An investigation into the relationship between cigarette smoking and diverticular disease of the colon

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ABSTRACT: A retrospective study was conducted to determine the relationship between cigarette smoking and diverticular disease of the colon. One hundred and two patients undergoing barium enema were assessed for diverticular disease and smoking history. No significant positive association between smoking and diverticular disease was found. **Can J Gastroenterol 1990;4(5):193-195**

Key Words: *Barium enema, Diverticular disease, Smoking*

Tabagisme et diverticulose

RESUME: Une étude rétrospective a été effectuée afin de déterminer le rapport existant entre l'usage de la cigarette et la diverticulose. Cent-deux patients ont été interrogés sur leur mode de vie et ont subi un lavement baryté visant à révéler la présence de diverticules. Aucune association significative n'a été établie entre le tabagisme et la diverticulose.

DIVERTICULAR DISEASE IS A COMMON condition especially in the older population, occurring in more than 35% of persons over the age of 65 (1). The prevalence of diverticular disease is much higher in the western world and in certain ethnic groups, and increases with age (2-4).

The causes of diverticular disease are complicated. However, pressure changes in response to eating or neuropharmacologic cholinergic stimuli are generally accepted as responsible for the eventual herniation of mucosa through breaks in the muscle at the site of penetration by small arteries, with the formation of typical diverticular sacs (4).

Tobacco smoking has been implicated as a factor in the pathogenesis of several gastrointestinal diseases (5,6), although no studies have looked at its relationship to diverticular disease.

It was hypothesized that cigarette smoking, through nicotine, could increase the colonic intraluminal pressure and thus contribute to the development of diverticula. Nicotine, a significant constituent of cigarettes, stimulates contractile activity of the distal descending colon (7) and can be sufficiently forceful to cause defecation in unanesthetized animals (8). Smoking has also been shown to increase intestinal motility in humans (9).

An alternative mechanism proposed was through vascular compromise as a result of arteriosclerosis. Diverticular disease and arteriosclerosis are as-

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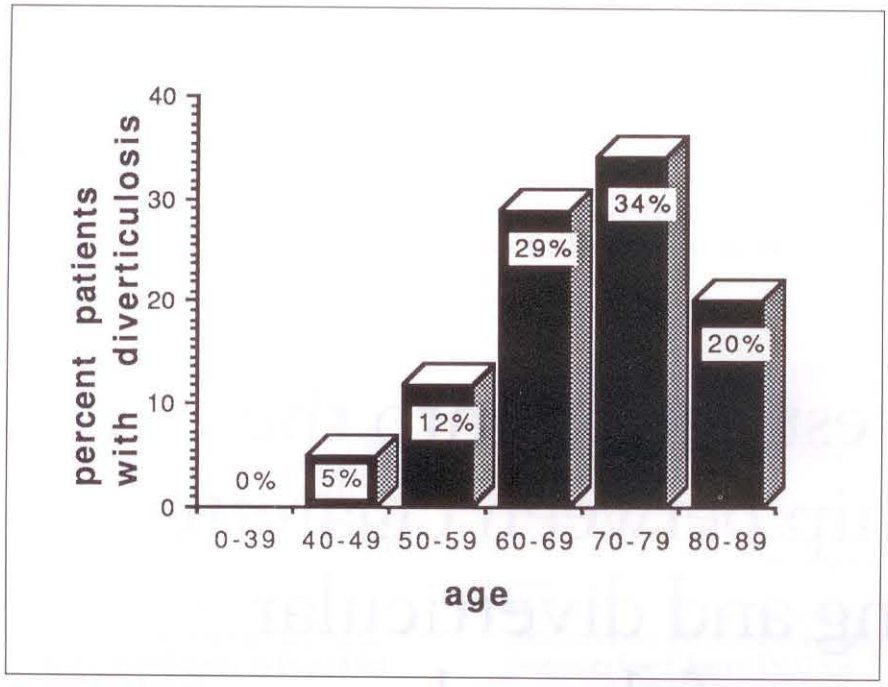

Figure 1) *Prevalence of diverticular disease with age in 41 patients*

TABLE 1
The number and percentage of smokers and nonsmokers with and without diverticula

	Smokers	Nonsmokers	Total
Diverticula present	27 (66%)	14 (34%)	41
Diverticula absent	40 (66%)	21 (34%)	61
Total patients	67 (66%)	35 (34%)	102

sociated in that they have the same geographic distribution, and both affect the older age group (10).

PATIENTS AND METHODS

All patients who were referred to a hospital radiology department for outpatient barium enemas over a four month period were chosen for entry into a retrospective study. Of the 200 patients contacted, 102 patients supplied complete and reliable smoking histories and were thus included.

The smoking data obtained was organized into a 'pack-year' system. 'One pack-year' was defined as one package a day for one year. Nonsmokers were defined as patients who had never smoked cigarettes.

The barium enemas were performed by double contrast technique and were reviewed by one radiologist who was not aware of the smoking histories of the patients. The radiologic criterion for the diagnosis of diverticular disease was the presence of one or more visible diverticula.

RESULTS

The prevalence of diverticular disease increased with age (Figure 1). No diverticula were found earlier than the fourth decade of life.

The sigmoid colon was the most common anatomic site for diverticula (seen in 85% of patients with diverticula). Other sites, in order of decreasing frequency, were descending (56%), transverse (32%), and ascending colon (32%).

Forty-one of the 102 patients had diverticula on barium enema. Sixty-seven had a positive smoking history. The percentage of patients with a smoking history was identical in patients with diverticula to those without diverticula (Table 1).

The incidence of diverticular disease did not change with increasing numbers of cigarettes smoked (Table 2).

DISCUSSION

The data in the present study are in general agreement with other studies with respect to age distribution and anatomic site of diverticula (2,4,11).

The data failed to provide evidence that diverticular disease is associated with a history of smoking or the number of cigarettes smoked in a lifetime. There are many difficulties that arise when undertaking experimental work into the effects of cigarette smoking, which were well recognized in a study that reviewed cigarette smoking and inflammatory bowel disease (12). For example, there are in excess of 3900 chemicals in cigarette smoke, and it is perhaps naive to propose an effect due to one component (13).

The endpoint chosen for this study was the absence or presence of diverticula. Barium enema is a widely used and sensitive measure of diverticula (3,14). No attempt was made to quantitate the number of diverticula nor the severity of symptoms. Thus it is possible that the study was not sufficiently sensitive, although this is unlikely since the number of patients with diverticular disease did not increase with the number of cigarettes smoked.

The most evident source of error in this study is selection bias, as only patients who needed a barium enema were included. However, most data on

TABLE 2
Relationship between cigarette pack-years and the incidence of diverticulosis

Pack-years	No. of patients	Percentage with diverticulosis
0	35	40
0-9	16	25
10-19	11	55
20-29	6	50
30-39	10	33
40-49	7	43
50-59	5	40
60-69	5	80
70-79	1	100
80-89	2	50
90-99	0	0
>100	4	0

diverticular disease have been collected in this way (4). The finding that 67% of patients in this study had smoked cigarettes in their lifetime is consistent with the current estimated prevalence of 35% in the general population (15).

The physiologic effects of nicotine have not been studied extensively in man and thus it is possible that levels during smoking are not high enough to stimulate the colon significantly. There is controversy (6) about the interpretation of the data in unanesthetized animals (8) in which the effect is explained by catecholamine release from peripheral adrenergic nerves and the adrenal medulla, causing relaxation of the proximal colon (16).

In summary, in patients undergoing barium enema, no association was demonstrated between the presence of colonic diverticula and a history of cigarette smoking.

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