmoid colon only</td>
<td>12</td>
<td>12.8</td>
</tr>
<tr>
<td>Total colonic involvement</td>
<td>12</td>
<td>12.8</td>
</tr>
<tr>
<td>Sigmoid and descending colon</td>
<td>10</td>
<td>10.6</td>
</tr>
<tr>
<td>Descending and transverse colon</td>
<td>7</td>
<td>7.5</td>
</tr>
<tr>
<td>Ascending colon only</td>
<td>6</td>
<td>6.4</td>
</tr>
<tr>
<td>Descending, transverse, and ascending colon</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Descending and ascending colon</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Transverse colon only</td>
<td>3</td>
<td>3.2</td>
</tr>
<tr>
<td>Other combinations*</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94</strong></td>
<td></td>
</tr>
</tbody>
</table>

*In "other combinations" the descending colon was involved in 6 patients, and the sigmoid colon in 11 patients. Thus, involvement of the descending colon occurred in 64 patients (68.1 percent). Next most site was the sigmoid-45 patients (47.9 percent) P < 0.01.

Table 3: Number of Patients with Left-sided, Right-sided, and Total Colonic Involvement

<table>
<thead>
<tr>
<th>Subsites</th>
<th>No. Patients</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left-sided diverticular disease only</td>
<td>41</td>
<td>43.6</td>
</tr>
<tr>
<td>Right-sided diverticular disease only</td>
<td>12</td>
<td>12.8</td>
</tr>
<tr>
<td>Left- and right-sided diverticular disease</td>
<td>29</td>
<td>30.9</td>
</tr>
<tr>
<td><strong>Total colonic involvement</strong></td>
<td><strong>12</strong></td>
<td><strong>12.8</strong></td>
</tr>
</tbody>
</table>

The left colon was involved in 87.3 percent patients. The right colon was involved in 56.5 percent patients.

The common subsite combinations were: sigmoid and descending colon (10.6 percent patients); descending and transverse colon (7.5 percent patients); descending, transverse, and ascending colon (5.3 percent patients), and descending and ascending colon (5.3 percent patients) (Table 2).

The rarity of diverticular disease in the black population of South Africa is well documented. It is noteworthy, however, that the classic presentation of acute diverticulitis is rare; only four patients (4.3 percent) who manifested with this condition required surgical treatment.

Discussion

It is clear that most diverticula in black patients occurred in the left colon, with the site of predilection being the descending colon. This contrasts with the distribution of diverticula in both Oriental and Western populations. Thus, diverticular disease affects predominantly the
right colon in Japanese, Thais, Chinese in Hawaii, and Chinese, Malays, and Indians in Singapore, whereas the most common site of diverticula in western populations is the sigmoid colon, which is involved in 95 percent of patients. The reason for this variation in anatomic discrepancy is unknown.

Painter's etiologic hypothesis is based on deficiency and is consistent with the physiology of the colon. Thus, feces arrive at the cecum in a fluid or semifluid state (chyme) and become more concentrated as they move distally. Approximately 100 to 500 ml of chyme pass through the ileocecal valve into the large intestine daily. Most of the water and electrolytes are absorbed in the colon, leaving less than 100 ml of fluid to be excreted in the feces.

Essentially all the absorption in the large intestine occurs in the proximal half of the colon. Thus, the fluid contents of the colon are converted to semisolid feces by the absorption of water. The lack of dietary fiber residue results in a viscous stool. If the colon must propel feces of abnormally high viscosity, it leads to a high colonic intraluminal pressure, sustained bowel contraction, and consequent diverticular outpouching. This pathogenesis may well apply to Western population groups. This fiber-deficient hypothesis, however, does not explain diverticula that form in the right side of the colon, because feces are usually not viscous in this region. The predilection for the descending colon in blacks is still inconsistent with this hypothesis, because feces are not maximally formed in this region. Furthermore, it is also important to note that African blacks commonly have a large redundant sigmoid colon, the role of which in the distributional pattern of diverticula has yet to be established.

There is no doubt that the epidemiology of diverticular disease in Western populations is consistent with a fiber deficient diet. The different distribution in other populations, however, suggests that diverticular disease may well comprise several entities with different causes.

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References