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Prevalence and Pattern of Colonic Diverticular Disease in Asymptomatic Indian Immigrants in the U.S.A.

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Aim: To evaluate the prevalence of colonic diverticulosis in asymptomatic Indian immigrants in New Jersey. **Materials and Methods:** The data is gathered from reports of screening colonoscopy performed in Indian immigrants older than 50 years. **Results:** The prevalence of colonic diverticulosis in Indian men (26.8%) and women (22.6%) is higher than in previous reports, but lower than in the native born U.S. population. The prevalence of right-sided diverticular in Indians (30%) is higher in Indians than in controls (14%). **Conclusion:** The Indian immigrants have a much higher prevalence of diverticular disease than what was previously reported. The factors influencing the change are hypothetical.

Painter and Burkitt, in 1971, postulated on diverticular disease of the colon as a 20th century problem and a dietary fiber deficiency disease (1,2). The dietary fiber hypothesis was supported by human and animal studies (3–5). Burkitt noted that the disease is so rare it is almost a clinical curiosity in Africa and Asia. Subsequent epidemiological studies have led to the current opinion that 1) diverticular disease is linked to decreased consumption of fiber in the western diet (“a disease of western civilization”). 2) the prevalence of the disease steadily increased in the 20th century. 3) the prevalence steadily increases as age advances to involve nearly 66% of the population after 65 years of age 4) in the large majority, diverticular disease is asymptomatic. 5) the disease is

extremely uncommon in Afro-Asian countries attributed to a fiber rich diet (1–6).

The initial data collected in the last 5 decades from many Afro-Asian countries, often based on clinical impressions, has not been carefully revalidated. Five decades ago, the data was mostly based on autopsy studies. Barium enema studies were seldom performed in the older adult. Life expectancy was short. In the last few decades, the prevalence of diverticular disease in many Asian countries has shown a substantial increase, because of better diagnostic studies and/or because of a true increase in prevalence (7–10).

The data from the Indian subcontinent has also shown a similar change of increase in prevalence (11,12). However, most of the information is from surgical studies (13) or barium enema examinations performed solely in symptomatic individuals (11,12). Thus, errors in the evaluation of the prevalence is to be expected in reports from developing nations where imaging studies and/or colonoscopy are not as frequently performed as in the affluent nations of the west, particularly in asymptomatic, older adults.

Screening colonoscopy that is routinely performed in the U.S. provides us an opportunity to accurately estimate the prevalence of diverticular disease based on

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direct visualization of the colon. Routine screening colonoscopy in asymptomatic individuals is not performed in India; hence the prevalence of any colonic disease in the asymptomatic population is not available. In this study, our aim is to evaluate the prevalence of diverticular disease of the colon in the Indian immigrant population in the United States. Central New Jersey has one of the highest concentrations of immigrants from India. The aim of this study is to assess the prevalence of colonic diverticulosis in asymptomatic, first generation, Indian adults above the age of 50 of the Indian diaspora.

MATERIALS AND METHODS

In this retrospective study, data from two endo-surgical centers located in Middlesex County of New Jersey was collected from colonoscopy reports, procedures performed for colon cancer screening in asymptomatic Indian immigrants above the age of 50 years. Colonoscopy was performed as part of age-specific colon cancer screening program as recommended by practice guidelines. Patients of Indian origin were identified by surname and forename as in other similar studies (9). This method has been shown to have excellent basis in previous studies. Control patients age matched, gender matched were the Caucasian patients who underwent screening colonoscopy. The location of diverticula on the right and/or left side of the colon was also noted. The prevalence of diverticular disease in the 6th, 7th, and 8th decades in both groups, in men as well as women, was compared. Statistical significance was estimated using chi square analysis.

RESULTS

The results are tabulated in Tables 1–3.

Since many patients had right-sided as well as left-sided diverticula, the total number of the two is greater than the number of patients studied.

Table 1.
Prevalence of Diverticular Disease in First Generation Indian Immigrants to the United States, Age 50–80, Based on the Results of Screening Colonoscopies Performed at Two Endo-Surgical Centers in Middlesex County, New Jersey

Age (in years)	Total Number (n)	Diverticulosis	No Diverticulosis	Percentage (%) of D+
A. Men:				
50–60	123	32	91	26.0%
61–70	72	25	47	34.7%
71–80	55	10	45	18.2%
Total:	250	67	183	26.8%
B. Women:				
50–60	72	16	56	22.2%
61–70	47	11	36	23.4%
71–80	36	8	28	22.2%
Total:	155	35	120	22.6%

*D+ indicates the presence of diverticula.

The results thus show that the prevalence of diverticular disease in Indians is higher than in previous reports. Although left-sided diverticulosis is the most frequent, the prevalence of right-sided diverticulosis is higher in Indians than in the western patients.

DISCUSSION

Based on data collected from screening colonoscopy performed in asymptomatic first generation immigrants from India, we have noted that diverticular disease of the colon among Indians in the U.S. is much higher than in many previous reports, yet significantly lower than in Caucasians. The prevalence of right-sided diverticulosis in Indians is much higher than in Caucasians as in previous reports (8,9). The observations indicate a better assessment of the prevalence of the disease in asymptomatic Indians in the U.S. and suggest an increase in the prevalence of the disease compared to many previous reports although not all (9,11–13). The results also reflect the growing number of elderly Indians being subjected to colonoscopic observation in the U.S. but not elsewhere.

Many recent studies have re-examined the earlier data reported from Afro-Asian countries (8). In one

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Table 2.
Prevalence of Diverticular Disease in Caucasian Patients, Age 50–80,
Based on the Results of Screening Colonoscopies Performed at
Two Endo-Surgical Centers in Middlesex County, New Jersey

<i>Age (in years)</i>	<i>Total Number (n)</i>	<i>Diverticulosis</i>	<i>No Diverticulosis</i>	<i>Percentage (%) of D+</i>
A. Men:				
50–60	127	84	43	66.1%
61–70	73	47	26	64.4%
71–80	47	29	18	61.2%
Total:	247	160	87	64.8%
B. Women:				
50–60	107	69	38	64.5%
61–70	57	36	21	63.2%
71–80	44	27	17	61.4%
Total:	208	132	76	63.5%

*The differences are statistically significant for all the categories.

study from Perak, Malaysia analyzed colonoscopic data of 410 consecutive multi-racial Asian patients (8). (The term Asian includes people from the Indian sub-continent in contrast to the usage of the term in the U.S. to indicate people of the far eastern countries.) Diverticula were present in 22 out of 147 (15%) of Chinese, 14 out of 153 (9%) of Indians, and 5 out of 110 (4.5%) of Malays. Thirty-six patients had (88%) diverticula only on the right side. Another study from Singapore looked at autopsy data and reported that in 19% of patients over the age of 14 had diverticulosis (10). Chinese men had significantly more diverticular

disease than Malaysian men and Indian men. There was preponderance of right-sided diverticular disease. The authors concluded that diverticular disease is not as uncommon as it was reported in earlier studies (10).

The data on the prevalence of diverticular disease in Indians is meager or mostly based on barium enema studies performed solely on symptomatic individuals. The studies reported on the one end that diverticular disease is “extremely rare” to the other end that it is “as frequent as in the west” (2,11,14). Painter and Burkitt, in their earlier communication reported that in 1975, the Indian physicians could not find any reported case from major medical centers (1,2). Surprisingly during the same period in 1976, Antia and Desai reported the disease to be frequent (11,14). The wave of popularity of fiber hypothesis supported publications indicating low prevalence of the disease. A 1989 study from India examined the barium enema images and noted colonic diverticulosis only in 2.4% of patients, and mostly on the right side. However, a recent study based on barium enema examinations in symptomatic patients from Chandigarh showed an overall prevalence of 3.2% (12). The frequency of diverticulosis in barium enema studies increased from 0.3% among individuals in the

Table 3.
Prevalence of Diverticular Disease of the Colon in Indian and Non-Indian Patients on the Right and/or
Left Side of the Colon Found by the Use of Screening Colonoscopies Performed at Two Endo-Surgical Centers
in Middlesex County, New Jersey

	<i>Number of Patients with Right Sided Diverticular Disease</i>	<i>Number of Patients with Left Sided Diverticular Disease</i>	<i>Total Number of Patients with Diverticular Disease</i>	<i>Percent of Patients with Right Sided Diverticular Disease</i>	<i>Percent of Patients with Left Sided Diverticular Disease</i>
Indian	30	82	112	26.8%	73.2%
Caucasian	14	92	106	13.2%	86.8%

3rd decade to 32.4% in patients above the age of 60. Most patients were from the city, vegetarians, and belong to the upper socio-economic strata. The frequency of patients developing complicated diverticular disease was 39.2%, not very different from the incidence in the west. Although sigmoid colon was the most common sight of diverticula there was a relative preponderance of right-sided diverticula. As in our study, another study on complicated diverticular disease in patients in New Delhi also indicated an increasing prevalence of the disease (13).

Our study and other recent observations by experts in India show that there is a changing scenario with regard to the prevalence of colonic diverticulosis in Indians. Colonic diverticulosis is not very rare in Indians in the U.S. although the present data still shows a lower prevalence than in Caucasians. The pathogenesis of the change in epidemiology is hypothetical. If dietary fiber deficiency is the sole or predominant factor in the pathogenesis, one might postulate an undetected decrease in the consumption of total fiber in expatriate Indians. It might also reflect the decreased consumption of the right kind of fiber in the diet (soluble vs. insoluble). If fiber deficiency is only one of the many factors in the pathogenesis of diverticulosis, we have to identify other factors. There is also a probability that the prevalence of diverticular disease has not really changed, but that previous reports markedly underestimated the prevalence. A sufficient number of elderly subjects were also perhaps not included due to lack of facilities for imaging studies, unwillingness of the older adult to undergo diagnostic studies, the short life expectancy in those days and, above all, a lack of resources.

The observation that Hawaiian Japanese who followed a western diet had a higher prevalence of diverticulosis of the large bowel than native born Japanese (15) always prompts the question whether the Indians who have migrated to the U.S have similarly changed to a western diet deficient in fiber. Although we have not looked at the data on dietary changes of the population in our retrospective study, our impression, based on the proliferation of Indian grocery stores and the easy availability of Indian foods in the U.S. and personal contacts with the Indian diaspora, is that the large majority of Indians, particularly the older adults, have not changed their dietary pattern. Most of the

Indians continue traditional Indian foods. We admit that studies on comprehensive analysis of food consumption are needed. Future studies should also look at non-dietary factors in the pathogenesis of development of diverticular disease. The risk factors and pathophysiology of progression from asymptomatic diverticular disease to diverticulitis also needs to be studied. The pathogenesis of increased frequency of diverticulosis on the right side is not explained by our study or other similar studies. ■

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