

Diverticular disease of colon in Port Harcourt, Nigeria.

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Abstract:

Background: Diverticular disease (DD) is traditionally reported to be rare among Africans with typical high fibre diet. There is increasing westernization of diet and availability of modern diagnostic facilities including colonoscopy in sub-Saharan Africa. This study aims to report a recent presentation pattern of DD at lower gastrointestinal endoscopy in a Nigerian metropolis.

Materials and Methods: A cross-sectional study of consecutive patients undergoing colonoscopy at a referral endoscopy facility in Port Harcourt Rivers State Nigeria, from March 2014 to December 2018. DD cases were grouped as: uncomplicated diverticulosis (A); symptomatic uncomplicated DD (B); complicated DD (C); and segmental colitis associated with diverticulosis (D). The variables collated included demographic, indications, and endoscopic findings. Statistical analysis was done using IBM SPSS Statistics for Windows, version 20 Armonk, NY.

Results: A total of 363 colonoscopies were performed with 50 (13.8%) cases of diverticular disease recorded. The age range of DD cases was from 27-88 years (mean 62.5 ± 11.9). There were 39 males and 11 females; a male to female ratio of 3:1. Bleeding per rectum was the most common indication for colonoscopy. Eight (16.0%) and 6 (12.0%) cases showed evidence of inflammation and bleeding respectively; >5 diverticula were seen per patient in 16 (32.0%) cases. The sigmoid colon was the most affected site - 25 (50.0%) cases.

Conclusion: Diverticular disease is not uncommon. A male sex predominance is the trend with the left side of the colon the most affected site.

Keywords: Diverticular disease; Colon; Colonoscopy,

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I. Introduction

Diverticula are mucosal herniations in the intestinal wall muscle layer. These outpouchings may form at weak points in the walls of either the small or large intestines; the majority occur in the large intestine.¹ Diverticulosis is one of the most common findings on colonoscopy in Western countries with an increase in prevalence related to aging.² In US, diseases related to diverticula was the 16th most common cause of death among gastrointestinal, liver and pancreatic diseases in 2012 with crude death rate of 0.9 per 100,000.³ More so, it is estimated to account for \$100 million (USD) in medication costs.⁴ In Asia, diverticulosis has a prevalence of approximately 13% to 25% and tends to have predominantly right-sided colonic distribution, unlike the Western world where left-sided diverticula are much more common.⁵

Diverticular disease (DD) is traditionally believed to be rare among Africans with typical high fibre diet. Historically, Painter and Burkitt in 1971 were the first to hypothesize that DD was due to a low fibre diet, which would foster shorter transit time through the colon based on his observation that native Africans had a low incidence of diverticular disease.⁶ Diverticular disease is a complex disease comprising uncomplicated diverticulosis and, in about 20% of cases, is associated with complications. These include bleeding and acute or chronic inflammation (diverticulitis) that may or may not be complicated by abscess formation, fistula formation, bowel obstruction or perforation.⁷ Newer taxonomy of diverticular disease includes symptomatic uncomplicated diverticular disease; and segmental colitis associated with diverticulosis.⁸ A correct diagnosis of DD is challenging for clinicians without colonoscopy. The patients' symptoms and laboratory findings may be unspecific and overlap with other gastroenterological conditions (e.g. inflammatory bowel disease) and, in young women (<40 years), also with gynaecological disorders.⁹

There is an emerging adoption of western diet and lifestyle in low- and middle- income countries of sub-Saharan Africa experiencing rapid urbanization. A change in disease pattern of DD in these countries is not unlikely. More so, there is an increasing utilization of gastrointestinal endoscopy in Nigeria for diagnosis and treatment of pathologies.¹⁰ This paper aims to report the presentation pattern of diverticular disease at lower gastrointestinal endoscopy in Port Harcourt metropolis of Nigeria.

II. Materials and Method

This a cross-sectional observational study on patients referred and undergoing colonoscopy in a private referral health facility in Port Harcourt, Rivers State, Nigeria.

Study design: Retrospective cross-sectional study.

Location: A multi-disciplinary ambulatory care Endoscopy facility in Port Harcourt, Rivers State Nigeria. Port Harcourt is the fifth largest metropolis in Nigeria located in the Niger delta region.

Study Duration: March 2014 to December 2018.

Patient selection: An approval from the Ethics Committee of the studycentre was obtained. The inclusion criterion was all confirmed consecutive cases of diverticular disease from colonoscopy in patients presenting for endoscopy. The DD cases were grouped as: uncomplicated diverticulosis (A); symptomatic uncomplicated DD (B); complicated DD (C); and segmental colitis associated with diverticulosis (D). A Microsoft Excel spread sheet was used to collate data from records on sociodemographic, indications, co-morbidities, clinical and endoscopic findings in patients diagnosed with diverticulosis/diverticular disease.

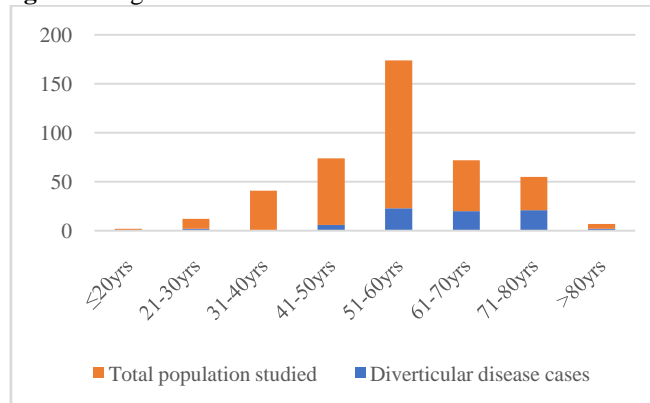
Procedure: All colonoscopies were performed by the same endoscopist (ERO) using a video colonoscope (Karl Storz GbmH & Co., Tutlingen, Germany). A digitally guided insertion of endoscope was performed under conscious sedation with opioid analgesic and benzodiazepine. The colonoscope was advanced by upward and downward deflection of the wheel and torque through the rectum with the use of the right/left wheel as needed further on. A gentle air insufflation or water distension was used to dilate collapsed bowel with the primary goal of reaching the caecum. The colon was carefully inspected during the withdrawal phase. To aid description, the colon was divided anatomically into two segments: left side (rectum to splenic flexure); and right side (caecum, ascending and transverse colons). The patients were observed for a minimum of 15 minutes post procedure before discharge.

Statistical analysis: Data was analysed using IBM SPSS Statistics for Windows version 20 Armonk, NY. The mean age and standard deviation were calculated. The categorical variables were analysed in simple percentages.

III. Results

A total of 363 colonoscopies were performed during the study period. There were 50 (13.8%) cases with diverticulosis/diverticular disease and the age range was 27-88 years (Figure 1). The mean age was 62.5 ± 11.9 years; mode 58 years and median age 60 years. There were 39 males and 11 females; a male to female ratio of 3:1.

Figure 1: Age and sex distribution of diverticular disease cases

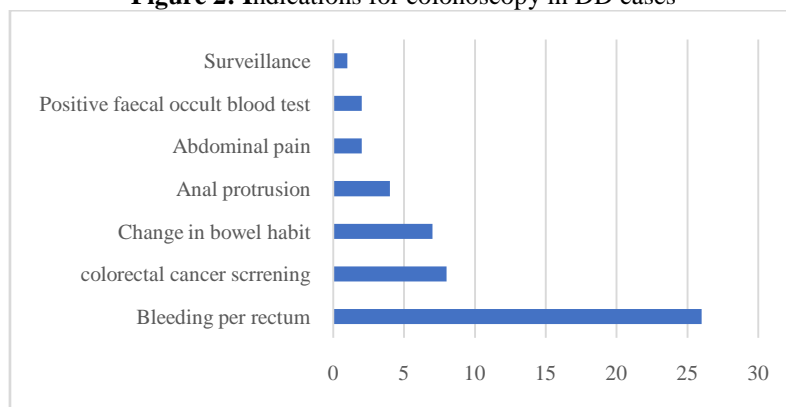


Bleeding per rectum was the most common indication for colonoscopy-30 cases (75.0%). The other indications are as shown in Figure 2. Diverticular disease was uncomplicated in 40 cases (Groups A and B). The other classes of DD as recorded are as shown in Table 1. Eight (16.0%) and 6 (12.0%) cases showed evidence of inflammation and bleeding, respectively. There were 2 cases of colorectal cancer coexisting with diverticula in unrelated colonic segments.

Table 1: Group classification of cases

Disease group	Number of cases	Percentage
A-Uncomplicated Diverticular disease (Diverticulosis)	34	68.0
B- Symptomatic uncomplicated Diverticular disease	6	12.0
C- Complicated		
Inflammation with evidence of bleeding	4	8.0
No inflammation with evidence of bleeding	2	4.0
D- Segmental colitis with diverticulosis	4	8.0
Total	50	100

Figure 2: Indications for colonoscopy in DD cases



In terms of distribution, more than 5 diverticula per patient were seen in 16(32.0%) cases. Multiple outpouchings were seen in all colon segments per patient (pan-colonic) in 10(20.0%) cases. Excluding the pan-colonic diverticula cases, a left-sided colonic predominance of outpouchings was observed in 15(30.0%) cases. The anatomic site distribution is as shown in Table 2. In all, the sigmoid colon was the most affected site in 25(50.0%) DD cases.

Table 2: Anatomic distribution of diverticula recorded

Site (n-50)	Frequency	Percentage
Pan-colonic	10	20.0
Right colon	18	36.0
Left colon	20	40.0
Mixed (Right and left colon)	2	4.0
Total	50	100

IV. Discussion

Diverticulosis is thought to occur because of abnormalities of peristalsis -intestinal spasms, intestinal dyskinesia. This results in exaggerated segmental muscle contractions, elevated intraluminal pressures, and separation of the colonic lumen into chambers or high segmental intraluminal pressures.¹¹ From this study, the frequency of diverticular disease at lower gastrointestinal endoscopy was 13.8%. The condition when diagnosed was uncommon (2%) below 40 years of age and most prevalent in the sixth decade of life (46%) with a male sex predominance. A similar male predominance and peak age pattern are recorded in symptom-based colonoscopy studies from Nigeria, Uganda and Zambia.^{12,13,14,15} In the US, the prevalence of diverticulosis increases with age; about 10% in adults under 40 years and up to 70% in those 80 years of age or older.¹¹ From a UK population-based study, female predominance and increased occurrence with age is reported.¹⁶

At diagnosis, the number of diverticula per case can vary from one to literally hundreds; they can occur anywhere in the colon but mainly present in the left colon in Western populations.¹⁷ There was a marginal left colon predominance distribution pattern recorded with the sigmoid colon as the most common site involved. Of all the patients with mucosal outpouchings, 20% had diverticula spread evenly throughout the colon (pan-colonic). A study from another metropolis in Nigeria similarly observed a left sided predominance but a 35% pan-colonic involvement.¹⁷ Similarly, a report from South Africa on black patients with DD recorded a 27.7% pan-colonic involvement.¹⁸ Western population with a high prevalence of DD similarly has increased predilection for the sigmoid, in part explained by Laplace's law, such that pressure is proportional to wall tension and inversely proportional to bowel radius.¹⁶ As the sigmoid colon is the segment of colon with the smallest diameter, it is also the segment with highest intraluminal pressure.

Most individuals with diverticulosis, however, do not have any symptom as in majority of cases seen. Some patients, however, may experience unexplained abdominal pain or cramping, alterations in bowel habits, or painless bloody stool. Bleeding per rectum was the leading indication for colonoscopy (75.0%). This is like in other African colonoscopy studies on DD.^{12,13,14,15,18} Hernia through the muscularis propria in colonic diverticula occur at the weak sites of perforation by vasa recta. As a result, the vasa recta in proximity become separated from the intestinal lumen by a layer of mucosa alone and are therefore exposed to a greater amount of injury. This results in eccentric intimal thickening, thinning of the media, and ultimately segmental weaknesses along these arteries which predispose the vasa recta to rupture and bleed into the intestinal lumen. In the setting of this study, there was a consistent pattern of delayed presentation (>48hrs) of patients with bleeding per rectum for endoscopic evaluation. Frequently, there were coexisting haemorrhoids detected. The findings of diverticulosis

with no evidence of bleeding or inflammation with coexisting haemorrhoids in delayed presentation after bleeding episode challenges an accurate diagnosis of the cause of bleeding episode. A detailed history may serve as a pointer to the leading suspicion. Endoscopic clip application is effective in treating bleeding DD.

Diverticulitis was not commonly detected in the study population. An obstruction of diverticula from faecolith or inspissated food matter leads to increased intraluminal pressures and resultant inflammation.¹⁹ Focal necrosis will ultimately lead to perforation, when mild, this is walled off by pericolic fat and mesentery (Hinchey I classification). In some cases, perforations may lead to pelvic abscess or fistula formation and purulent peritonitis (Hinchey II and III respectively). When the perforations are large and uncontained there is resultant faeculent peritonitis (Hinchey class IV). Laparoscopic lavage has been reported to have similar results to open resection in Hinchey class I.²⁰ Currently, professional bodies advise against routine resection and instead propose an individualised approach.²¹ This, in part, reflects an appreciation that complications of diverticulitis typically manifest on the initial presentation and the morbidity and mortality of elective procedures for diverticulitis can be significant.²² The options during surgery include resection plus end colostomy (Hartman's procedure) and resection plus primary anastomosis. Two distinct indications for elective surgery are: prophylaxis against recurrent attacks/ complications and second; surgery for ongoing symptoms that impact quality of life (QoL).²³

The limitation to this single-centre study is a detection/referral bias as colonoscopy was performed on a majorly symptomatic population; thus, may not reflect an overall population prevalence of 13.8% as recorded. A population-based prevalence study of asymptomatic diverticulosis is needed.

V. Conclusion

Diverticular disease is not an uncommon endoscopic diagnosis in this Nigerian metropolis. Males are predominantly affected with bleeding per rectum as the most common indication leading to the detection of DD. The sigmoid colon is the most affected site with a predominant left-sided colon distribution.

References

- [1]. Slack WW. The anatomy, pathology, and some clinical features of diverticulitis of the colon. *Br J Surg.* 1962; 50(220):185-190.
- [2]. Martel J, Raskin JB. History, incidence, and epidemiology of diverticulosis. *J Clin Gastroenterol.* 2008; 42(10): 1125–1127.
- [3]. Peery AF, Crockett SD, Barritt AS, Dellon ES, Eluri S, Gangarosa LM, et al. Burden of gastrointestinal, liver, and pancreatic diseases in the United States. *Gastroenterology* 2015; 149(7):1731-1741.e3.
- [4]. Everhart JE, Ruhl CE. Burden of digestive diseases in the United States part II: lower gastrointestinal diseases. *Gastroenterology* 2009; 136(3): 741-754.
- [5]. Sugihara K, Muto T, Moroka Y, Asano A, Yamamoto T. Diverticular disease of the colon in Japan. A review of 615 cases. *Dis Colon Rectum* 1984; 27(8):531-537.
- [6]. Painter NS and Burkitt DP. Diverticular disease of the colon: A deficiency disease of Western civilization. *Brit Med J.* 1971; 2(5759):450–454.
- [7]. Strate LL, Modi R, Cohen E, Spiegel BM. Diverticular disease as a chronic illness: evolving epidemiologic and clinical insights. *Am J Gastroenterol.* 2012; 107(10): 1486–1493.
- [8]. Rezapour M, Ali S, Stollman N. Diverticular Disease: An update on pathogenesis and management. *Gut Liver* 2018; 12(2):125-132.
- [9]. Stollman NH and Raskin JB. Diagnosis and management of diverticular disease of the colon in adults. *Ad Hoc Practice Parameters Committee of the American College of Gastroenterology.* *Am J Gastroenterol* 1999; 94(11): 3110–3121.
- [10]. Ray-Offor E, Igwe PO. Utilization trend of gastrointestinal endoscopy in Port Harcourt Southern Nigeria. *Niger J Gastroenterol Hepatol* 2018; 10(2):71-77.
- [11]. Jacobs DO. Clinical practice. Diverticulitis. *N Engl J Med.* 2007; 357(20):2057–2066.
- [12]. Kayamba V, Nicholls K, Morgan C, Kelly P. A seven-year retrospective review of colonoscopy records from a single centre in Zambia. *Malawi Med J.* 2018; 30(1):17-21.
- [13]. Kiguli-Malwade E, Kasozi H. Diverticular disease of colon in Kampala, Uganda. *Afr Health Sci.* 2002; 2(1):29-32.
- [14]. Oluyemi A, Odege E. Diverticular disease at colonoscopy in Lagos State, Nigeria. *Niger Med J.* 2016; 57(2): 110-113.
- [15]. Alatise OI, Arighabau AO, Lawal OO, Adetiloye VA, Agbakwuru EA, Ndububa DA. Presentation, distribution pattern and management of diverticular disease in a Nigerian tertiary hospital. *Niger J Clin Pract.* 2013; 16(2):226-231.
- [16]. Kang JY, Hoare J, Tinto A, Subramanian S, Ellis C, Majeed A, et al. Diverticular disease of the colon--on the rise: a study of hospital admissions in England between 1989/1990 and 1999/2000. *Aliment Pharmacol Ther.* 2003; 17(9):1189-1195.
- [17]. Morris AM, Regenbogen SE, Hardiman KM, Hendren S. Sigmoid diverticulitis: a systematic review. *JAMA* 2014; 311(3): 287–297.
- [18]. Vally M, Koto MZ, Govender M. An investigation of diverticular disease among black patients undergoing colonoscopy at Dr George Mukhari Academic Hospital Pretoria, South Africa. *S Afr Med J.* 2017; 107(2):137-139.
- [19]. Bucket TO, Stollman NH. Diverticular disease of the colon. In: Feldman M, Friedman LS, Brandt LJ (eds) *Sleisenger and Fordtran's gastrointestinal and liver disease: pathophysiology, diagnosis, management*, Volume 2, 10th edition. Philadelphia: Elsevier, 2014.
- [20]. Afshar S and Kurer MA. Laparoscopic peritoneal lavage for perforated sigmoid diverticulitis. *Colorectal Dis.* 2012; 14(2):135–142.
- [21]. Stollman N, Smalley W, Hirano I. American gastroenterological association institute guideline on the management of acute diverticulitis. *Gastroenterology* 2015; 149(7): 1944–1949.
- [22]. Van Arendonk KJ, Tymitz KM, Gearhart SL, Stem m, Lidor AO. Outcomes and costs of elective surgery for diverticular disease: a comparison with other diseases requiring colectomy. *JAMA Surg.* 2013; 148(4): 316–321.
- [23]. Cuomo R, Barbara G, Pace F, Annesi V, Bassoti G, Binda GA, et al. Italian consensus conference for colonic diverticulosis and diverticular disease. *United European Gastroenterol J.* 2014; 2(5):413–442.