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Current trend of colonic diverticulosis in patients undergoing colonoscopy in a tertiary care hospital in Northern India

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ABSTRACT

Background: Diverticular disease of the colon has a wide geographic variation and is a very common cause of hospital visits and admissions in the west. Contrary to this there is scarce data on colonoscopic prevalence of diverticular disease from our country. **Aims and Objectives:** To determine the prevalence of colonic diverticulosis and concomitant colonoscopic pathologies among patients undergoing colonoscopy in a tertiary care gastrointestinal endoscopy setting in Northern India. **Materials and Methods:** All adult patients who underwent colonoscopy for various indications and were diagnosed to have colonic diverticulosis from August 2016 to December 2019 in the Department of Gastroenterology, Shifa Medical centre, Srinagar, Kashmir, India were included in the study. **Results:** Out of a total of 4500 colonoscopic procedures, diverticulosis was seen in 190 cases with an overall prevalence of 4.2%. Fifty-six percent of these were males and 44% were females. In 77 (40.52%) patients diverticulosis was seen in left colon, in 72 (37.89 %) in right colon and in 41 (21.57 %) diverticulosis was noted in pancolonic distribution. Adenomatous polyps were seen in 27 % of the cases. **Conclusion:** Colonic diverticulosis has very low prevalence in this northern Indian state. Adenomatous polyps are commonly associated with this condition.

Key words: Diverticulosis; Prevalence; Polyps, Srinagar; Northern India

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INTRODUCTION

Diverticular disease of the colon is among the most prevalent conditions in Western society and is among the leading cause for hospital visits and admissions.[1] Besides being an important cause of hospital admissions it is a significant contributor to healthcare costs in Western and industrialized societies.[2,3]

Colonic diverticulosis (CD) can present with a wide spectrum like diverticulitis (acute/chronic), Symptomatic uncomplicated diverticular, segmental colitis associated with diverticula, diverticular bleeding and perforation.

The prevalence of CD is age-dependent and has been increasing from 5% by the age of 40 years to 65% at 80 years of age.[4] Diverticulosis prevalence shows wide geographic and ethnic variability and is considered to be low in Asian population. In India the prevalence is reported to be low based on the scant literature available.[5,6] Diverticulosis is mostly an acquired disease. Increasing age, low fiber diet, weakening of the colonic wall and altered neuromuscular activity are considered as the major predisposing factors involved in the pathogenesis of diverticulosis. But in recent years, the pathogenesis of CD has been explained on different axis, like environmental and genetic susceptibility factors[7] also has an important role in the development of diverticular disease of colon as seen by the association of diverticulosis with certain well-defined genetic diseases like Ehlers–Danlos syndrome [8] and renal polycystic disease.[9] Initially diverticulosis was described in older patients only especially in patients over

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70 years old. With increasing age, structural alterations are known to occur in the colonic wall collagen and elastin which leads to loss of tensile strength and resultant susceptibility to diverticulum formation.[10] But recent published data by Katz et al.[11] reported the occurrence of aggressive forms of the disease with higher chances of recurrences in younger patients.

In this study we aimed to determine the prevalence of colonic diverticulosis and concomitant colonoscopic pathologies among patients undergoing colonoscopy in a tertiary care gastrointestinal endoscopy setting.

MATERIALS AND METHODS

The case records of all colonoscopic examinations performed in adult age group (≥ 18 years age) from August 2016 to January 2020 were analyzed to note the presence of diverticulosis in the department of gastroenterology at Shifa Medical centre Srinagar Kashmir, India. Shifa medical centre is a high volume tertiary care and referral centre for gastrointestinal diseases. Patients with prior colonic resection, incomplete examination or inadequate bowel preparation were excluded from the study.

Diverticulosis was defined as the presence of colonic diverticula irrespective if these are clinically silent, symptomatic or complicated.[12]

Gender, age and distribution of diverticulosis were recorded. Age was divided into a categorical variable consisting of five groups as follows: ≤30, 31 to 40, 41 to 50, 51 to 60, ≥61 years old.

The location and number of diverticula was recorded. For the purposes of this study, we defined the right side of the colon as the cecum, ascending and transverse colon and the left side as recto-sigmoid and descending colon, pancolonic if both the segments had diverticulae. If an individual had undergone two or more colonoscopies during the study period, all examinations were considered together as one examination. In addition we also took into consideration presence of concomitant colonoscopic findings like polyps and malignancies.

Statistical analysis

The data was analyzed on the SPSS version 16.0 (SPSS, Inc., Chicago, IL, USA) and frequency analysis performed. Continuous variables are presented as mean ± standard deviation and categorical variables as number of patients and percentages in parenthesis. Continuous data were analyzed using independent t test. P-value below 0.05 was considered significant.

Ethical clearance

This study protocol was started after approval by the hospital Ethical Committee. Infomed consent was taken from all the patients before enrolment.

RESULTS

This study was a retrospective study in which colonoscopies done in our hospital over a period of thirty-six months were analysed. A total of 4500 colonoscopies were studied, among them 190 (4.2 %) cases revealed presence of diverticulosis of the colon. Mean age of diverticulosis in our study was noted as 55.38 years. Higher incidence of diverticulosis was seen with increasing age with 2 % in the age group < 30 years to about 5.8 % >60 years (Table 1).

There was slight male dominance in the overall colonoscopies with 56 % males and 44 % females. Colonic diverticulosis was almost equal among both the genders with total prevalence of 4.14 (82/1980) in females about 4.28 % (108/2590) among males (Table 2).

As per location in 77 (40.52 %) patients diverticulosis was seen in left colon, in 72 (37.89 %) in right colon and in 41 (21.57 %) diverticulosis was noted in pancolonic distribution.

Most common additional finding associated with diverticulosis was presence colonic polyps (mostly adenomatous) in approximately 30 % patients and two patients had associated colorectal carcinoma.

DISCUSSION

Colonic diverticulosis (CD) is characterized by multiple saccular out-pouchings of one or more layers of the large bowel wall. They can be either of the false (containing the mucosa and muscularis mucosa) or of the true (containing

Table 1: Age distribution of the patients with diverticulosis

Age group (years)	Number of colonoscopies	Colonic diverticulosis N (%)
<30	450 (10)	9 (2)
31-40	720 (16)	18 (2.5)
41-50	1170 (26)	46 (3.9)
51-60	1350 (30)	70 (5.2)
≥61	810 (18)	47 (5.8)
	N=4500	N=190 (4.2)

Table 2: Sex-wise distribution of the patients

	Total colonoscopies (n=4500) (%)	Colonic diverticulosis n (%)
Male	2520 (56)	108 (4.28)
Female	1980 (44)	82 (4.14)

all layers of the large bowel wall) type. The former type is acquired, while the latter type is congenital. Since CD patients have no specific clinical symptoms, it is difficult to distinguish CRD from other large bowel diseases and the final diagnosis often relies on colonoscopic findings. Diverticular disease (DD) represents a serious burden to health care systems.

Diverticulosis prevalence shows wide geographic and ethnic variability and is considered to be low in Asian population. In 1975, Painter and Burkitt[13] observed that incidence was less than 0.3%. However, recent studies indicate an increased prevalence in India as well. The prevalence rate reported by Goenka et al[5] from Chandigarh is 3.2%. Kamalesh et al[6] from south India reported 9.9% prevalence. But the overall reported prevalence rate in India is considerably low compared to other countries. Our study is first of its kind from north India on this problem. In our study we noted prevalence of 4.2 % in patients undergoing colonoscopic examination for various indications. This is lower than that noted in Indian studies as well as reports in the western countries.

A number of epidemiological studies have been reported on the prevalence of diverticulosis in Asian and Western population. In Western populations, colonic diverticula are estimated to occur in 5 % of the population by the age of 40 years and up to 65 % at 80 years.[4] In a prospective study of 624 individuals undergoing screening colonoscopy in the United States, 260 (42 percent) had colonic diverticulosis.[14]

Miura et al from Japan reviewed 7,543 barium enema examinations between 1982 and 1997 and reported a prevalence of 22.8 % in males and 15.5 % in females.[15] Chia et al from Singapore and Chan et al from Hong Kong reported a prevalence of 20 % and 25.1 % respectively based on barium enema examinations.[16, 17] Colonoscopy findings were reviewed in two recent studies one from Malaysia and the other from South Korea and they reported a prevalence of 10 % and 12 % respectively.[18,19] This possibly reflects a higher prevalence of colonic diverticulosis in urbanized Indians. In another study from mainland China,[20] the prevalence of colonic diverticulosis was found to be very low at 1.97% with 85.3% located on the right-side.

Our state is the northern most state of India. The main dietary pattern of our region has remained stable over last many decades characterized by high intakes of rice, fresh leafy vegetables, low-fat red meats, poultry and fish and low intakes of wheat flour and maize/coarse grain. Besides more than 80% of the population have agriculture as their main source of economy with most of them using traditional methods for farming. These factors have lead to a lower risk of obesity, hypertension, and diabetes. These factors may explain the lower risk of diverticulosis in the present study. Additionally recent reports suggested that overweight, obesity and physical inactivity are an increased risk for diverticular disease.[21- 23]

In the recent times the role of fibre content in diet has also been debated and two large cross-sectional studies by Peery et al could not find a protective effect of dietary fibre. In their cross-sectional study containing 2108 patients from the Vitamin D and Calcium Polyp Prevention study,[24] a fibre-rich diet was not associated with a decreased risk for diverticulosis (odds ratio (OR) 0.96); in their second cross-sectional study[25] containing 2104 patients from the Diet and Health Study those patients within the highest quartile of fibre intake were found to have greatest prevalence of diverticulosis. The varying prevalence of diverticulosis may also be attributed to different race, genetic predisposition,[26] dietary habits and lifestyle.[27]

Peery et al[24] found that non-white participants showed a 26% lower risk of diverticulosis towards whites, suggesting how race was a risk factor independent from diet, smoking and other lifestyle factors. Strate et al[8] confirmed that genetic factors contribute to diverticular disease susceptibility in a population-based study of twins and siblings. Recently alcohol intake is found to be an independent predictor for colorectal diverticulosis in asymptomatic subjects[28] and higher rate of admissions due to colonic diverticular disease.[29] Altereation in colorectal motility by alcohol could be mechanism for this increase in diverticulosis.[30]

The location of the colonic diverticula in our patients is different from the Western population, in whom diverticulae occur on the left side in 85 %.[4, 31,32] In our study, left colon diverticula were seen in 40.52 % of patients and right colon disease was seen in 37.89 % and pancolonic in 21.57 %. Right sided diverticulosis was relatively more common as compared to west confirming the findings of other Indian studies.[5,6] Right colon disease was seen in 60 % to 85 % of study population in several Asian studies.[16-19]

The prevalence of diverticulosis increased with increasing age, which is observed in our group of patients as well as in other studies from all over the world.[4,5,19]

Right sided colonic diverticulosis tends to be more common in younger age groups,[20] has an early peak and may well have a pathogenesis different from left-sided disease. Additionally majority of the right sided diverticulosis might be self-limiting [33] and congenital[34,35] and less commonly related to dietary fiber contents.

Colonic pathologies associated with colonic diverticulosis

The current study observed a higher frequency of colonic polyps in these patients as depicted in Table 3. Majority of

them were adenomatous in nature. A variable data exists regarding the concomitant colonoscopic findings in patients with colonic diverticulosis. A Chinese study[36] found higher frequency of colonic polyps (51.05%) associated with colonic diverticulosis followed by haemorrhoids (6.15%), colorectal cancer (2.56%), melanosis coli (1.68%), and ulcerative colitis (1.37 %). Another study [37] reported higher prevalence of colonic polyps in these compared with patients without diverticula (26.2% vs 17%). But they reported a significantly lower incidence of colorectal cancer among them (Table 4).

The current study based on review of colonoscopy findings in a tertiary gastroenterology centre has shown a very low prevalence which is still lower comparable with most reports from other Asian countries.[15,16] This cannot be explained on the basis of environmental factors like dietary habits only because this part of India consumes low fibre diet as compared to the south India. Possible explanation could be to consider diverticulosis as a complex genetic disease resulting from environmental factors interacting with multiple susceptible genes and disease modifiers.

The strength points of this study include a large sample size that gives the study enough statistical power and all diverticulosis are diagnosed by endoscopy which may reduce the study heterogeneity.

Limitations of the study

The limitation of the present study is that it is a hospital-based single centre study only recruiting patients who required colonoscopy for gastrointestinal symptoms. We agree that a wide population based study would be necessary to establish the population prevalence of this condition in this part of the world but we have to agree that the actual prevalence of colonic diverticulosis is difficult to determine, because most people with colonic diverticula are asymptomatic and may not present for colonoscopy.

Table 3: Distribution as per the location in the colon

Site of colon	Frequency	Percentage
Right colon	72	37.89
Left colon	77	40.52
Pancolonic	41	21.57
Total	190	100

Table 4: Associated endoscopic findings in patients with colonic diverticulosis in our study

Associated endoscopic findings	Frequency (n)	Percentage (%)
Hemorrhoids	22	24.44
Adenomatous polyps	52	27.3
Hyperplastic polyps	6	3.15
Colorectal carcinoma	2	1.05

CONCLUSION

We conclude from our study that prevalence of colonic diverticulosis is very low in this northern part of India the reason for which cannot be based only on dietary habits. There could be complex interactions involving environmental factors interacting with multiple susceptible genes and disease modifiers.

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Author's Contribution:
SAS, BAK, SAZ - Concept and design of the study; prepared first draft of manuscript; **SAS,ZIK,SSL,IRW,AIS,ZAW -** Interpreted the results; reviewed the literature and manuscript preparation; **SAS,ZIK,SSL,IRW -** Concept, coordination, review of literature and manuscript preparation; **SAS,BAK,SAZ -** Statistically analysed and interpreted, preparation of manuscript and revision of the manuscript.

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