

## Diverticular disease of colon: Changing trends

**Ajithakumari K., Philip Umman, Roshan Varkey, Deepak Johnson,  
Geetha Gopal, Abraham John**

### ABSTRACT

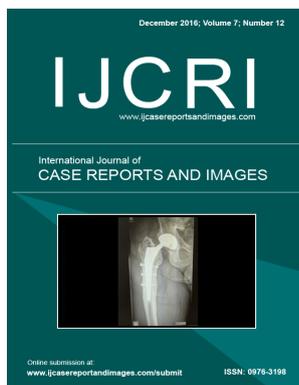
**Introduction:** Diverticulosis of the colon with all its complications is a well-known entity with a high prevalence rate among the western population affecting mainly the older people. But in the Asian countries it is far less common and the true incidence of diverticulosis in India is still not known. Only less than 25% of these cases become symptomatic and so far only very few studies have been conducted among our population.

**Case Series:** Here we report four cases of symptomatic diverticular disease of the colon who reported to a tertiary care centre in South India with different patterns of presentations within a period of five-month.

**Conclusion:** This report is a reflection of the increasing incidence of this alarming clinical condition among our population. It is high time that we should identify these cases early and take measures to prevent the evolution of diverticulosis into complicated diverticular disease with all its morbidity.



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**Introduction:** Diverticulosis of the colon with all its complications is a well-known entity with a high prevalence rate among the western population affecting mainly the older people. But in the Asian countries it is far less common and the true incidence of diverticulosis in India is still not known. Only less than 25% of these cases become symptomatic and so far only very few studies have been conducted among our population. **Case Series:** Here we report four cases of symptomatic diverticular disease of the colon who reported to a tertiary care centre in South India with different patterns of presentations within a period of five-month. **Conclusion:** This report is a reflection of the increasing incidence of this alarming clinical condition among our population. It is high time that we should identify these cases early and take measures to prevent the evolution of diverticulosis into complicated diverticular disease with all its morbidity.

**Keywords:** Complicated diverticular disease, Diverticulosis, Diverticular disease, Diverticulosis associated colitis

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## INTRODUCTION

Diverticular disease of colon is largely reported from developed countries and the prevalence among Asians were considered to be very low. But recent studies indicate the changing trends in the incidence of this condition over the last two decades. Consumption of a diet having a low fiber content was attributed to have major role in the development of diverticular disease and the changing trends among Asians is considered to have a strong association with adoption of western dietary habits.

A diverticulum develops when the mucosa and submucosa herniate through the muscle wall of the colon through weak areas. This usually occurs between the taenia coli and at points where the vasa recta enter through the muscle coat. Diverticulitis develops when there is superadded obstruction and infection in a diverticulum. Diverticulosis mostly is an under researched and underestimated condition due to its predominantly asymptomatic nature. Available studies showed a wide

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geographic and ethnic variation in its incidence [1]. In general, diverticulosis has the highest incidence in the United States and Canada reaching 50% in the age group 50 and above. Diverticulosis usually affects individuals over the age of 40 years. The prevalence rate before the age of 40 is only 5% whereas this increases to 65% in those above the age of 65 [2]. Only 10–25% of those with diverticulosis develop features of diverticulitis and present with symptoms. Herein, we report four cases of symptomatic diverticular disease who got admitted to our hospital within a span of five months and with different patterns of presentations.

## CASE SERIES

### Case 1

A 74-year-old male presented with severe abrupt bleeding per rectum and passing of blackish stool since one week. The patient was anemic and comorbidities were Type II DM and hypertension since six years. Hemoglobin level at the time of admission was 7.6 g/dL for which 2 units of packed red blood cells given (PRBC). Ultrasound imaging was suggestive of diverticulosis and colonoscopy showed diverticulosis with bleed in the diverticulae. After initial conservative management, laparoscopy assisted right hemicolectomy was done and multiple diverticuli were identified in the cecum and proximal transverse colon. The specimen received in the pathology department was a segment of proximal colon and ileum, measuring 30 cm in length. On opening the mucosa of the colon showed multiple diverticular openings, with the orifices plugged with blood clot. On cutting through these openings showed outpouches through the colonic wall containing hemorrhagic material. Histology showed these outpouches with features of inflammation and hemorrhages (Figure 1) thus confirming the diagnosis of diverticular disease with diverticulitis.

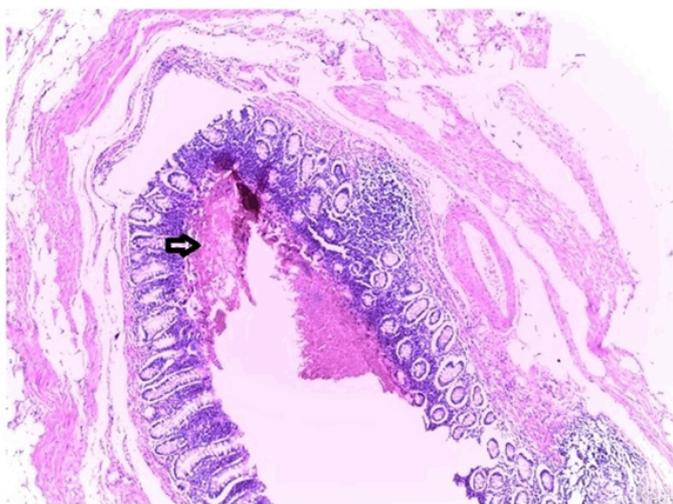


Figure 1: A diverticulum containing blood (H&E stain, x10) Case 1.

### Case 2

A 77-year-old male who was a known case of sigmoid diverticulosis of left colon since more than a year presented with pain abdomen and difficulty in passing stool since one week. On examination there was an ill-defined soft, tender swelling at left iliac fossa with ill-defined borders. Comorbidities were systemic hypertension since 10 years and bilateral inguinal hernia for which he had undergone hernioplasty twice before. On contrast-enhanced computed tomography (CECT) scan, the diagnosis was complicated sigmoid diverticulitis with contained perforation, fistulous communication with anterior abdominal wall and left paracolic gutter collections. Symptomatic improvement was achieved with conservative management which included antibiotics, fluids, hematinics and nutritional supplements with an advice for healthy diet, regular exercise and to avoid strenuous exercise. The patient was discharged and re-admitted after three weeks for sigmoid resection and hernia repair.

The specimen received in the pathology department appeared as an adherent mass which on opening showed a segment of colon with narrowed lumen, mucosa showing multiple outpouches into the wall (Figure 2). The bowel wall appeared markedly thickened with edema and fibrotic areas. Serosal aspect showed circumscribed necrotic areas forming abscesses surrounded by marked fibrosis with involvement of periserosal tissues. Histopathological diagnosis was complicated diverticular disease with diverticulitis, foci of suppuration and abscess formation (Figure 3) undergoing organization with serosal and periserosal involvement.

### Case 3

A 69-year-old female presented with right sided abdominal pain and melena since one week with one episode of vomiting. She was severely anemic, had

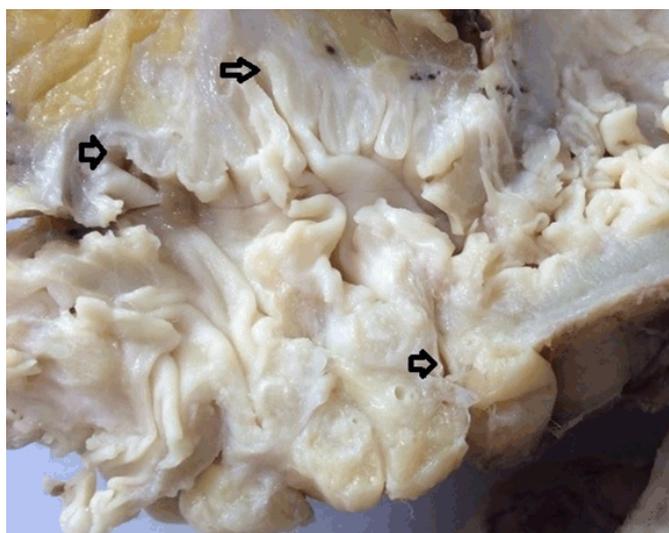


Figure 2: Gross morphology of Case 2 showing the narrowed lumen, thickened wall and diverticulae.

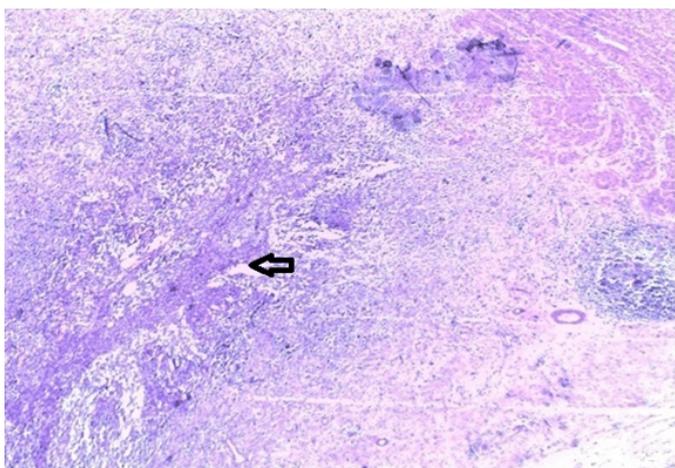


Figure 3: Abscess formation in the wall of colon (H&E stain, x10) (Case 2).

decreased appetite and dyspnea on exertion since few years. Comorbidities were Type 2 DM, hypertension, coronary artery disease and dyslipidemia since 16 years on treatment. Initial hemoglobin level was 6.9 g/dL for which she was given two units of PRBC. Stool occult blood was positive. The CECT showed multiple small contrast/air filled outpouchings in the sigmoid colon suggestive sigmoid diverticulosis. Colonoscopy showed diverticulosis with features suggestive of sigmoid colitis either ischemic or diverticuli related. Histopathology of colonoscopic biopsy from the sigmoid colon was compatible with diverticulosis associated colitis (Figure 4). With no ischemic features. She was treated conservatively without any surgical intervention.

#### Case 4

A 77-year-old female presented with complaints of bleeding per rectum following a one-week history of loose stools. She is a known case of hypertension and

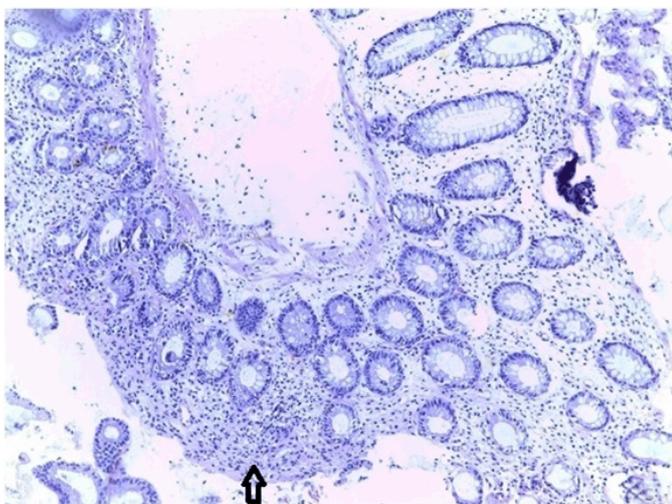


Figure 4: Histopathology of showing features of colitis (H&E stain, x10) Case 3.

coronary artery disease with previous surgical history of hernioplasty and hysterectomy. The hemoglobin level at the time of presentation was 7.9 g/L and she was given one unit of PRBC. Colonoscopy showed diverticulosis in sigmoid colon with multiple superficial ulcers involving the colon. Biopsy showed features of colitis with ulceration. Patient was treated conservatively and discharged with an advice to do elective sigmoidectomy.

## DISCUSSION

Diverticulosis just means the presence of diverticula without any symptoms whereas diverticulitis refers to inflammation of the diverticula with or without complications and the term diverticular disease refers to clinically significant and symptomatic diverticulosis manifesting itself as an illness.

Diverticular disease can manifest as

1. Symptomatic uncomplicated diverticular disease.
2. Recurrent symptomatic uncomplicated diverticular disease.
3. Complicated diverticular disease with abscess formations, peritonitis, obstruction, fistulas and hemorrhages.
4. Diverticular disease associated (segmental) colitis which refers to chronic active colitis in the inter-diverticular mucosa and this could be symptomatic or asymptomatic.

Of the four cases we reported here, Case 1 was a complicated diverticular disease with severe lower GIT bleeding which was treated surgically. Patients with complicated diverticular disease can present with massive lower gastrointestinal bleeding in 3–5% of cases [3]. This is attributed to segmental weakening of the arteries in the wall of the diverticula followed by rupture into the lumen. Risk factors for this bleeding include atherosclerosis, ageing and the use of NSAIDs. When these older patients present with abrupt and painless bleeding per rectum, the most important differential diagnosis clinically is carcinoma colon. Vascular ectasias of the colon may also present in a similar way. Case 2 also was a complicated diverticular disease but with a different pattern of presentation. Complicated diverticular disease of this type with abscess formations, fibrosis, fistulas, peritonitis and obstruction clinically appear as an indurated mass that may be confused with carcinoma. Another important diagnosis with such a clinical presentation is Crohn's disease where pericolic abscess and multiple fistulous tract are common. This type of a clinical presentation in diverticulosis is initiated by inflammation followed by microperforations at the fundus of the diverticulum which later evolve into abscess formation with all its complications. With Case 3 and Case 4 the clinical manifestations were less severe and were treated conservatively.

Endoscopic biopsy showed features of chronic colitis in both Cases 3 and 4. In the absence of clinical and

endoscopic data, it would be difficult to distinguish, diverticulosis associated colitis from idiopathic inflammatory bowel disease due to overlapping morphological and clinical features. For a better and precise interpretation of the mucosal biopsy it is essential to know the gross endoscopic findings of the colon in such cases which often show limitation of the inflammatory process to segments of the colon in relation to diverticulosis with rectal sparing. Diverticulosis associated colitis is considered as a unique variant of chronic colitis most commonly seen in the sigmoid colon and the most important differential diagnosis is ulcerative colitis [4]. In order to arrive at a correct diagnosis and for appropriate management, it is important to take into consideration the clinical radiological and endoscopic findings before making a pathology interpretation.

All four patients in this series were older patients age ranging from 69–77 years with equal number of male and females. In three of our cases, sigmoid colon was primarily involved with right sided involvement in the other patient. Just by studying four patients as in this case series it is not possible to derive conclusions regarding the age, sex or site of involvement of diverticular disease. In the Asian population Miura et al. [5] has reported a higher incidence of right sided diverticulosis. More studies are needed to assess the significance of the location of diverticulosis in the colon and its possible relation with complications.

### Colonic diverticulosis in India

In 1975, Painter and Burkitt [6] in their review of colonic diverticular disease stated that they could not find any case reported from India. According to their personal communication with major Indian hospitals they 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. [7] from Chandigarh is 3.2 %. Kamalesh et al. [8] from south India reported 9.9% prevalence. But the overall reported prevalence rate in India is considerably low compared to other countries (Table 1).

### Pathogenesis

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. Along with all the environmental and other factors genetic susceptibility 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 [9]. Strate et al. [10] reported a higher incidence of diverticular disease in patients with Ehlers–Danlos syndrome. Association of renal polycystic disease and diverticulosis was reported by Lederman et al. [11].

Table 1: Prevalence of diverticulosis in different countries [1].

<b>EUROPE</b>	
UK	47%
Germany	21–49 %
Norway	32.1%
Finland	12–50%
Greece	22.9%
Poland	21.8%
Romania	1.29–2.5%
Italy	19.4–51.4%
<b>USA</b>	
Hispanic patients	43%
African American patients	57.7%
<b>AFRICA</b>	
Nigeria	9.4 %
Kenya	6.6 %
Egypt	2%
<b>ASIA</b>	
Thailand	28.5%
Singapore	20%
South east Asia	8.0%
Hong Kong	25.1%
Japan	20.3%
<b>ARAB countries</b>	
Saudi Arabia	7.5 %
Iran	2.4%
Jordan	4.0%

Initially diverticulosis was described in older patients only especially in patients over 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 [12]. But recent published data by Katz et al. [13] reports the occurrence of aggressive forms of the disease with higher chances of recurrences in younger patients. What appears more important than age is how much damage is done to the colonic wall by prolonged exposure to other predisposing factors. The traditional pathogenetic concepts which involve mainly the life style factors have been challenged recently. Studies from USA by Peery et al. [14] in 2013 made entirely different conclusions by stating that fiber intake is positively linked with development of diverticulosis. Similarly, epidemiological studies have come out with conflicting results with regard to the possible relation between red

meat intake and development of diverticulosis. Novel aspects suggested in the pathogenesis of diverticular disease include intestinal motility disturbances due to serotonin imbalance and intestinal innervation disorders.

How these patients with diverticulosis progress to symptomatic diverticular disease is currently an active topic of debate and needs further studies to clarify what is still unknown. Recent studies have correlated specific genes called the TNFSF 15 in the evolution of diverticular disease from diverticulosis [15].

## CONCLUSION

Colonic diverticulosis and its complications are not rare in the Indian subcontinent and in the appropriate clinical settings this should also be considered in the differential diagnosis of abdominal disorders. Awareness of this condition and its preventive aspects among our population is also equally important. Management decisions also have to be made on a case by case basis.

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## Author Contributions

Ajithakumari K. – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Philip Ummen – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

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Deepak Johnson – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Geethagopal – Conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Abraham John – Conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

## Guarantor

The corresponding author is the guarantor of submission.

## Conflict of Interest

Authors declare no conflict of interest.

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